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A NEW METHOD OF SOLAR PHOTOGRAPHY.

A discovery, or invention, of the highest importance, in connection with photographing the sun, was communicated by Dr. Huggins to the Royal Society at its last meeting, and it bids fair to forward the progress of research into questions of solar physics in a manner and to an extent that previously had scarcely been hoped for. Our readers are aware of the great interest that has attached to total solar eclipses on account of certain phenomena being visible which at no other time had been observed; and, though the progress of science had enabled methods to be devised which permitted some of the phenomena once seen and noted to be observed and photographed in ordinary daylight, a certain class of them had, up to the time of Dr. Huggins' communication, been beyond the power of observation.

The phenomena we speak of are those long streamers, flames, and beams which, forming a visible crown of glory round the sun during an eclipse, have received the appropriate designation of the "corona." The other phenomena accompanying an eclipse, but which need not here be noted, have been seen without the intervention of the moon through the medium of the spectroscope; but, as the corona gives, in the main, a continuous spectra such help would be useless. Professor Young says in his work, *The Sun*:—"We must evidently wait a while for a solution of the problems presented by the beautiful phenomena. * * * Unless something like this can be done the progress of our knowledge must, probably, be very slow; for the corona is visible only about eight days in a century in the aggregate, then only over narrow strips of the earth's surface, and but from one to five minutes at a time by any one observer." "Something like this" has been done by Dr. Huggins, again by photographic agencies.

The corona consists of a number of remarkable radial filaments, beams, and sheets of pearly white shooting out, sometimes to several degrees, beyond the sun's border, and for a long time they have formed a puzzle to all astronomers. Though the spectrum they give has bright lines it is, in the main, continuous. The beams, and rifts between them, though sometimes evanescent in character, usually last for hours, perhaps for days and weeks, and, when seen from far distant parts of the earth's surface, possess the same appearance.

They are invisible during ordinary daylight by reason of the extent to which the atmosphere of the earth is illuminated, the effect being that of a bright fog or haze, which hides these less luminous appendages of the sun, just as a slight fog upon the earth would hide the light of a taper at a few yards, though it fail to obscure a brilliant gas-burner. This atmospheric illumination or glare is the result of the atmospheric particles scattering the sun's light, which are thus taken into the eye at the same time as the coronal light, and are powerful enough to hide it. For many years Dr. Huggins has been trying to eliminate this atmospheric effect in one direction without success, owing to many causes which need not be here enumerated; but it lately occurred to him that the very causes of this want of success for the end he was seeking would in the case of the corona be of actual service.

The corona abounds with those rays which have most effect upon the photographic plate—the rays about G and H—while the atmosphere contains an even admixture of all sorts. Dr. Huggins tried the qualities of various glass to find one that only allowed these G and H rays to pass through, and by this means lessened the disturbing effect of the atmospheric glare by robbing it of most of its light while allowing the chief constituents of the coronal light to pass through unweakened, and so able to overpower the residual atmospheric rays of the same kind. So far so good; but for eye observation these particular rays are the weakest, and as it was desired to obtain a knowledge of faint and shadowy variations that exist upon the coronal forms—which variations were, further, of a transient nature—Dr. Huggins came to the conclusion that eye observations would not answer his purpose. Photography, however, taking the greatest cognisance of these very rays, offered the necessary aid; and thus, by placing coloured glass at some point between the sensitive plate and the sun, the atmospheric rays were expected to be insufficient to prevent a photograph of the corona to be secured.

Before detailing the effects obtained it will be well to describe the actual means employed. Not being sure of the degree of correction for chromatic aberration in a photographic lens he first employed, Dr. Huggins made use of a reflecting telescope without eyepiece, there being, as our readers are aware, no chromatic dispersion when using a mirror in place of a lens. A camera was put at the side of the telescope, and the rays reflected by a plane mirror into the camera, where they were focussed upon the ground glass. The coloured glass was placed immediately in front of the ground glass, or the sensitive plate when *in situ*. The glass chosen was pot-metal violet of a particular shade selected, ground, and polished, several pieces being used together and temporarily cemented by castor oil to avoid reflections from their surfaces. The sensitive plates were gelatine, and were backed by a solution of asphalte in benzole. The front of the telescope was provided with an adjustable shutter; not fitted directly upon the telescope, but connected with it by a piece of black velvet—a wise precaution to prevent vibration.

Dr. Huggins states that in his later experiments he used a solution of permanganate of potash held in a vessel with true, carefully-polished sides. This, he states, "may be considered as restricting the light to the desired range of wave length, since light transmitted in the less refrangible part of the spectrum does not effect the photographic plates." Though he does not speak of any special plate, we can scarcely infer that he is unacquainted with the fact that ordinary gelatine plates have a range of sensibility for rays well into the red direction. The exposures given were varied in length—some so short that the sun's proper light was photographed and others so much longer that the sun's image was reversed, and the reversal extended to the lower part of the corona.

It is singular, in experiments of such moment, that, to prevent any possible halation, the precaution was not adopted of obscuring by some means the actual image of the sun itself, though such a method is alluded to in the latter part of the paper, as being probably an advantageous one. It states that the climate of our conntry is very unpropitious, there being few days of sufficient atmospheric clearness to allow these photographs to be taken; still, though the experiments were only begun in May, twenty successful photographs were secured.

With regard to the results obtained the statements in the paper are very guarded. Dr. Huggins says that in all the twenty photographs the coronal form appears to be present. This appearance

does not consist simply of increased photographic action immediately about the sun, but of distinct coronal forms and rays, admitting in the best plates of measurement and drawing from them. This agreement in plates taken on different days "makes it evident we have not to do with any instrumental effect." Professor Stokes writes:—"The appearance is certainly very coronal-like, and I am disposed to think it probable that it is really due to the corona;" and Captain Abney says:—"I think that evidence by means of photography of the existence of a corona at all is as clearly shown in the one case (the eclipse photographs of May last) as in the other." *(Dr. Huggins' New Photographs.)*

We have thus placed in brief before our readers an account of this most interesting and cleverly-devised plan. It is evident that the means we described last week would be well adapted for securing similar photographs with studio appliances on a suitable day; but, whatever optical method be adopted, astronomers, we may be sure, will look forward to a continuance of the study of the phenomena of the corona with eager interest.

"CRYSTAL PAINTING" OR "CRYSTOLEUM."

The system of colouring photographs from the back, after they have been rendered semi-transparent, is an exceedingly old one—almost as old as photography itself—although it has never been extensively practised commercially. As far back as the year 1852 a patent was obtained in this country for the production of coloured photographs by this method, although this was, we believe, by no means the first application of the principle. Again, in 1853 (thirty years ago) within a few weeks of each other, two more patents were obtained for similar methods of colouring. Later on the late Mr. Oliver Sarony took out a patent for rendering photographs transparent after they were coloured, and then backing them up with paper of different tints. The object of this invention is described as being to imitate paintings on ivory.

Since those dates, as the records of the Patent Office show, many other specifications have been taken out for achieving the same ends and in many instances the methods of working are almost, if not quite, identical with the earlier ones. In others the changes have been rung in matters of detail, such as different materials for rendering the paper translucent—mastic varnish, Canada balsam, bees'-wax, paraffine, spermaceti, castor oil, *et hoc genus omne*, have in turn been pressed into service; and, again, using two pictures superimposed instead of a single one, employing oil in place of water colours, the substitution of textile fabrics for paper, &c., &c.

This method of colouring photographs has, at several different periods, been also vended as a secret process, and large sums realised thereby. The names under which it has passed are nearly as numerous as the times it has been re-invented or brought again into prominence. Not alone in England, but on the continent and in America, the process has cropped up, from time to time, under different names, again to sink into oblivion.

On several occasions, when a claim has been put forward for the invention of photographing in natural colours, an investigation into the matter by experts has shown that the pictures are neither more nor less than ordinary paper prints, which have been made translucent, and then the "natural colours" applied to the back of the print—in fact, our old friend again in disguise.

The advantage claimed for this method of colouring is that no skilled work is required, and that anyone can do it; all that is necessary being to apply sufficient paint, the shading and gradation being supplied by the photograph itself. Thus, for the face bright red was thickly laid on; so with other colours for the drapery, background, and accessories.

Now it is manifest that, although somewhat pleasing effects may be produced with some photographs, they cannot be secured with all. For example: if the sitter were possessed of auburn hair, that in the photograph would, of course, be dark, and no amount of lighter colour applied to the back to overcome it would render it the tint of nature. Nor could high lights be strengthened or rendered pure by colour applied to the back; neither could a light dress of a non-actinic colour be successfully treated. Hence it was found necessary to do a certain proportion of work on the face of the print, and, unless some degree of skill was employed here, the result was anything but satisfactory. The effect of these pictures, in most cases, was much enhanced by their being cemented in optical contact with a glass plate.

The most successful results in this direction that we have seen were produced by using two prints—one superimposed upon the other, with a thin glass plate between them. The uppermost one was a very light print on thin paper, rendered transparent, and delicately tinted on the surface, the under one being a much darker print, and very highly coloured, also, on its surface.

With all pictures of this class, if the best result be required, it is essential that a considerable amount of skill be brought to bear on the work, and when this is done we very much question whether, if the same amount of skill had been expended in the ordinary method of colouring a better result would not have been achieved—certainly a more *artistic* picture would have been produced. The most unfortunate part of this process and its varied modifications is that, whatever be the medium with which the print is made transparent, it is generally found that in the course of a very short time it has changed to a disagreeable yellow tint, which, in many instances, is further exaggerated by the fading of the photograph itself.

The latest phase of this "dodge"—for that appears to us a more appropriate term than "process" for this style of colouring—is "crystal painting" or "crystoleum," which during the past year or so has become very popular amongst ladies, as most photographers are aware by the increased demand there is for unmounted prints. Many ladies practice it merely for amusement, while others have been induced to pay liberally for tuition, with the idea of adding to their incomes, in a genteel manner, by colouring for the profession—alas! we fear, too often to meet with disappointment.

In this case two curved glasses are employed instead of one flat one. The *modus operandi* is this: a paper print is cemented in optical contact with the concave side of one of the glasses, and when it is dry the paper is carefully rubbed away, so as to leave only the film of albumen behind, a piece of glass paper being used for the purpose. The print is then rendered transparent and lightly coloured at the back with oil colours, the second curved glass being employed to support the major part of the colour, which is coarsely applied. The two glasses are then fixed together, and the picture placed in a neat frame.

For this process special materials are now being sold at a somewhat high price, but they offer no advantage over those which have been employed of old, and some of which we have enumerated above. With a little experience and a *good photograph* some pleasing—though, possibly, inartistic—effects may be produced by those who have had no art training. A good photograph is an essential, even with those who have the necessary experience, as will be understood when we consider that the purity of the colours applied must, of necessity, be considerably modified by the tinted film of the photograph, however thin it may be, through which it has to be viewed.

With regard to the merits of such pictures many opinions have been expressed. Very recently, we heard an artist remark that, at best, they were only good photographs spoiled. The opinion was expressed by a learned judge in a celebrated lawsuit, a few days back—and he was supported by good authorities—that artists are not, of necessity, the best judges of art. It may be correct in this instance, therefore we shall leave our readers to form their own conclusions on the subject.

In our article in another column, upon Dr. Huggins' invention of a new method of solar photography, we have alluded to Dr. Young's work upon the sun. It is published by Messrs. Kegan Paul and Co. in the "International Series." Its price, being only five shillings, places it within the reach of everyone. It contains information brought down to the latest date upon all facts connected with solar photography, the whole subject being treated with the utmost plainness and simplicity of language consistent with clear-

ness of exposition, while the subject is treated with a lucidity and conciseness which is truly admirable. Those of our readers who take an interest in scientific photography should become possessed of the volume, which is illustrated with engravings, wood-cuts, and photographs to explain everything that is necessary, altogether forming an excellent volume at a low price.

Most of the volumes of the same series deserve equal praise, and we think no photographer who takes an intelligent interest in the science can consider his library complete without a copy of the above, and of the volume on "The New Chemistry," by Professor Cooke.

A writer in a scientific contemporary points out a peculiar defect in lenses which exists in nearly every instrument he has examined; and, though for ordinary photographic purposes it would not be of any consequence, cases might arise in which the defect would be serious. Hence we may make a note of it in these columns, to preserve a memorandum for future reference. The defect consists in the imperfect annealing of optical glass, which results in serious disarrangements of the results of polarisation experiments, the lens itself producing polarisation effects—to speak exactly, "a plain polarised incident beam is elliptically polarised on emergence from it."

Mr. Sabine has lately invented a new photometer for measuring the intensity of light by means of a wedge of glass of neutral tint, which promises to be a useful instrument. We may say, *en passant*, that we believe much more may be done for photographic purposes by specially-devised contrivances for measuring the intensity of different portions of the spectrum than has hitherto been attempted. The present instrument, however, is not made on these lines; but it possesses a useful addition for ascertaining approximately the amount of light which passes through any coloured glass—for example, orange glass—this being done by furnishing the eyepiece with a rotary disc containing small panes of white and different-coloured glasses, either of which can be interposed at pleasure.

The accounts which continue to be received from the various Venus-transit parties at the more distant stations seem to be almost uniformly satisfactory, a full degree of success having been met with both in the results of photography and in measurements. It is now expected that the distance of the sun can be certainly estimated within 300,000 miles.

According to *The Times* Geneva correspondent, Englishmen have, in comparison, little reason to complain of the wet weather of the past season; for, from that authority's statement, we learn that up to the end of November there had been in that region only fifty days of sunshine to two hundred wet days.

We recently commented upon the absurdity of the assertions made that signalling from the top of the Pyramids to Alexandria had been performed; the rotundity of the earth, we stated, would stop the rays long before they reached their destination. It now turns out that instead of to Alexandria—some hundred and twenty miles away—the signalling had been from the top of the Pyramids to Cairo, which is only one-tenth part of that distance, or about twelve miles.

According to M. A. P. N. Franchimont, benzole is capable of dissolving some of the compounds of mercury used in photography; thus the chloride, bromide, and iodide are slightly soluble in the cold, but to a far greater extent when the menstruum is made warm. This fact is interesting in view of the possible use of a benzole varnish upon a negative intensified with mercury.

The favour with which photography was once received by the fairer portion of the community—many lady amateurs having attained considerable skill in manipulation—seems slowly and gradually to have cooled for reasons more probably than any connected with soiled fingers. So far they do not seem to have taken up gelatine with any degree of ardour, though there is no doubt that they will do so sooner or later; for with ferrous oxalate almost perfect cleanliness of fingers and dress may be secured. In the old process of iron development, followed by pyro. as an intensifier, fingers of appalling blackness were obtained without the slightest difficulty, and many were the nostrums recommended to clear the stains away. Few of them were entirely efficacious, owing to a failure to appreciate the fact that such stains were not the same kind as those produced during printing operations. The stains in developing were not only silver stains, but pyro. stains. With gelatine plates and pyro. development the stains are only of pyrogallic origin; and yet, strange to say, the knowledge of how to remove them is by no means universal. We were asked, last week, by a gentleman—a *quasi* professional—how we kept our hands clean, as he got his "in such a mess with pyro." Apart from the question of gloves or mittens—most desirable adjuncts to the dark room—it was quite news to him to learn that a ten-per-cent. solution of citric or hydrochloric acid would remove every trace in a fraction of the time needed by the time-honoured pumice.

GREEN FOG.

Few of your readers have not probably, at some time or another, met with the aggravating defect in gelatine plates known generally by the name of "green fog." Plates both of commercial and of amateur preparation are frequently affected with this disease—a defect the more exasperating because of the mystery surrounding its appearance and the length of time the question of its origin has baffled inquiry. No defect that has troubled the gelatine plate user has given rise to so much speculation—frequently of the most contradictory character—than has this, the *bête noir*—rather the *bête vert*, or shall we say *rouge*—of the photographer of the present day. But, while some little light has been shed on its nature and cause, and still more on the reason of its appearance, our knowledge on the subject is still in a most unsatisfactory condition, and much more has yet to be done before it is likely to be banished for ever from our studios. In a mild form we see it as a light deposit, bright green by reflected light, pink by transmitted rays, the colours being in fact complementary, reminding one of the exactly similar phenomena shown by eosine, chlorophyll, and other natural and artificial dyes. At other times, when present in larger quantity, we see it as a dirty, whity-brown or bronze deposit by reflected light, and, when held between the eye and the lamp, of a gorgeous ruby hue like the glass of our dark rooms. Less frequently it takes upon itself other, but kindred, forms—one condition under which it appeared to the eye of the writer being a bluish-green by reflected, and orange by transmitted, light. In all cases it appears least on those parts most acted on by light, thus confirming what has been frequently noticed in another manner, that it may, unless very virulent indeed, be almost, if not entirely, avoided by giving the plate a longer exposure.

But this leads us to the question—"Under what circumstances may green fog arise?" This may, perhaps, be more readily answered by a general consideration of the varied experiences from time to time published.

In the first place: we know that some batches of plates are, to all ordinary experience, perfectly free from it, other batches showing it in a more or less marked degree. It is certain, therefore, that the primary cause is in the emulsion itself. Secondly: no such phenomenon has been noticed in connection with collodion, and it would appear, therefore, that green fog is a phenomenon connected purely with gelatine. But it must also be remembered that collodion is unable to be used successfully with the strong developers employed for gelatine, and a tendency to green fog in a plate may, probably, be due to some peculiar state of the haloid salt, rendering it particularly susceptible to the action of a strong reducing agent. Thirdly: it seems now to be generally considered that alkalinity in the emulsion during mixing has no small share in producing green fog. The writer's experience strongly confirms this view, not forgetting to add that cooking under such circumstances is almost a *sine quâ non* for its production.

In reference to emulsification with ammonia opinions appear to differ; but the majority appear to favour the view that this method of emulsification is liable to bring about green fog. If this be true, then the time the ammonia is in contact with the emulsion,

and more particularly the temperature during that period, must be no unimportant factors. There is, too, good evidence to show that plates prepared with ammonia, if they are at all liable to fog of any kind, show this tendency to a greater extent the longer they are kept. While the presence of a trace of alkali in an emulsion subjected to the boiling process is an undoubted cause of fog, it cannot be said, on the other hand, that the presence of a trace of acid will entirely prevent it. It is the writer's experience, however, as stated by him at a recent technical meeting of the Photographic Society of Great Britain, that a tendency to green fog is thereby arrested, and that such tendency is still further arrested by the presence of a slight trace of iodine or bromine. In the case brought forward the presence of free iodine was due to the bromide of potassium used containing a trace of bromate. Bromine, being set free from the bromate on the addition of a drop of hydrochloric acid, sets free, in its turn, iodine from the iodide of potassium, the solution of the haloid salts becoming slightly coloured. It remains yet to be seen whether the addition of iodine to an emulsion during mixing is an absolute preventive of green fog. That it will prevent what is known as a tendency to the same I have but little doubt; but since green fog may, under certain conditions, be produced on plates having no such tendency, absolute prevention of it is quite impossible.

Fourthly: "Has the method of mixing anything to do with the appearance of green fog?" It has been considered that green fog is more likely to appear when the gelatine and nitrate of silver are mixed together before adding the bromide; and this opinion is shared by the writer, who considers that green fog is *sometimes* brought about by the presence of some compound formed by the action of a soluble silver salt on gelatine, and which is not decomposed on boiling with excess of bromide alone. Captain Abney's experience, however, is that green fog is less frequent with bromide into gelatine *plus* silver than with silver into gelatine *plus* bromide; and unless he has omitted to take some other cause into account, which is very unlikely, we must come to the conclusion that the mixing has nothing whatever to do with it.

Fifthly: "Has partial decomposition of gelatine any relation to green fog?" In other words—"Can green fog be avoided by removing completely the gelatine used in boiling, and by carefully avoiding all chance of decomposing the gelatine added later on?" Here is an opportunity for those who have tried Mr. W. K. Burton's latest method to give us their results. If immunity from green fog be really ensured by this method we owe a great debt of gratitude to Mr. Burton; but, alas! one complaint of green fog has already reached us.

Sixthly (by-the-bye, I have just had an uncomfortable feeling come over me that I am trying to write a sermon, from which "Good Lord, deliver us!" but as I have begun so shall I continue): green fog only appears with alkaline development. To speak more correctly, the development of green fog can be directly traced to the action of ammonia, or, as Captain Abney states, some solvent of silver bromide in conjunction with a strong reducing agent. Ammonia, pure and simple, will not produce green fog. In conjunction with *any* developing agent it will do so, particularly with ferrous oxalate, to which a *trace* of ammonia may be added without producing a precipitate. Salts of ammonium, in which no free ammonia is present, will not induce green fog; and plates subject to green fog may be developed free from this evil, if ammonium carbonate be used instead of ammonia. Such a developer is, however, comparatively weak. Sulphite of soda is said to produce green fog, but on this point I beg to differ. My reasons for so differing will probably have appeared in this Journal by the time this communication is published. Sulphite can only be said to bring about green fog inasmuch as it renders the development more prolonged, and allows the ammonia and pyro. more time to act. Any other alkali than ammonia—*e.g.*, potash and soda—produce, not green, but grey, fog, whether used with pyro. or oxalate.

Lastly: green fog may be produced on plates having *no usual tendency* to this defect. Captain Abney states that he can bring about green fog on any plate by sufficiently prolonged immersion in the alkaline developer, and that the same thing may be brought about by the action of light during fixing when the plate has not been very thoroughly washed after ammonia and pyro, or on alkaline development of plates which are at all sensitive to such light as passes through ruby glass. But the most powerful producer of green fog is ferrous oxalate, to which ammonium carbonate and ammonia have been added. This is capable of entirely reducing all the silver haloid in a gelatine plate, so that there is none remaining to be fixed out, and I am not unhopeful of turning this to practical account.

Considering the comparative prevalence of green fog of late, one is naturally led to the inquiry whether it really does appear more frequently than in the early days of gelatine. Several considerations would lead us to a contrary opinion. Early defects of a nature likely to hide green fog are now conspicuous by their absence, while photographers are more desirous to possess a clear, bright, and quick-printing plate. These, in conjunction with a rage for rapidity and a fear of over-exposure, are sufficient in themselves to account for the recent alarming spread of the disease. Our present knowledge on the subject may thus be summed up:—

1. That green fog is a tendency possessed by all silver haloids in conjunction with gelatine to become reduced by the action of free ammonia and a developing agent.
2. That this tendency is possessed by some plates in an inconvenient degree, but may, probably, be to a considerable extent overcome by taking precautions to prepare the emulsion acid (if it is to be boiled), and by the addition of a sufficient trace of iodine to distinctly colour the solution of soluble haloids before mixing. This, perhaps, requires confirmation.
3. That green fog may be avoided by longer exposure and more rapid development, by increasing the proportion of bromide in the alkaline developer, or by using ferrous oxalate developer containing a trace of free acid (oxalic, tartaric, acetic, &c.), this latter method being preferable, as it allows of longer exposure.
4. To the above I would add the outcome of Captain Abney's experiments and my own—that no gelatino-bromide plate has been, nor probably will be, prepared which cannot be made to show green fog; in other words, that absolute prevention or *perfect* cure is unattainable.

To those who possess a stock of green-foggy plates I would recommend, if they are very bad, slight exposure to white light and treatment with bichromate. If the evil be only slight, avoid it if you can; should it then appear, cure it, after fixing, with a ferric salt, followed by the ferrous oxalate developer, as recommended by Captain Abney.

In conclusion: permit me to draw your readers' attention to the necessity for publishing their experiences, more particularly in reference to the preparation of the emulsion. Until *all* the circumstances attending symptoms of green fog are known we shall not be able to enjoy even comparative immunity from it.

C. Ray Woods.

SILVER PRINTING—A LAMENT AND A WISH.

I venture to ask you how is it that, with all the improvements in photography, so little progress has been made in the ordinary process of silver printing? We have had, during the thirty years and more since the infancy of photography, progressive advancement in the science of producing negatives. Appliances, manipulative skill, optics, have all contributed, with chemical science, in making photography what it now is up to the stage of the finished negative.

Negatives, as now obtainable by the gelatine process, are as near perfection as anything that, during a long period of the practice of landscape photography as an amateur, I have ventured to hope for. There is scarcely anything wanting. The great desideratum has been a rapid plate that would take, if not moving figures, figures and groups with the shortest possible exposure—a plate that should give all gradations from the highest lights to the deepest shadows, and that a dry plate.

We now have all this and more. We have plates that we can take out at a moment's notice, choose our most favourable opportunity for exposing, and develope at leisure. All the forms that we see before us, animate and inanimate, stationary and moving, we can secure. The passing cloud, the breaking wave, the fleeting effects of the atmosphere, are all on that boxed-up plate, and it only wants observation and skill in development to secure what will be a perfect representation in form and light and shade of what we went out in search of. Let anyone used to the examination of negatives compare those that can be got on a gelatine plate with what we had been obliged to be satisfied with, and he must admit that we have arrived at a stage of perfection that we were scarcely sanguine enough to dream of.

How is it, then, that we have so much dissatisfaction expressed over the results of the gelatine process? The old, experienced wet-plate workers, particularly, who have gone in for the gelatine not less vigorously than they worked the old collodion plates and with equal success, are disappointed with the resulting finished prints, and are tempted for the moment to associate the failure with the negative. There can be no question that the beauty of the finished print is not proportionate to that of the finished negative.

With any of the printing processes on paper with which we are familiar, we quite fail to get the exquisite delicacies that make up the image on the negative. Take the ordinary silver printing on albumenised paper. What improvement has been made? This process and the formula as now worked are precisely the same as those used a quarter of a century ago. An uncertain amount of over-printing is necessary. It *may*, perchance, turn out of the right depth; by over-toning to a rich purple the desired warm browns *may*, perchance (after the bleaching process of the hyposulphite), be obtained. The whole is a matter of uncertainty.

But take the finished print, under its most favourable condition, and compare it with the negative. Where are all the gradations of the clouds gone? Where the tender reflections in the water, the delicate lichens and time-markings on walls and roof, and all the infinite details that go to making the negative so charming? They are obliterated—gone, to a large extent; and often a patch of white paper only represents the lovely blendings of the high lights in the negative.

To prove that they are producible on the paper it is only necessary to examine the print during the printing. When printed to the depth (or just short of it) that one would like it to finish, all the detail will be there—only to be obliterated in the after processes of toning and fixing.

With other printing processes on paper these shortcomings are present in a greater or less degree. So great is this defect felt to be that old workers are tempted to put away their negatives unprinted, and instead of the old social *réunion* to compare notes over prints of work done, the invitation is to "come and see my negatives," which seen, and duly admired, back they go to the plate-rack and are lost to the world.

With all the scientific investigations of late years, why has printing lagged so far behind? What is wanted is a process by which all the beauty and detail of the negative can be reproduced and retained on the finished print—a process by which we can print to the required depth and then stop, and tone to the desired colour and there finish off, without fear of the results of all our care and skill being rendered null and void in the after processes. J. Gale.

GREEN FOG A SILVER COMPOUND.

[A communication to the London and Provincial Photographic Association.]

Mr. Orsman, at a recent meeting, deduced from the following experiment that green fog is due to a staining of the film of a gelatino-bromide plate by a kind of dye produced during the development by pyro.:—One half of a double *carte* plate with green fog was given to Mr. Orsman by Mr. Debenham, and the other half to myself. Mr. Orsman treated his plate first with a solution of chlorine gas in water, and then submitted it to the solvent action of hyposulphite of soda. The effect of the hypo. was to dissolve away the image, but the green fog was quite unaffected.

The experiments I have recently been trying lead me to quite an opposite conclusion; that is, that green fog is due to a compound of silver, and that the veil or fog is removed, if properly treated, by the above-mentioned reagents, provided the chlorine be allowed to act during a sufficiently long time.

The portion of the plate given me by Mr. Debenham was immersed for about one quarter of its length in bromine water, and when the silver had been completely converted into bromide of silver that portion of the plate was plunged into hypo. By this treatment the green fog disappeared entirely, leaving only a faint yellow colouration. The opposite end of the same plate was then placed for a short time in a solution of iodine in iodide of potassium. The action was judged to be complete when the silver was changed from black to white and the shadows stained red by the iodine. On treating this portion of the plate with hypo. the green fog disappeared as before, but the film was stained much deeper than when bromine water was used.

A second green-fogged plate was taken and immersed for about one-sixth of its length in chlorine water. After this had acted for about two or three minutes it was immersed to about a sixth more, and the action continued for a couple of minutes longer. It was then washed, and finally fixed with hypo. The green fog disappeared completely from that part which had been acted on for the longer time, but only partially from the portion which had been left in the chlorine water for a couple of minutes. Bromine water and hypo. produced exactly the same effect on this plate as on the other—that is, completely removed the green fog.

From these experiments—which can be repeated by anyone with, I am sure, the same results—I conclude that green fog is due to silver in a finely-divided state, and not to a change in the gelatine or a staining of the film.

Mr. Orsman further found that chlorine water, followed by hypo., *removed the image*, but left the green fog untouched. In my own experiments in no single case have I been able to completely remove the image; a faint, but perfect, negative image is left, however energetic the solvents may be.

A plate was treated first with iodine in iodide of potassium, washed, and then flooded with a twenty-per-cent. solution of cyanide of potassium. The first effect of the cyanide was to destroy the red colouration due to the iodine and then to dissolve the iodide of silver. Where the high lights of the picture had been there the film was stained yellow, the shadows being colourless gelatine. The whole picture was perfectly distinct when placed on a sheet of white paper. The plate, after washing, was treated with chlorine water, which discharged most of the colour left; and a further application of iodine and cyanide, of the same strength as above, failed to remove or change in any way the colour of the image as left by the chlorine water. When bromine water was used the colour of the image was intermediate in intensity between what it was when iodine and chlorine were employed.

From these experiments I am inclined to think that the image does not consist of a silver compound at all. When examined under the microscope no granularity is visible. It cannot be due to staining of the film, for when chlorine water is used a faint image is still visible; and the staining power of chlorine, if any, must be very feeble indeed. What the image is composed of I am not at present prepared to say; at some future time, however, I hope to be able to tell you a little more concerning some experiments I am making on the same subject. A. Haddon.

OUTDOOR PORTRAITURE.

It may appear that this is rather an unseasonable period of the year to discuss such a subject as the production of portraits out of doors; yet, as it becomes manifest that in the preparations for such work there is a little of the joiner needed, the advantage of making profitable use of the dull winter will be perceived, and the apparent want of appropriateness explained away.

Amongst the large publishing firms the value of outdoor portraiture is fully recognised, it being a well-known fact that, if the best of those photographers waited till they could induce a celebrity to enter their studios for the purpose of being photographed, the portraits of some of our greatest would not be quite so plentiful; and, besides, when it is known to the gentleman whom it is desired should sit that he can be photographed at home, permission is more readily accorded. Mind, this remark is not intended to prevent an effort being made to get a studio portrait, but to show how any objection to sitting, on the ground of the trouble in coming, may be set aside. Get them into the studio by all means if possible, but if they will not consent to their portraits being taken there then do it where you can. It will be found that many may be persuaded to give a sitting at home who would not, or could not, spare the time for a visit to a studio. Even if the publication of the portraits of eminent characters be out of the way of business of the greater number of photographers, there is still an addition to one's income to be made from the ability to photograph invalids, the infirm, and aged, or to visit large mansions (by permission or invitation, of course), camps, matches, or any such places where men do congregate, and who frequently have leisure which they are quite willing to pass in sitting for a portrait. How many of those high in the political world, the church, science, and field sports have been secured at some such gathering, whose pictures are so excellent as to compare favourably with the best studio work! Very often a photographer is instructed to take a group in which there are to be a few notabilities; or, perhaps, with a view to single portraits he proposes a group, and asks permission to take it. Here, then, is the opportnity to cover a few plates, if means be at hand to do it, in the hope that the results will be fairly successful. Many persons may be caught in this way who would, perhaps, never enter a studio.

To successfully practise this class of portraiture requires the possession and exercise of sharp wits to enable the selection of suitable spots, and the adaptation of the means to the end to be rapidly accomplished. In arranging for a sitter much will depend on the complexion. Those of a healthy and florid character will be round and well-modelled if photographed in almost any light; while, on the other hand, those who are pallid and sallow or too brown will necessitate great care in the management of their lighting. This remark is hardly necessary, however, because the difficulties of rendering such subjects have been noticed by all operators of any

experience, who know that even with a good studio, and every appliance for controlling and softening the illumination, the result is not always satisfactory. Whether the place chosen be a shady nook, porch, outbuilding (such as a coachhouse or barn), or a corner, it is easily fitted up with background and furniture; and where no such place is to be found one must resort to a kind of folding-screen for the purpose, in the construction of which there is employment for a few winter evenings.

This screen is best made in pine in the form of slight strainers about six and a-half feet by three feet in dimensions. Five of these are hinged together to fold up, and, when opened out to stand upright, are so placed that two of the middle ones form the back, with another turned to a right angle in front to shield the background on the one side, and two others turned from the opposite edge to the same angle to, as it were, deepen the recess in which the sitter is to be placed to give the shadow required. The tops of these sides should slant upwards towards the camera, and support another slight and suitably-shaped strainer to cover in the top, and being held when in position by having holes through which half-a-dozen iron points on the sides may pass.

This simple arrangement makes a very effective temporary studio, in which I know, from personal experience, that excellent portraits can be produced. It may be erected and arranged with background and accessories in almost any region in three or four minutes, provided there be sufficient space for it and to work the camera in its front. Should the light on the more open side need softening it may be done by hanging up a muslin curtain.

The background is best carried upon a light roller with projecting pins at the ends to rest upon hooks in the interior of the tent. By-the-bye, if the fine woodwork of the strainers be considered cumbersome, the canvas may be made up without them, and erected, tent fashion, on four jointed bamboos kept perpendicular by guy-lines and pegs.

Should there be any choice of site preference ought to be given to that which has any natural advantages to aid in the proper distribution of the light. Shelter from the south, and the placing of the more open side of the tent towards the north, are the principal things to care for.

If the selection of weather be at all at the option of the photographer, it is better to decide upon that when a grey sky or broken clouds prevail. With blue skies there is a great tendency to hardness and heavy shadows, especially if the wind be in the north-east; in fact, the bad effects of this kind of light are more prominent in portraiture than in landscape photography, and how disappointing it is in this latter most of the profession are well aware.

With respect to apparatus: a repeating camera mounted upon a tripod, with a ball-and-socket joint or other adjustable head for levelling, will be found the most convenient. When many portraits are to be taken at one time a few boards might be laid to admit of the use of the ordinary studio stand; but, in a general way, the tripod will answer the purpose best. Unless the exposures are very rapid it will be well to provide a head-rest—one of a simple character, and as light as possible, being what is needed. The whole paraphernalia can then be carried on a small hand-truck or conveyed by rail for a small extra charge. I am speaking from experience, having moved about with appliances of the above description, with all that appertains to the working of 12 × 10 plates by the wet process added.

In placing a sitter in an open doorway—such as that of a porch or coach-house—let him turn himself well towards the interior of the place that the line of sight for the camera may be inclined at about 40° or 45° to the front of the building, and sufficiently far in the interior to be sheltered from all top light above 50° from the horizon. Try to fulfil these conditions when the subject is quite out of doors. Let the spot be as much of a recess as possible, and, whether of trees or shady corners of buildings, endeavour to have the principal illumination obliquely to the front of the sitter, and all very high top light excluded. These points cannot be too carefully considered. JOHN HARMER.

NOTES FROM THE NORTH.

THE almost unprecedented storm through which the inhabitants of the northern metropolis and various other places in Scotland have recently passed has seriously affected all trades and professions, but none more than the poor photographer. Sitters were, of course, not to be expected, and if, impelled by some imperious necessity, they had made their appearance, the snow-clad roofs of most of the studios and the almost constantly prevailing fog were sufficient to almost defy even the most rapid gelatine plates. Within less than half-a-mile of the city, however, all was bright and clear, and the exquisite beauty of the snow-clad landscape, and the charming effect of hoar frost on every branch and twig—more like a scene in fairy-land than a reality—are not likely to be soon forgotten by those who were privileged to see them; and I hope future exhibitions will show that photographers did not let the rare opportunity slip, as such another may not occur during the present generation. Of the various lochs and ponds in the neighbourhood advantage was fully taken by skaters and curlers from dawn till daylight disappeared, and in some cases long after that by artificial illumination; and I was glad to see several of our generally busy, but at present almost idle, photographers turning the opportunity to account by doing a large and, I hope, profitable business in photographing curling clubs and groups of skaters.

If proof were needed that here, at least, dull trade does not depress the spirits, it will be found in an account of the first anniversary dinner of the Photographic Club, recently held at Mrs. Main's, Peacock Hotel, Newhaven. It will be remembered that the Club was organised by a few of the more active members of the Edinburgh Photographic Society, and that its number is limited to thirty, all of whom must be members of the Society, and active practical photographers. The Club takes as its motto, "Without Precedent," as it differs considerably from all such institutions hitherto established. It has neither president nor chairman. The members all contribute work of their own doing during the season, and at the close the contributions are balloted for amongst themselves, and I only give utterance to a pretty generally accepted truth when I say that many pictures recently so distributed were at least equal to anything shown at the late competitive exhibition. The large amount of valuable information evolved at the monthly meetings is strictly confined to the members themselves, as hitherto, at least, a cardinal point in the arrangements is that such meetings shall not be reported.

The dinner in question was served in Mrs. Main's usual well-known style, the room being handsomely decorated from designs by Mr. Jamieson. Behind the chair there depended a large banner on which was emblazoned the King of Clubs, and the motto of the Club, "XXX Without Precedent." Round the walls were arranged shields bearing the arms of several of the Scottish nobility, surmounted by bannerets and trophies.

After dinner a highly-grotesque and laughter-provoking ceremony was gone through, organised by the three executive members, Messrs. Mathison, Jamieson, and Mitchell, who evidently believe in the truth of the couplet—

> "A little nonsense now and then
> Is relish'd by the best of men."

The three entered the room in the character of heralds sounding gilt trumpets, and accompanied by a page, in knee breeches and silk stockings, bearing a cushion on which were two crowns and other insignia of regal dignity. After a flourish of trumpets a proclamation was read announcing the accession of King John the First, and amidst the plaudits of the company the chairman of the evening was duly robed and crowned, the ceremony being followed by the singing of "God Save the King." After another flourish of trumpets and another proclamation the croupier was similarly robed and crowned as the coming King and present Prince of Clubs. The ceremony was highly amusing, and all the more enjoyed because unexpected by anyone present.

The company then settled down to the business usual on such occasions, and spent a delightful evening with toast, song, and recitation, several of the songs being original, and written for the occasion. The following, by Mr. Mitchell, is too good to be forgotten:—

> It's lang been kent that guid Scotch glue
> Wad stick maist onything th'gither;
> But no' lang syne it turned oot fine
> For drawin' freends tae ane anither.
>
> They bring't frae far awa' folks tae
> And mony queer contrivin's ha'e w'it,
> In bilin's, stewin's, shakin's, makin's,
> I dinna ken what a' they dae wi't.
>
> At ony rate, the richt way o't
> Is unco graund, and fill'd o' wonders;
> Some folks w'it simmer tae success,
> While ithers bile just a' tae blunders.
>
> Weel, sirs! the stew o' that guid glue
> Brings us this winter nicht's convivin'.
> Then let us each, wi' kindly thocht,
> Oor canty, crony sels enlivin.
>
> Here are nae troubles wi' oor plates,
> Nae fash wi' fogs—white, green, or red anes.
> I'se warrant, noo, ye'll find them clear,
> For ilka billy here's had guid anes.
>
> Auld wet days gang, new dry days come,
> We still develope by solution;
> It's mixed this way or that, but still
> Seems aye a standin' institution.
>
> When tae a' comin' change exposed
> May Fate's firm hand the richt way stroke us;
> And nane that's here be badly posed,
> Nor find their fortunes oot o' focus.

In the course of the evening the members of the Club presented their new king with a portrait of himself—a life-size bust. It was an admirable likeness, done by Mr. W. T. Bashford, of Portobello.

I am surprised that we hear so little of the application of ammonia previous to development, as recommended by Colonel Stuart Wortley, the good effects of which I have more than once mentioned in these pages. A few days ago I was asked by a neighbour to photograph what he expected to be a prize cow, before she was sent to the show. It was a dull, gloomy day. The only lens available was a portable symmetrical, and the light was so bad that focussing even with the full aperture was a matter of much difficulty. My friend declared the cow would stand as steady as a rock for ten minutes, if necessary, and I resolved to try her with twenty-five seconds; but at the fifth she, with the curiosity for which such animals are proverbial, turned her head to see what was going on, and I put on the cap. A second trial was more successful, and I managed to get an exposure of twenty-three seconds before she moved. Anxious to see what a pre-soaking in ammonia would do under such circumstances I placed what I knew, under ordinary development, would be a much under-exposed plate in a four minims-to-the-ounce solution of ammonia, and left it there for ten minutes. At the end of that time the solution was poured into the glass and sufficient bromide and pyro. to make two-grain solutions added, and the whole poured over the plate. The image appeared almost immediately, and in about thirty seconds was developed into a satisfactory negative, full of detail, and free from hardness, although it included a bank of piled-up snow. The second plate, which had got nearly five times as much light as the first, was developed in the ordinary way, the solution containing ammonia 3, pyro. 2, and bromide 1. The image did not appear for at least half-a-minute, and at the end of three minutes was still very much wanting in detail. Remembering a suggestion made by Mr. Gray, of Newcastle-on-Tyne, I poured off the developer and flooded the plate with a solution of four minims of ammonia and two grains of bromide for about five minutes more. This considerably increased the detail, but left after fixing a slight indication of a yellowish (by reflected light) deposit, but so slight as not to interfere with the printing qualities of the negative, and which, altogether unusual in my practice, disappeared on drying. A comparison of the two negatives and of prints from them, shows unmistakably that the first is much the better of the two, and the difference is just such as would lead an expert, unaware of the circumstances, to say that the first was properly exposed, and the second considerably under-exposed.

Pre-immersion in ammonia is undoubtedly a power in the hands of all who wish to work rapidly, or who, from any cause, are forced to give shorter exposures than under ordinary circumstances they think sufficient.

The Edinburgh Architectural Association have done a bold thing in conceiving and successfully carrying out the idea of an architectural exhibition, which was opened on the 22nd ult., and attracted a large share of public patronage during the holiday season.

Although the idea was mooted only a few weeks ago, the energetic executive have succeeded in bringing together sufficient material to actually fill the spacious galleries of the Royal Scottish Academy. The collection includes many illustrations of Edinburgh architecture, both old and new; specimens of the best and greatest works of eminent architects, both living and dead; and in many cases portraits and busts of the architects themselves. There are also many works in which architecture is treated from a pictorial point of view, and the exhibition is therefore likely to attract not only those interested in the building trade, but all who have an eye to the beautiful. It will be evident that such a collection should be specially interesting to photographers, and I was glad to see, during the several visits I made to the exhibition, that they were largely taking advantage of the opportunity.

John Nicol, Ph.D.

NOTES ON PRINTS AND MOUNTS.

I remember, a few years ago, reading an account in these pages of a visit to a manufactory of photographic mounts in Paris. One million of *cartes de visite* were turned out daily, and, including cabinets and other series, there was a total of more than three millions. So taking the whole year there would be in round numbers one thousand million boards manufactured for photographic purposes by one firm alone. Since then (1875) it may be assumed that the supply has considerably increased; but this gives a fair idea of the magnitude of the enterprise. If one firm produce such a number, what must be the grand aggregate of the countless millions issued by the many factories engaged in the industry? It is very interesting to think of the enormous quantities of photographs which must be printed for these mounts. Surely those whose task it is to finish and circulate the millions of "counterfeit presentments" of the human face are no small units in the sum of the world's workers.

What variety of style do we find in these productions! Each establishment has its own particular character, and no matter how professedly this or that plate or process is claimed as the keystone of success, it still remains a fact that there are almost as many qualities of photographs as there are photographers. This business, which is of itself the essence and model of exactness and imitation—in fact, a synonym of truth, for we are given to understand "a photograph cannot lie"—is to all appearance capable of being wielded and fashioned at the will or caprice of the operator. Individual art and skill are paramount to aught else, and it is on the possession and use of these qualities, more or less, that the stamp of the work depends. It is essentially in the posing, lighting and manipulating that such differences arise, the after operations being to a great extent mechanical, and requiring care and method rather than any special talent.

How often, though, it has been noted that a printer makes or mars the beauty of the picture! The nicety of judgment and feeling in this branch of the art leaves its impress on every print, and happy is he who can confide his pet negatives without a qualm to the tender mercies of the printers. Great experience and observation are necessary for the choicest rendering of the nicer details to be found in modern negatives. This is pretty well recognised, however, and modifications of formulæ and materials are liberally given by specialists in these matters; so I will confine my remarks more to particulars of regular routine, and endeavour to scatter a hint or two that may be acceptable to those who have not yet got into an easy system of working.

With nearly all silver printing is the rule, and no matter how much the claims of other means have been advocated it still holds its ground almost universally. When it is considered what a mighty leap was taken all at once, practically speaking, from wet plates to dry, it is quite within reason to expect that printing may take as sudden a bound into one of the more stable processes. In the meantime the general run of prints have not a very long lease of life, and, regarding the matter in one light, it is occasionally not a matter for very deep regret. It would be well, perhaps, if some more would fade entirely off the face of the earth, for there are many pass a miserable existence and rise up in judgment against the unfortunate operator.

But letting this pass, and assuming we are all on the right path, using our materials in the most enlightened manner, as is often pointed out to us, the albumenised paper guaranteed wholesome, the sensitising solution prepared in strict harmony with it, and all the other familiar operations of toning, fixing, washing, and mounting under perfect control, it is found that the prints, generally speaking, answer their purpose with the public. Absolute permanency is not everything, or there would soon be an end to many professions. Occasionally striking cases of fading occur, and, to the credit of the profession, no means are left untried to fathom the cause, and with little hesitation, pounds' worth of stock, very often thousands of mounts, are condemned when found guilty. Nearly all have, at one time or another, had to suffer to some considerable extent. I remember, some time ago, nearly every batch of prints contained a large percentage, more or less, covered with small, pale spots. It was ultimately found that the particular sample of albumenised paper then being used, became quite spotty if left only a minute or so longer in the hypo. solution than was absolutely necessary to fix.

Taking even the present day, an able photographic friend tells me his last supply of mounts is completely worthless to him, owing to the coloured enamel or some impurity in the cards affecting the prints. The manufacturer objects to be blamed in the matter, and so the stock is thrown on the photographer's hands. His own address, &c., is engraved on them, so he must, perforce, destroy them. He has not the remedy that was given in the *English Mechanic* some time ago. "What am I to do with a sofa infested with insects?" asked a correspondent. "Sell it," was the reply.

In most establishments where one or two thousand prints are cleared off weekly the necessity for some system has created a system, and the work goes on regularly and smoothly. Many little matters of detail are observed which make the labour less irksome, and allow for more breathing time and a greater production. A few of these are here noted, which, doubtless inferior to many, may still be of service to some engaged in the printing and finishing department.

There are many advantages in the use of ready-sensitised paper, and I believe it is gaining ground. More especially is it suitable for the miserable, foggy weather prevalent just now. Some prefer, however, to prepare their own sensitised paper daily, or as occasion requires. In half-sheets is, perhaps, the readiest manner for ordinary work. Of course, the flatter the dish, whether of porcelain or other ware, the less solution will be needed; but it is always advisable to have plenty, so that an average strength of whatever may be recommended for the particular paper is maintained. Some, practising economy—although, may-be, at a little sacrifice of brilliancy—draw the paper out of the dish over a smooth glass rod made secure along the edge. An amount of the bath is thus saved, the drainings going directly into it. Paper that sometimes dries very unevenly is found more uniform after this treatment. With care and a suitable glass tube the albumenised surface need not be affected.

Much time is gained by cutting the paper to the various sizes before printing. It can be folded and cut rapidly and with a minimum of waste. There have been one or two ingenious methods suggested in The British Journal of Photography; but the little appliances necessary should, by right, be easily obtainable from the photographic dealers—only, like many other important trifles connected with the business, one has to make them himself or do without them altogether. A good substitute is the ordinary cutting-glass. If for *cartes* fold the half sheet into three lengths, and with a large pair of scissors, very sharp, cut three pieces at a time. This will give twenty-one *cartes*;

other sizes in like manner, and preferably with a sharp-pointed knife. It has been contended that cutting is best done after toning and washing, as the latter is so productive of frayed edges; but in practice there are less frayed edges and torn prints when previously cut. A trimmed paper is less liable to tear than when left jagged.

A piece of cardboard, with an aperture the size of the cutting-glass, should be used for marking the negative. Adjust it very carefully, and two pencil lines at right angles at the top left-hand corner will be sufficient as a guide for laying the paper to print.

Each negative is named and numbered from the reception-room book, after various fashions—preferably scratching through the film with a steel point. The name—Geo. Robson; the quantity ordered—12. If the prints are to be called for, the letter "C" is added; if to post, "P;" and the register number of negative—as 2,155. These particulars are written in soft pencil on the back of the first print. This saves an unnecessary tax on the memory, and the time gained afterwards is considerable.

A strip of albumenised paper fastened to the negative is handy for marking, as each print is done. The frames should not be placed at random on the printing benches, but arranged in some order so as the quick ones are ready at hand. A systematic printer need have none overdone, and yet not be everlastingly dodging about looking through them.

Passing over the toning, fixing, and washing, a few further remarks may be included. In picking up the prints out of the trough for partial drying, previously to mounting, placing them separately on sheets of linen made up into a book has many advantages. It can be repeatedly washed, guarding against soap and suchlike. When taken out of the book the prints should be sorted into various piles; such as all the names (as previously alluded to) together—all the heads, ladies sitting and standing, gentlemen sitting and standing, children, &c. Each kind should be, as far as possible, kept rigidly divided through the mounting, rolling, and spotting, and then when the final sorting at the end of the week is done, the advantage of the system will be apparent. In mounting, the names and the particulars on the back of the print are re-written very lightly on the back of the mount. This is found very useful when placing in envelopes and post wrappers ready for despatch. When sorting, the named card is placed on top of its fellows. The "C" for call, "P" for post, and the register number are now found a saving of time and prevent the possibility of confusion.

Before concluding I may just mention a useful construction for saving space in mounting. Sheets of millboard 28 × 22 inches holds fifty-five *cartes*, or twenty cabinets, or eight imperials. These, when filled, are placed in the following:—A wooden framework, not unlike a cupboard without the front, is fastened to the wall. A convenient size is six feet in height and twenty-nine inches in width. The depth from back to front need be no more than fifteen inches, as the projection of the millboards is immaterial. Strips of wood, about an inch wide, are placed on the upright sides as ledges for resting the board. Placed at intervals of five inches, there will be room for eighteen in the cupboard, six feet high. So eighteen millboards, each containing fifty-five *cartes*, make a total of 990 stowed away in small space for drying, and with abundance of room for the air to circulate. The advantages of this for larger sizes, too, will be apparent. THOMAS M. LAWS.

TRANSPARENCIES.

WITH ILLUSTRATIONS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

RECOGNISING the value of the lantern as a source of instruction and amusement, and having made during the past year many experiments in the production of photographic transparencies for the same, we have embodied the results of those experiments in a paper which, we think, will be a fitting, if not an interesting, one to read before you tonight, as bearing directly upon the object which our Society has in view; and if we can induce other amateur members to be content with their modest—albeit portable and compact—quarter-plate apparatus, we think the fascinating art of photography might receive a great impetus amongst us. For what can be more gratifying than to exhibit to a surprised and delighted audience of friends the places of interest which one has visited and "taken" during the summer holiday trip, and these not small, insignificant paper prints, but enlargements on the screen—say of six feet—as we have them tonight? The negatives for lantern transparencies need not be larger than $4\frac{1}{4} \times 3\frac{1}{4}$; and no one can gainsay that this size is much more pleasantly and efficiently worked by amateurs than its larger brethren. One advantage that the making of transparencies has over printing on ordinary albumenised paper is the greater latitude of result obtainable from a given negative. It is next to impossible to get satisfactory prints from many gelatine negatives, owing to thinness or want of vigour, arising from over-exposure of the plate. Yet it is almost as easy to make a good transparency from such a negative as from a more perfect one by variation in the exposure and mode of development. This we will illustrate as we go on. The first method we will bring before your notice is contact printing on gelatine plates, these being commercial commodities, and consequently in most general use by amateurs, who are now quite in the fashion of neither affording the time nor taking the trouble of preparing their own plates.

Unfortunately, there is rather a difficulty in preventing the discolouration of the gelatine film, which, however, can be overcome to some extent, as you will presently see. We could not produce a decent paper print from the negative now upon the screen, it being lacking in contrast, although dense. We put a so-called "ten times" plate under the negative in a printing-frame, and expose it for thirty seconds, at two feet distance, to the light of a duplex paraffine lamp with opal globe, and develope it with the ordinary ferrous oxalate made by mixing one part of a saturated solution of sulphate of iron with three parts of a saturated solution of oxalate of potash, and then adding one-third of a grain of bromide to the ounce. The picture was very tardy (so we thought) in making its appearance, it being about forty-five seconds before any vestige was visible, and even after five minutes was not dense enough. It was also very flat, and intensification was necessary. The picture on the screen is, after treatment with mercury, followed by cyanide of silver. You see it is not quite clear, although it was put through the alum and acid bath. This we thought might be due to over-exposure and the necessary intensification, which greatly tends to increase the opacity of the film; so with the next plate we diluted the developer to 1-4—that is, one part of iron to four of oxalate potash solutions—giving the same length of exposure and development. The result was that the picture took about seventy seconds before appearing, and at the end of the five minutes was still lacking in vigour, and had to be intensified, but not to such an extent as the last. It is, perhaps, a trifle better.

The next plate received only two-thirds of the exposure—viz., twenty seconds—and although it was nearly two minutes before coming out, at the end of six minutes we secured ample density with the ferrous developer alone. We were almost convinced that this resulted from the shorter exposure, and to test it we again tried another plate, giving half as long again exposure with the same time of development. Result, as you perceive, poor and flat, which confirmed our opinion that the best results are obtainable by giving as short an exposure as possible to bring out the necessary detail—say, an average of fifteen seconds—and then gaining density with the dilute and restrained ferrous oxalate developer alone. A great deal of patience is sometimes requisite; but there is this consolation—that the dish can be covered up and the plate left to its own devices. There should be no trace of the image before at least ninety seconds, or over-exposure is indicated, which is best remedied by washing the plate thoroughly under the tap, adding more bromide to the developer, and then finishing with the restrained solution.

The next three slides were all done with the ferrous oxalate alone without any need of intensification. The same developer can be used for three or four plates. This slide had the same exposure as the last, but it was not developed quite so long, and afterwards slightly intensified with mercury and ammonia, to show you the difference in result; it is not so good. The plates should always be put in the alum bath for two minutes before fixing with hyposulphite, and for five minutes in the alum and hydrochloric acid one after fixing and washing, which will remove any scum of oxalate lime formed in and upon the film by the reaction of the oxalate developer and the tap water.

Gelatine transparencies can also be developed with the ordinary pyrogallic and ammonia, restrained with a large amount of bromide, as in Swan's formula. It is best to dilute it with an equal quantity of water, adding more pyrogallic if the make and character of the plate require it to give density. We have found the exposure rather shorter than with ferrous oxalate, and the time of development materially curtailed, three minutes being ample for all the plates we tried, although half that time elapsed before indications of the picture were discernible. A good plan is to keep the image rather thin, and then intensify with *ferric* oxalate as follows:—After the plate is thoroughly dry wet it under the tap, and cover it with ferric-oxalate solution (we obtained ours from the Platinotype Company), which changes the image to an olive-green colour. Now rinse a little under the tap, and treat it with the ordinary ferrous oxalate solution, which in its turn converts the green image first into a pleasing brown, and if allowed to act for a longer period into a colder but agreeable tone. This ferric treatment renders the film more transparent, and makes any ammonia stains or green fog disappear as if by magic. Gelatine slides should always be varnished, as that gives them the highest degree of transparency. From the different makes of gelatine plates upon which we have experimented, we are of opinion that one rather thinly coated with an emulsion containing chloride and iodide in addition to the ordinary bromide of silver gives the best results, especially when developed with pyrogallic as above, and afterwards redeveloped with ferric oxalate. We may be wrong, but such is our experience.

There is one very important item in the production of transparencies by artificial light worthy of notice, and that is, with a thin negative use a weak light by interposing two or three sheets of tissue paper between the frame and the lamp. This gives greater contrast, especially when joined to the shortest possible exposure. The reverse holds equally good with dense negatives.

We will now show you some anatomical slides on gelatine plates opied from engravings (also on gelatine plates), and all intensified with

mercury and cyanide of silver. As for these line subjects, to obtain clean black and white results, intensification must nearly always be resorted to.

Seeing that gelatine plates are not always satisfactory, being sometimes most erratic in their behaviour, we next experimented with dry collodion plates, made by Canon Beechy's process—a process simple in the extreme. Glass plates are coated with a sensitive collodion, and, when set, immersed in a preservative of beer and a small proportion of pyrogallic, and then taken out and dried, when they are ready for use.*

The exposure required is about twenty times that of gelatine plates, and development is effected by flowing over the plate a mixture consisting of fifteen drops of a ninety-six grain alcoholic solution of pyrogallic, thirty drops of a twelve-grain aqueous solution of bromide potassium, and one drachm of a sixty-grain solution of carbonate of ammonia. This we used for all the pictures we will put upon the screen. The image begins to appear in about a minute or a minute and a-half, but then comes up very rapidly, and care must be taken not to get to much density. No silver intensification is ever needed, as delicate or dense pictures can be secured at will, simply by varying the duration of the development.

The view now upon the screen was exposed to the paraffine light for seven and a-half minutes, but as the developer was kept on too long, it is rather dense. The next slide also was made too dense purposely to show the capabilities of the plates which, with the same exposure, but shorter development, gave this result; while with shorter exposure and a little longer development a different result again was obtained, as you see. Hyposulphite is always used for fixing. We found the advantages of these dry collodion plates over gelatine ones to be greater latitude of exposure allowable, better colour of image, perfect control of density, and greater comfort in developing; for, while with gelatine plates the greatest care is requisite in the matter of light, these can be developed by the aid of a bright orange light without the slightest danger of fog. In fact, it is next to an impossibility to fog them by any legitimate means, and they will bear forcing in cases of under-exposure with quite double the amount of ammonia given without veiling the film in the least.

The next and last method of producing lantern transparencies we will bring before you is the ordinary wet collodion bath process. Here to get sharp pictures one must use a copying camera, the one we used, utilising our ordinary tourist camera, being now on the table, the simplicity and inexpensiveness of which you may see for yoursleves. While contact printing limits the size of the transparency to the original size of the image on the negative, by using such a transposed piece of apparatus the resulting picture may be either an enlargement or reduction—a great advantage when a lantern picture is required from a half-plate (or larger) negative; or, again, if a smaller portion of the negative than three inches be desired to fill the slide. The silver bath ought to be in its primest condition, and decidedly acid with (say) five drops of strong nitric acid to the pint. The collodion is best rather old and of a darkish colour, so as to work quite clean. The developer we have found most suitable is the following:—

Ammonia sulphate iron	15 grains.
Glacial acetic acid	½ drachm.
Lump sugar	15 grains.
Water	1 ounce.

The older it is the better it works. This will give ample density in most cases without silver intensification if the plates are scrupulously clean and the silver bath pure, so as to allow the developer to be kept on long enough without forming a sandy metallic deposit between the film and the glass. The plates are better edged with india-rubber by running a camel's-hair brush, dipped in a solution of the latter in benzole, right round the margin and edges; and as this dries instantly no time is lost. This enables the film to bear any amount of washing without lifting. The exposure required for wet plates through the copying camera in good summer or spring weather, using a diaphragm $\frac{f}{16}$ with a rapid rectilinear lens, is half-a-minute on an average. But, of course, the density of the negative regulates the time of exposure to a great extent, ten seconds being sometimes enough, and at other times a minute or more is required.

The picture you now see on the screen had thirty seconds (the negative being placed against ground glass facing the north, and a piece of white cardboard fixed underneath at an angle of 45°, to equally illuminate it), and development and intensification was completed with the iron alone in about one minute. The bright light allowable with bath plates makes it very easy to judge of the density, especially if a piece of white tissue paper be placed in front of the orange glass of the lantern. Always use artificial light, as, being constant, errors in judging the density are not so usually made as when using filtered daylight. Hyposulphite must always be used for fixing, as even weak cyanide eats away the delicate half-tones, and sometimes the whole image itself, if left to act upon it long enough. As with the Beechey plates, density can be regulated by prolongation of development, as the next two slides will show. If the picture cannot be got the right density with the iron developer from over-exposure, thinness of negative, or any other cause, there are several modes of intensification available with wet collodion films. This of Waterloo Bridge, North Wales, from a very thin negative, was intensified before fixing. But care must be taken not to overdo it like this one of the Swallow Falls; for it must be borne in mind that lantern slides are not to be as strong as those transparencies intended to be viewed out of the lantern as complete pictures (say) for window decoration, otherwise the light will not be able to penetrate through the mass of density, as this slide illustrates.

The next slide from the same negative, merely intensified a little, and that with a solution only half the ordinary strength, is more like what it should be. Intensifying after fixing is sometimes advisable and beneficial when the transparency, although full of detail, is wanting in contrast. Before-fixing gives softness with density, while after-fixing gives contrast without adding much, if any, to the density of the high lights of the picture. To illustrate this to you, we show this thin negative of the Miner's Bridge. The best gelatine transparency we could produce from it by any means was what you now see on the screen; but by intensifying a wet plate, after fixing and washing, we got this result, which has much more sparkle you must admit. This old house in Chester is intensified with pyrogallic and silver before fixing, and this one from the same negative with mercury and ammonia after fixing, showing the difference in colour obtained by each mode. A half-grain-to-the-drachm acidulated solution of chloride of gold can be used for giving density and tone at the same time. It is poured on and off the fixed and well-washed plate until the desired effect is attained. Gold seems to be particularly useful for giving buildings and suchlike subjects a pleasing and almost natural effect, as this of the ruins of St. John's, at Chester, for example.

We have now shown you the three methods of transparency-making which we have tried. We will now put a few more specimens of our production upon the screen, making a few remarks thereon as they pass through. This one, from the same negative as the last, was treated with a solution of—

Ferridcyanide potassium	2 grains,
Nitrate uranium	2 ,,
Chloride of gold	$\frac{1}{10}$ of a grain,
Water	1 ounce,

which gives a colouring more or less approaching to a Woodbury slide. This negative now on the screen before you is a very bad one (there is hardly any need to tell you that)—it is nearly all halation and smudge; yet, to make good what we said about decent pictures from faulty negatives, we show you this transparency from it. Of course it was doctored, but only by washing off the iron developer while yet it was very thin, and then intensifying with pyrogallic and silver, as far as we dare go without making it too opaque, &c.

In conclusion: we would remark that although excellent results can be obtained from ordinary bath plates (requiring, however, good daylight, which is not always at command), yet a dry process which can be worked by artificial light, on dark winter evenings, when the labours of the day are over, seems to be the readiest, easiest, and most cleanly method for amateurs, and that, in our opinion, dry collodion plates are superior to gelatine, although for certain subjects these latter possess a grain or texture which is rather pleasing.

We ought to mention, for the benefit of those who do not care to make their own dry collodion plates, that Beechey plates can be purchased at Messrs. Rouch's, Strand, London.

J. H. Robinson.
Dr. Williamson.

* For details see The British Journal Photographic Almanac for 1879, page 43.

ON COLD EMULSIFICATION.

I was induced by the reading of Herr Obernetter's circular (regarding cold emulsification), at the meeting of the Photographic Society of Vienna, on the 3rd October last, to make a trial of his method in so far as it was explained in the communication in question; and, as the first attempt turned out quite to my satisfaction, I shall here relate my experience, with the remark that no one should expect that I will at present exhaustively develope the method which Herr Obernetter has already had in use for two years.

For my first experiment three grammes of Simeon's gelatine was soaked in eighty c.c. of distilled water, three drops of a saturated solution of chrome alum were added, and then the whole was dissolved at a gentle heat. Into this solution a solution of five grammes of nitrate of silver in twenty c.c. of distilled water was poured by daylight and well mixed with a glass rod. The collective fluid was then poured into a shallow dish to stiffen. The stiffened gelatine showed neither colouring nor subsequent darkening by daylight, after several hours, and even when exposed to the direct sunlight, there was only a slightly yellowish opalescence.

After the stiffened gelatine had been cut into small dice with a horn spatula, I placed them in a glass beaker, and in the dark room poured a rather concentrated solution of bromide of potassium over them. Immediately they showed superficially a white colouring; but it was only after standing the whole night covered by the bromide of potassium, that the nitrate of silver was completely converted into bromide of silver. The gelatine was then much stiffer and the dice harder than before the bromide of potassium was poured over them, only it seemed that a small part of the bromide of silver had dissolved off from the dice, because the fluid was white and turbid, and then a white, somewhat coarsely-granular, deposit was thrown down.

These gelatine dice were next tied in a small muslin bag and washed for five hours in a glass beaker with five changes of water. The washed gelatine was rendered fluid by heat, filtered into a teapot, and the plates prepared with it. The plates had all a substratum of albumen, only such happening to be in stock. The plates were previously warmed on account of the low temperature (9° C.), and therefore allowed of their being beautifully coated. At first they dried in six hours; but afterwards, the temperature having fallen still lower, they dried perfectly during the night and were matt and pure white.

They were exposed for three, five, ten, fifteen, and twenty seconds without showing the slightest fog. The shadows were as clear as glass, yet the lights were not particularly powerfully covered; the pictures were on the whole very soft, and emulsion so prepared seemed to me particularly suitable for portraiture. The development with ferrous oxalate lasted the usual time, and I remarked that only the highest lights copied through.

With regard to crapiness I can give no certain decision, as the plates had an albumenous substratum. As I remarked that a small portion of the bromide of silver was not combined with the gelatine, I tried the addition of five to ten per cent. of the weight of the gelatine of alum, but was not satisfied with it. Just as the bromine compound penetrates the gelatine, and reacting there upon the silver salt forms bromide of silver, at least from the commencement of the reaction, part of the nitrate of silver withdraws from the gelatine into the fluid and there becomes converted into a coarsely-granular bromide of silver. With the addition of the quantity of alum mentioned the stiffened gelatine became very stiff, and it was eighteen hours before the whole of the nitrate of silver was converted into bromide of silver; yet all the bromide of silver was not combined with the gelatine.

As far as my experiments extend they show that, so far as the published announcements go, Herr Obernetter's possesses considerable advantages. It is very easy of execution, as a great part of the work can be done by daylight, and in the dark room there remains, besides the preparation of the plates, nothing to be done except to set agoing a reaction which progresses itself. As on repeated trials I have never observed a failure; the method seems reliable. With its assistance one ought to be able to prepare gelatino-bromide of silver of constantly equal quality. Finally: the method is capable of many modifications which must be more closely studied.

Franz Ritter von Reisinger,
Oberlieutenant.

STUDIES ON THE BEHAVIOUR OF SILVERED GELATINE TO BROMIDE.

1. When solutions of nitrate of silver have been mixed with gelatine one observes that, if the temperature were high, an instantaneous browning of the mixture takes place. If, however, the temperature were as low as possible there was at first no change whatever; but after a few hours, even when light is excluded, the mixture becomes yellowish, and after a few days brownish-red. Of course when daylight acts upon it also this change of colour takes place much more rapidly. If such a silver gelatine, which has become brown, be used for the preparation of an emulsion the plates prepared with it will exhibit the well-known red fog. A slightly yellowish colouring, on the other hand, appears to exercise no harmful influence.

Through a considerable addition of nitrate of silver the gelatine further loses a great part of its power of stiffening. Thus, for example, if a solution of equal parts of gelatine and silver salt still stiffens after the lapse of rather a short time, yet if the amount of the silver contents be raised to double, then even after standing for several hours the jelly will be far from firm. This drawback, which makes itself specially felt in concentrated solutions, may indeed be avoided by the addition of alum, yet the latter carries other disadvantages in its train, which show themselves during the working up of the gelatino-silver. Thus the addition of alum renders the bromising difficult, and when ammonia is used gives a precipitate of insoluble aluminic-dihydrate. Finally: the quantity of alum which one can add is limited, as when large quantities are added sulphates of silver very difficult of solution form. A trace of free acid, on the other hand, robs every silvered gelatine almost completely of the power of gelatinising.

A mixture of gelatine and silver oxide of ammonia (obtained by adding ammonia to nitrate of silver) behaves essentially more favourably. Such a mixture readily stiffens into a firm jelly, and even after standing for days the colour is not at all changed.

2. The bromising of the silvered gelatine proceeds but slowly, and the concentration of the gelatine, as well as the nature of the bromide, has a considerable influence upon it. Concentrated silver gelatine bromises slowly; bromide of ammonium acts more rapidly than bromide of sodium, and the latter less energetically than bromide of potassium. The addition of alum to the gelatine, as already mentioned, delays the penetration of the salt of bromine.

When concentrated gelatine and bromide of potassium solutions are employed it is often quite impossible to produce with them a regular formation of bromide of silver. By making a section through the bromised gelatine substance one will see three principal, distinct films—an outer one, rich in coarsely granular bromide of silver; a middle one, with less bromide of silver, but what there is being very finely granular; and, lastly, a transparent core, which only contains potassic bromide.

This phenomenon can only be explained by the assumption that not only does bromide of potassium enter into the gelatine but that silver solution also diffuses from the same. By the employment of bromide of ammonium and by a proper choice of the relative quantities of silver salt and gelatine, as well as of the degree of concentration of the bromising fluid, this unequal bromising may doubtless be effectually met.

3. An emulsion prepared from gelatino-nitrate of silver transmits light with a red colour and contains the bromide of silver for the most part in the form of microscopic, well-formed crystals, which apparently belong to the hexagonal system, and the size of which reaches to about 0.006 m.m. By the employment of gelatino-silver oxide of ammonia, or of gelatino-nitrate of silver having an admixture of bromide and of ammonia, one obtains green bromide of silver; the emulsion only transmits blue light, and the crystals of bromide of silver are present in the latter case in but scanty numbers, and in the former not at all.

4. The photographic sensitiveness of all the emulsions prepared in this way was far from fulfilling the requirements one is now accustomed to demand from very sensitive plates. An emulsion obtained by bromising a mixture of twenty grammes of nitrate of silver, twenty grammes of gelatine, and 300 c.c. of water, remains, with regard to sensitiveness, far behind a normal preparation boiled for about half-an-hour, the latter working at least two or three times as fast. Matters are much more favourable when silver oxide of ammonia is used, or a bromising fluid made of a mixture of ammonia with a bromide. Yet even under these conditions, in the proportions given above for the silver, gelatine, and water, the sensitiveness of the boiled emulsion will hardly be reached.

It is interesting to observe that great density in the negative is obtained by the employment of ammonia in the gelatino-silver, but that ammonia in the bromising solution only raises the sensitiveness without increasing the density of the lights too much. Finally: the sensitiveness of the preparation to light may depend also upon the proportionate concentration of the gelatino-silver, analogously to the long-known fact that it does so in warm emulsionising.

F. Pizzighelli, *Capt.*
Baron A. Hübl, *Ob.-Lieut.*
—*Photo. Correspondenz.* Victor Stadler, *Ob.-Lieut.*

RECENT ADVANCES IN PHOTOGRAPHY.*

Lecture IV.

Now I will show you an experiment demonstrating what over-exposure will do. Two of Stebbing's films were placed face to face, and exposed for a considerable time to light behind a graduated screen. The results are before you. On the film nearest the graduated screen, the whole of the numbers so far as 20 are reserved; that is, appear opaque on a transparent background. On the bottom film, except No. 1, the whole of the gradations are perfect; that is to say, there is not a reversed image at all. Thus you see that a reversal takes place in the top part of the film, and not at the bottom. That is a point I wish to bring before you. No doubt this reversing action is partly due to the bromine which passes over the molecules which lie immediately below it. Not only that, however, but, if you enter into the chemistry of the thing, you will find that gelatine will take up the bromine, as it is liberated, though slowly; and that, when bromine combines with gelatine, one of two things happen—it either replaces and liberates hydrogen, or else a molecule which has the properties of hydroxyl. Either of these will combine with bromine to form hydrobromic acid, or yet another compound of bromine, which is equally ready to destroy the photographic image as bromine itself, or as any oxidising agent such as I showed you just now.

Now, before I quit the subject of oxidising agents, I should like to introduce to your notice a very remarkable utilisation of this oxidising process of photography which was proposed, and not only proposed, but carried out—there is a great distinction between the two, for we often hear propositions made by men who perhaps never have the pluck to carry them out—by Mr. Bolas. He, first of all, took an ordinary gelatine negative with proper gradations of light and shade. Then he wanted to reproduce it, so he took a gelatine plate, and immersed it in bichromate of potash, allowed the film to dry, and exposed it to light behind the negative to be reproduced. You will see that in this exposure to light he had an oxidising agent present in his film, and that the oxidised parts were acted upon by light, leaving the other part intact, and by that means he got a reversed image. Now, he was aided by the fact that the gelatine was rendered insoluble to a large extent by bichromate of potash, but still that is not everything. On the screen is the original negative, and also the reproduced negative. These I had the pleasure of seeing manipulated at the Photographic Society. In regard to this process we have a curious case of re-invention. We have lately had in the papers devoted to photography letters from France, in which a certain Captain Biny has been supposed to have invented this process. Across the channel they have not the same facility for reading English, I am afraid, that we have for reading French. However, the discovery of Captain Biny's is nothing more or less than Mr. Bolas's discovery, and I hope Mr. Bolas will put in a claim for it.

Another use of oxidising agents is to enable us to get rid of fog. If you have a gelatine plate which has been exposed to light and so has been fogged,

* Continued from page 750, volume xxix.

you can get rid of that fog by immersing it in bichromate of potash. I have here a fogged emulsion plate of which the upper half has been immersed in bichromate of potash, the bottom half is completely veiled, but you will notice how beautifully clear the top half is, where the plate has been immersed in the bichromate.

The next subject I wish to treat of is one which has been much misunderstood by many. The theory involved is not new to myself, but I think the results I shall show will be new as far as the audience is concerned. On this plate is pasted tin-foil, with various figures cut on it; first, there is a circle, then a line across, and so on. The image of these figures I now throw on a monster gelatine plate, the thickness of the glass being some quarter-inch. Now, I ask you to observe what you see on it. You see every figure surrounded by a halo. Thus, you see, the circle is surrounded by a ring. You have a halo round every part of the images. If you come to analyse it, you will find that the halo surrounding the bright cross is made up of a series of rings similar to that ring which surrounds the clot of light. Now, I have here some wonderful elixir to get rid of these halos. I touch the back of the plate where the cross falls with asphaltum, the halo varnishes. I move the plate a little, to get a fresh surface, and with red varnish I again touch the back of this plate, behind the cross, and now I have a white cross on a red background. To put the matter in words: according to the medium you place on the back of the plate, so is the reflection toned down. If I use a red varnish, this halation will have but little effect on the photographic plate, because it is red, and these red rays do not much affect the production of a change in the sensitive salt. The most perfect cure for halation is Brunswick black; there is no reflectien from the back of the plate, and by that means you get rid of any tendency to fuzziness of the image, which was often a disgrace to photographers' pictures. I will now throw on the screen one or two of the absolute photographs showing different halations. One is from an ordinary plate, the other from a thick glass plate; when a thick one comes on the screen, instead of the cross remaining where it was, it was spread out considerably. [Shown.] When you come to analyse it mathematically you will find the diameters of these rings depend on the thickness of the glass, together with the critical angle of reflection for the glass employed; that the greatest intensity in the ring is fixed by the critical angle alone. That is a very important point, because there has been a good deal of controversy about it, which I will not enter into now. I think what you saw on the gelatine plate, and what you see on the screen now, ought to settle that point for ever. I will show you some plates taken with an asphaltum backing; it is of no use giving improper backing. If you have anything which will reflect blue light, you get this blurring of the image. With a plate prepared with a backing of asphaltum, you can even expose it to a bright image of the sun without getting a halo round it. An astronomer in Germany has recently deluded the French Meteorological Office into believing that he has photographed the corona in full sunlight, but when you come to inquire into the matter, this corona is nothing else than the halation; not only that, but he has found the most extraordinary rays shooting out from it at certain times. When, however, you come to investigate the question you will find that these wonderful rays, which are supposed to proceed from the sun, and thus to influence our earth, are nothing more than a certain reflection which the laws of optics tell us ought to be there. Here is a simple method by which photographers can always be sure of seeing what amount of blurring they may get. If they take the trouble to place a gelatine plate, or any plate they wish to try, in contact with a slit cut in tin-foil, and then look through the back of the glass at a strong light, they will find it has more or less blurring round the slit.

FIG. 2.

FIG. 3.

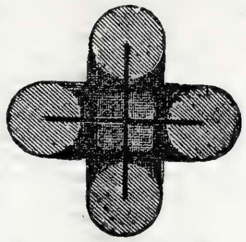


FIG. 4.

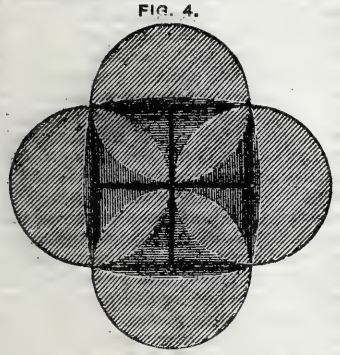
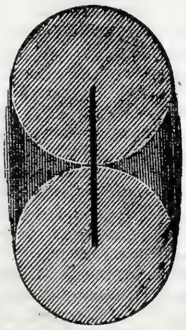


FIG. 5.



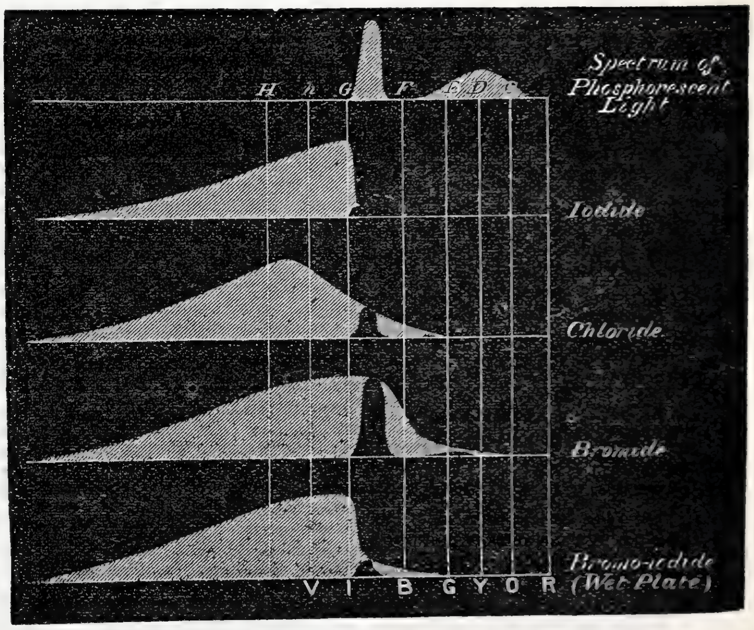
Having so far digressed, I may say that the reason why you get apparently greater reversal in a photograph taken on a glass plate than you do in a paper negative, is because there is none of this halation to help it.

There is also another reason why reversal is more difficult to secure on paper, in that the bromine has two ways to escape—one through the paper, and the other through the surface of the bromide. I hold in my hand an example of reversal on paper.

Now I will show you how you can get rid of this reversal altogether. The film before you was exposed sixty seconds behind a negative to the full sunlight, yet there is no reversal on it. How is that? Simply because I gave it something which, instead of allowing the bromine to attack the bromide of silver, that had been altered by light, at once took it up. The substance employed was potassium nitrite. This shows that, if you want to get rid of the reversal of the image, you must give the plate something which will very rapidly absorb bromine, and I should say something if possible which is not organic, for the reason I have already stated to you. Now, is it possible that you can give a film something of that kind? I say it is quite possible to do so, and those photographers who are experimenters no doubt might turn their attention to this point. In the meanwhile, I may say that the addition of iodide to bromide in a plate is sufficient to a very large extent, because as I showed you in a former lecture the sub-iodide of silver acts as a sensitiser to the bromide of silver; the consequence is, that those films which contain a large qnantity, or even a small quantity of iodide, do not reverse in the same horrible manner as a pure bromide film will do. Perhaps a certain amount of anxiety may have been created in photographers' minds by a recent article in one of the photographic papers, in which a doubt was raised as to whether they can get iodide in their films. Let me once for all reassure them. If you have iodide of potassium, and bromide of potassium to combine with silver nitrate, iodide of silver will always be present in your films; for the iodide is formed always long before the bromide, and therefore, the scare as to whether you have iodide in your plates or not is one which need not be seriously entertained. As far as chloride goes, I leave that for another occasion to remark upon; but once for all, if you have soluble iodide present when making an emulsion you must have silver iodide in the film, and this will act as a sensitiser to prevent the reversal of the image.

I now come to a description of a most useful instrument introduced by Mr. Warnerke, which is known as a sensitometer; it consists of squares of coloured gelatine of different opacities through which light is allowed to fall on a sensitive plate. This sensitometer is meant to enable you to judge of the comparative rapidity of your plates. You have seen on the screen some of the images produced on glass, on paper, or on films, by the exposure of such a tablet as this, and it is a most useful instrument. To my mind no photographer, be he amateur or professional, should be without one, or one similar to it. Mr. Warnerke has been the first to adapt this sensitometer to practical purposes. There are others in the field, of which we have a notable instance in that of Mr. Spurge; but for the time being I propose simply to call your attention to Warnerke's sensitometer. The method of operating is very much the way I operated just now. First, a phosphorescent tablet is exposed to magnesium light, and then allowed to rest a minute, placed in contact with the sensitometer plate, which is in front of the plate to be tried. The exposure lasts for half-a-minute, and the plate is then developed. The last distinct number seen upon the plate by reflected light, before fixing, is read off. By a simple table you are able to see the comparative sensitiveness of two particular plates of the same kind. Here, owing to Mr. Warnerke's kindness, I have an enlarged apparatus, showing the way in which you read off the sensitometer. Suppose, for instance, you find the last number on one plate to be twenty in the one case, and sixteen on another, if you take two such plates out in the field in the same light, and you want to know how much exposure to give in the one that registers sixteen, knowing that necessary for the one reading twenty, how are you to do it? You take Mr. Warnerke's instrument—such as we have here (but in miniature, of course); you place this opening at twenty, you then cast your eye on the ring, look at sixteen, and find that the one that registers twenty is three times more rapid than the one that registers sixteen, and expose accordingly; so, in the same way, if you had one that registered twenty-five, which is a very high degree of sensitiveness, and another twelve, you would find that you would have to give the one thirty-six times more exposure than the other. I recommend this to the notice of practical photographers; I do not wish to act as advertiser to Mr. Warnerke's sensitometer, but I merely advise them to get some sensitometer, so as to prevent groping about in the dark as to what exposure to give to plates of different degrees of sensitiveness. There is nothing like picking a hole in your friends if you possibly can, and now I am going to pick a hole in Mr. Warnerke's sensitometer; it is not a very grave one, but still, one which ought to be noted. I want to show you what happens supposing you measure all kinds of plates by such a sensitometer. First, let us examine what kind of light is emitted by this phosphorescent tablet. You will see, if I expose it to the light, it will phosphoresce, and the stronger the light the more it phosphoresces. Now, here we have a spectrum of the phosphorescent light, and when you come to

FIG. 6.



examine it by the eye it is found that there is one bright band in the indigo; there is a very faint light coming down as far as the red. When you photograph such light in the photo-spectroscope nothing is indicated except the existence of the indigo band of light, and nothing in the violet or beyond; it is almost a monochromatic light which it emits, as far as photography is concerned. Supposing we have to try some plate, the composition of which is unknown, with such a sensitometer, it will be seen that we may fall into serious error. On this diagram the mountain represents the intensity of light which is painted by the phosphorescent light on a plate. Supposing the plate only contained iodide, you will really see that the little mountain, which only affects the iodide, is only $\frac{1}{30}$th part of the whole mountain which would be there if you are using white light. If you only use chloride it would be showing one-third only; whereas, if you use bromide, it would be unity, or as giving the maximum amount. If you try a wet plate by the sensitometer, you will find that it indicates only about one-fourth of the true value; that is to say, you would be wrong supposing you went out with a wet plate and a gelatine plate and exposed according to the sensitometer. You would find that you had given five times too much exposure to the wet plate, simply because the bromo-iodide is most sensitive to those rays of light which are not present in the phosphorescent light. Hence, when using such a sensitometer with phosphorescent light, you must be aware what you are about, and hesitate before you draw any exact conclusions. W. de W. Abney, R.E., F.R.S.

(To be continued.)

Contemporary Press.

PHOTOGRAPHING THE SOLAR CORONA.

[The Times.]

Astronomers have long hoped, almost against hope, for a time to come when the solar corona might be seen, even as since 1868 the sun's coloured prominences have been seen, without the aid of a total solar eclipse. Almost against hope, because what is known about the corona shows that its light is far too faint to be discerned directly, so greatly is it overmastered by the light of the sky near the sun, while the method which avails to show the coloured prominences cannot be successfully applied to the corona. We know that, during a solar eclipse, even the brighter part of the corona is only seen a few seconds before totality begins, and can only be discerned for a few seconds after the total phase is past. In the full glory of sunlight it is as hopeless to look for the corona, either with or without a telescope, as it would be to look for a star of the fourth or fifth magnitude without telescopic aid in the daytime. And what a telescope does to make a star visible in the daytime cannot be done for the corona; the star is but a point, even when the most powerful telescope is turned on it, and therefore a star looks so much the brighter, not so much the larger, as the illuminating power of the telescope is increased. But an object like the corona, or a comet, or a nebula is magnified in at least as great a degree as the illuminating power is increased, and in yet greater degree when high magnifying powers are used, so that it looks no brighter, only larger; in fact, as some light is always lost in passing through the lenses, the apparent brightness of such objects is always rather reduced when a telescope is used, however greatly the total quantity of light received from them may be increased.

The same is true of the sun's coloured flames, so that it was long regarded as hopeless to look for them at any other time but during the few minutes' duration of total solar eclipse. But spectroscopic analysis, so soon as it was shown that they shine only with special tints, gave the means of seeing them in broad daylight. If we consider how this was done, we shall better understand the difficulty in regard to the corona. We cannot do this better, though that is not the actual manner in which the observation is made, than by considering Newton's familiar experiment on the decomposition of light. In that, light admitted through a circular opening, being dispersed by a prism, cast a long rainbow-tinted image on a screen, this image being really made up of multitudinous images of all the colours, not of the rainbow, which is usually but a diluted spectrum, but of the true solar spectrum. In that long streak there were thousands of images of various tints of red, thousands of orange images, thousands of yellow, green, blue, indigo, and violet images—so many, in fact, that no eye could see where any single image began or ended—all were completely blended together. The light, which undispersed would have formed a single circular white image, being spread over a long ribbon-like band of space, was, of course, correspondingly weakened; no part of the spectrum was nearly as bright as the round white spot seen before the prism was interposed. Now, suppose that instead of shining with all the colours of the rainbow, the sun shone only with a certain small number of tints—say, one kind of red only, one kind of orange, and one kind of blue. Then instead of the rainbow-coloured streak formed by tens of thousands of blended images, there would have been but three images—three circular discs—a red circle, an orange circle, and a blue circle. The light, which before dispersion had formed a single image, would have been weakened in forming three, but not nearly so much as in the actual case, where the long streak formed by multitudinous images was many times longer than the diameter of a single circular image. And any further dispersion, which in the actual case would have correspondingly lengthened the spectrum and weakened its lustre, would only have thrown the three images further apart, leaving their brightness unchanged. This difference actually exists between the white light of the sunlit sky and the light of the sun's coloured prominences. These are masses of glowing gas shining chiefly with one red tint, one orange-yellow tint, and one green-blue tint. If we receive on a screen (or when we receive on the retina as on a screen) the light from the sky over a prominence and the light from that great mass of glowing gas, we are unable to distinguish the shape of the prominence, because its light quite overmastered by the light of the sky; but when, by means of suitably-arranged prisms, we disperse the light thus received, we weaken the sky light just in proportion as we increase the dispersion, while we only throw the images of the prominence further apart with each increase of spectroscopic dispersion; so that if only our spectroscope has sufficient dispersive power, the prominence, no longer forced to contend against the whole light of the sky, but only against a small portion of it, becomes discernible on the weakened light of the rainbow-tinted background.

If the corona were of the same nature as the prominences its form might be rendered discernible in the same way. But, as a matter of fact, only the very brightest part of the corona shines with light of special tints; the greater part of this stupendous solar appendage shines with light of all the colours of the rainbow, though, fortunately, with an excess of light from certain parts of the spectrum, otherwise the success we have now to record would never have been achieved.

We must here make a few remarks respecting ordinary methods of observation and their failure to show any trace of the corona. It occurred long since to Sir George Airy to receive the image of the sun and surrounding parts of the sky on a smooth, white surface, and by removing that part of the surface on which the image of the sun itself fell, and putting there a black surface (as it were "quenching the sun in a black bag") to give the prominences and corona a better chance of being seen. The method failed utterly. It was later suggested that, so far as the prominences were concerned, the use of a ruby-tinted medium, cutting off all the light except rays of nearly the red tint of the prominences, and the substitution of a smooth, red surface for a white one would greatly help to make them visible. It was further suggested that if, when both devices had been employed, the light received on the coloured card were examined through a spectroscope of suitable power, the whole ring of coloured prominences around the sun might be seen at a single view. And it is worthy of notice that the first coloured prominence ever seen—as a whole—by man, was seen by Mr. William Huggins by the aid of the absorptive power of ruby-tinted glass. But, so far as the corona was concerned, such methods as these had persistently failed.

Recently, however, it occurred to the eminent spectroscopist just named to utilise certain information obtained during the total solar eclipse of May 17th last. It was shown on that occasion that though a large part of the light of the corona gives a continuous spectrum (or, in other words, shines with all the colours of the rainbow), there is an excess of coronal light from near the violet end of the spectrum. This does not help, so far as the spectroscopic method is concerned, because a multitude of images of the corona, of various tints of violet, would not, under spectroscopic dispersion, give a single well-defined image, which could be seen and examined. The use of absorptive media, cutting off all, or nearly all, but the violet light, was naturally suggested; but this method failed, chiefly, perhaps, for the reason noted by Mr. Huggins, that the sensitiveness of the eye for very small differences of illumination by violet light is much less than for similar differences in red, yellow, orange, or green light. But, as photography deals most effectively with violet rays, it occurred to Mr. Huggins to try whether he could not photograph the corona by means of its violet light. He received the image of the sun and of the region around the sun, on the photographic plate, after the light had been sifted out by a screen of violet (pot) glass, and in later experiments, by a solution of potassic permanganate. The sifting thus effected was more perfect for photographic purposes than for ordinary vision, because such red, orange, yellow, and green light from the sunlit sky as found its way through, though hiding the visual image of the corona, produced no effect on the photographic plates. This arrangement being made, and the image of the sun with a due portion of the sky around it being received on the plate, it was found that the coronal image —or what looked very like the coronal image—made its appearance on no less than twenty of the plates. This appearance does not consist simply of increased photographic action immediately around the sun, but of distinct coronal forms and rays, admitting in the best plates of measurement and drawing. As Mr. Huggins well remarks—"This agreement in plates taken on different rays with different absorptive media interposed, and with the sun in different parts of the field" (that is, of the photographic plate), "together with other necessary precautions observed, makes it evident that we have not to do with any instrumental effect." Nevertheless we should be glad to hear that the simple device had been employed of cutting away the portion of the plate on which the sun's image would fall, and thus allowing the rays from the sun himself to pass through, and be received where they could not in any way affect the photographic result. Still, the tests applied are probably sufficient to show that Mr. Huggins has really accomplished the great result he announces. Little reliance should be placed on the agreement between the corona photographed in September last and that seen on May 17th, the sun and his surroundings being viewed in such very different directions. But the similarity of structural detail and general character is too marked to be explained by mere coincidence.

If the new method is really the success it seems to be, a most interesting series of discoveries may be expected to follow from its employment. Now for the first time the corona can be studied from day to day and from year to year. A multitude of interesting questions which hitherto have been asked in vain may now be answered. In clearer skies than ours, and at observatories high above the sea-level, a much greater success than Mr. Huggins has yet obtained may be expected. Even more is to be hoped from the steady progress which photography is making, and the use of improved and more sensitive plates.

MOUNTING PRINTS WITHOUT COCKLING.

[Photographic Times and American Photographer.

Now that there is a growing demand for albums or scrap books in which to paste unmounted photographs, a demand has also arisen for a paste which can be used in mounting such pictures without cockling the leaves.

No one requires to be told that, if a photograph be mounted by means of starch or paste upon a card or sheet of paper of medium thickness, such

mount will be all puckered up when the paste dries, presenting an unseemly appearance. The knowledge of this deters many from pasting a photograph in a book in which its presence might otherwise be desirable.

To obviate this puckering, which arises from the unequal expansion and contraction of the wet print and the mount, it was some time ago sought to make use of a paste in which there was no water at all; and that which was long believed to be the best consisted of a solution of india-rubber in benzole. This undoubtedly does answer the intended purpose, for there is not the slightest appearance of cockling when a print is mounted with rubber paste upon a thin card. But, having recently examined some prints mounted several years ago by this material in an album, we found that the rubber had become rotten and disintegrated, and that, in consequence, it cannot be recommended as standing the test of time.

But there is a method of preparing a gelatinous paste that is not open to this objection. It consists in impregnating the gelatine with a minimum of water, and then dissolving it in a quantity of alcohol sufficient to make it of a working degree of thicknesss. Take one ounce of gelatine and place it in a dish of cold water, allowing it to stand for a period of time varying from half-an-hour to several hours according to the thickness of the gelatine. When it has become swollen from the absorption of water pour off the whole of the water, liquefy it by the application of heat, and then add about fourteen ounces of alcohol. It is of importance to add the alcohol very slowly and by little at a time, the gelatine being stirred continually while the addition is being made. When cold this mixture will be slightly stiff, but it is made perfectly fluid by setting the bottle in which it is contained in a vessel of tepid water.

When this is applied to the print that is to be mounted the small proportion of water present is insufficient to swell the paper, and, as a consequence, there is no cockling of the picture when mounted.

The knowledge of this will prove a boon to those who wish to mount photographs on the thin leaves of a book, and, as the gelatine when thus prepared will keep for a long time, a large quantity may be made at a time.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 9	Great Britain	5A, Pall Mall East.
„ 9	Newcastle-on-Tyne (Ann. Meet)	College of Science.
„ 10	Cheltenham Amat'r (An. Meet).	
„ 11	London and Provincial	Mason's Hall, Basinghall-st.
„ 11	Manchester	Mechanics' Institution.
„ 12	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 28th ult., Mr. W. Coles occupied the chair.

M. A. Haddon read a paper on *Green Fog a Silver Compound.* [See page 5.] He produced plates showing that the green fog had been removed by the re-agents, iodine, chlorine, and bromine, followed by hypo. or cyanide. The image, however, had not been entirely removed with the fog, a trace of it remaining in each case.

Mr. W. E. Debenham was glad that the subject had been investigated in the scientific manner followed by Mr. Haddon. When Mr. Orsman had supposed that his experiments demonstrated that green fog was not a silver compound, he (Mr. Debenham) thought that that conclusion was due to inexactness in the experiments then described, and this was shown to be so by the carefully-conducted researches of Mr. Haddon.

Mr. A. L. Henderson had found, with Mr. Haddon, that the last trace of image could not be dissolved out from the film.

Mr. F. W. Hart agreed that this remaining image was not silver, but due to the action of pyro. upon gelatine, pointed out by Mr. Warnerke.

Mr. A. J. Brown said that it would be interesting to know whether an image would be left on a plate that had been developed by ferrous oxalate, after treatment to dissolve out the silver.

Mr. Haddon thought that the relief of parts of the gelatine plate was due to liberated bromine.

Mr. Hart had, during the preceding discussion, kept a strip of negative showing strong green fog in a weak solution of chlorine, and now, after about ten minutes' action, exhibited the strip, in which both image and green fog were converted into chloride, thus substantiating Mr. Haddon's view of the argentic character of the green fog deposit.

Mr. Henderson said that Mr. J. Spiller had found that there was an insoluble albumenate of silver. [Query: Was there a similar compound of gelatine and silver?]

Mr. Haddon remarked that chlorine passed into gelatine solution threw down a white curd.

Mr. E. J. Golding said that if ferrous oxalate developer were made alkaline with ammonia so much green fog could be developed as to leave nothing to fix out.

Mr. Henderson observed that he had had a negative hopelessly dense, but had immersed it in a solution of ozone bleach and chrome alum, as recommended by Mr. Debenham. He had allowed the action to continue until the negative was rendered too thin; but upon intensifying with mercury had obtained a negative that printed perfectly. He had used half-an-ounce of bleach to two ounces of water, and saturated the mixture with chrome alum.

Mr. Hart had had some negatives which in fair weather refused to yield detail in the light after ten days' printing, so intense were they; but, after treatment with iodine dissolved in cyanide of potassium, they had given prints with rich detail. He (Mr. Hart) also exhibited a print from the negative shown at a previous meeting. In the print it was seen that the stained or faded portions of the negative followed the lines of creasing of the paper which had been in contact with it.

Correspondence.

SAVING SILVER WASTES.

To the Editors.

Gentlemen,—Your Almanac, whose publication I always look forward to, is this year, I think, more than usually interesting. Perhaps this is in consequence of many of its articles treating of subjects which, at the present time, claim a good deal of my attention. Many of the papers require careful and attentive reading, and partly owing to this and to my being otherwise engaged, I have not yet perused the whole of the work. If I may find a fault, it is that some of the papers are cut too short, and only make one wish for more; but this is, I know, a point of necessity in a publication of this nature.

I have always advocated economy in the photographic laboratory—in fact, the recovery of "wastes" has been rather a hobby of mine; but I must say the article *To Save Silver Wastes Arising from the Development of Plates* rather staggered me. Though the plan would doubtless save silver wastes it would waste a great deal of silver. I would not trust a good negative to such an ordeal as to fix it in a bath in which zinc and hyposulphite of silver are reacting on one another.

I hope Mr. Clement Williams will pardon me for criticising his method, and I quite expect he will retort if he thinks me worthy of a reply, that I should not run a process down before giving it a trial. This I certainly do not mean to do, but I would point out that all the benefits, with none of the risks, both chemical as well as mechanical, will be secured by pouring the fixing bath, when done with, into a jar containg some scrap zinc. This is the plan I have for some time adopted, and it well repays me.—I am, yours, &c.,

Liverpool, January 3, 1883. W. Horseman Kirkby.

A CORRECTION.

To the Editors.

Gentlemen,—Kindly allow me to correct a few errors which have made their appearance in a paper of mine on *Enlarging* in the Almanac, pages 132-3.

Shutter for developing baths, &c., &c., should read *shelves*, &c. In the second sketch the base-board to camera has been omitted, and the image is spoken of as being projected on the *screw*, instead of *screen*.—I am, yours, &c., J. Pike.

December 30, 1882.

IMPROVED FOCUSSING ARRANGEMENTS.

To the Editors.

Gentlemen,—Referring to the article in the Almanac on improved focussing arrangements, by Mr. Crowe, I beg strongly to recommend its careful perusal to amateur photographers who desire an easy, cheap, and expeditious method of accommodating a set of lenses of various foci to one focussing rack or screw of short length.

I claim no originality of idea over Mr. Crowe, but, having used a rack adjustment somewhat after his model for some years past, I can bear testimony to its simplicity and efficacy. My rack is made from the rackwork taken from the interior of a colza oil lamp, which I bought at a sale (being out of repair) for a trifle. I have seen many since then at sales, and, as they seem to be superseded by paraffine, they always sell at a price that will pay a photographer to break them up for the sake of their mechanism, whilst the body of the lamp is capable of being used as an effective table ornament. I mention my experience with the lamp, as it contains the rack exactly as required, whereas to make one is a rather more difficult task than most amateurs would imagine.

I have sunk my rack in the base-board, being thus quite out of the way. The channel in the wood is only just sufficiently broad to allow the rack to have a little "shake," so as to move freely. Holes are drilled at intervals, and a hook drops into the one required. It is held in its place by a spring.

The pinion head, also found in the lamp, is so placed as to move the rack, and any other details can readily be followed by paying attention to Mr. Crowe's excellent article.

Again: I have to render my thanks to that gentleman for his valuable suggestion concerning his instantaneous shutter attachment. I have used it continually, and have nothing but praise on its behalf.—I am, yours, &c., H. J. N.

Higher-lane, Fazakerley, Liverpool, January 2, 1883.

EXCHANGE COLUMN.

I will exchange a pocket camera and three backs for a Ross's No. 4 portable symmetrical.—Address, Kenneth Bean, New Ferry, Cheshire.

Wanted, a studio stand, scenic background, rustic, in exchange for a good magic lantern.—Address, W. Butt, photographer, East-street, Blandford.

Wanted, a half-plate camera, with group and view lens, in exchange for a very good lockstitch treadle sewing machine, in perfect order, cost £8.—Address, A. Hopkins, photographer, Exeter.

I will exchange a camera, for plates $4\frac{1}{4} \times 3\frac{1}{4}$ and $5\frac{1}{2} \times 3\frac{1}{4}$, with one single and three double backs, for 12×10 zinc tanks or anything useful in carbon printing.—Address, J. S. M., 47, Park-road, Haverstock-hill, London, N.W.

I will exchange a good folding camera 10×8 for gem lens and camera or four Victoria lenses, or anything useful in photography. The camera is in good condition; one single dark slide, focussing screen, sliding front.—Address, S. H., Albert-terrace, Guernsey.

I will exchange one large background interior, by Seavey, 8×8, nearly new, and one exterior, by Ball, new, 8×6, for anything useful, posing chair, or a half dry-plate camera, with one or more double dark slides.—Address, R. Spurr, 24, Ramsden-street, Huddersfield.

I will exchange the following articles for a good half-plate lens, backgrounds, or anything useful:—The British Journal of Photography for 1881 and 1882, a strong tripod stand, *carte* rolling-press, two interiors and an exterior background, copying camera, 10×8 rubber-lined bath, Ottewill's changing-box, $3\frac{1}{4} \times 7$, for eighteen plates, large quantity of *Photo. News*, from 1866 to 1879.—Address, W. B., 32, Stoke-road, Guildford.

Upwards of 300 negatives, *carte*, cabinet, and 10×8 original negatives of actors, actresses (plain and in costume), and celebrities, a capital series for specimens or publication, also a quantity of glass stereo. slides or opal, and three and a-quarter lantern slides on carbon, will be exchanged for stereo. landscape or other sized negatives of places of interest, or anything useful in photography.—Address, Photographer, 4, Avenue-road, Goldhawk-road, W.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered—

Messrs. Debenham and Gould, Bournemouth.—*Two Photographs of Canon Harrison.*

William Moscrop, Kendal.—*Two Photographs of Mary Birkett, who died December 18th, aged 102.*

Miss Catherine Middleton, 9, Anglesea-place, Southampton.—*Photograph of Swans on the Dart and New Forest Foxhound Puppy.*

Messrs. Wilson and McCormick, 116 and 120, Vincent-street, Glasgow.—*Three Photographs of the Steamship "Columba."*

T. W. O.—Will forward your letter direct.

G. P.—We have not yet heard of the work.

Puzzled.—Double the quantity of both pyro. and bromide.

J. H. T.—The proportions are four parts (by weight) of the sulphite to one of pyrogallic acid.

J. E. M.—There is, we believe, still a nominal charge. Write to the Autotype Company.

J. R. T.—If you send us the negative we will endeavour to give you the information required.

P. W.—The enamels have had too much heat. Try a slower heat and the glazing solution with less glaze in.

Old Hand.—The "triplet lens" is still a very serviceable instrument, and for your purpose will answer quite as well as either of the more modern constructions of lenses.

X. N. T.—This correspondent asks—"What are the points required in an instantaneous photograph, so that it may have some chance of success in a competition in connection with such subjects?"

George.—From sixteen to twenty grains to each ounce, according to the quality of the gelatine. With the Autotype, Heinrich's, Coignet's, or similar hard gelatines the smaller qualities will suffice; but with Nelson's No. 1 it will be necessary to use the larger.

G. N.—In taking such scenes it is better to arrange with the manager of the theatre, who might permit you to place your camera in a more suitable position. The distortion is caused by having to point the camera down so much. It must have a swing back.

T. M. G.—Yes. But the lens will not cover your plate satisfactorily. We should recommend one of the same class, but of longer focus—say one or two inches shorter than the length to which your camera will extend. The ratio of rapidity will be about the same.

A. H. B.—You will find a leading article on the subject in the present number. No license is required to work the process, nor is it necessary for you, as you surmise, to pay a royalty on your work. Neither need you purchase the materials at any particular establishment.

Platino.—1. The marks you complain of are probably caused by air-bells which are likely to occur with your method of working. The best plan is to touch the liquid with one end of the print first, and then lower it rapidly and steadily.—2. Indian ink.—3. You use the acid bath for too many prints.

Carbo.—The cause of the lack of brilliancy in the print is, no doubt, due, in a great measure, to the weak light in which they are printed. Try the effect of printing much deeper than usual, and prolonging development. Keeping the tissue for a longer time before use will possibly prove advantageous.

Philo.—You have employed far too much chloride in the albumen. According to present notions six grains to the ounce will be ample. At one time as much as fifteen was used, but then the paper was sensitised, and a much stronger bath employed than is now customary. From this you will see that the twenty-five grains you are using is far too much.

Citro-Oxalate.—Dissolve two parts of neutral oxalate of potash and three parts of sulphate of iron in water separately; mix the solutions and collect the precipitate that forms. Allow it to subside thoroughly before pouring off the clear liquid.

Jehu.—You will scarcely find it possible—at this period of the year at any rate—to produce a "perfect" picture of a coach in full motion. It is a difficult subject under the most favourable circumstances, and the specimen you have sent is not by any means so bad as you appear to deem it. True, it is not a perfect picture, but you will not be able to obtain a much better.

T. Lewis.—1. We have not the two editions to refer to, but probably each is right for the particular formula there given.—2. There is certainly something wrong in the manipulations, as the emulsion should not be full of black spots. Of course we cannot say where you have failed. As the emulsion is faulty it is not surprising that you cannot get the ruby colour by transmitted light.

A. R. Waters.—The sulphocyanide fixing bath never came into general use, as no real advantage was found from its employment. Use hypo. of good quality and plenty of it, and never employ the same solution for more than one batch of prints, however small the number in it may be. Remember the hyposulphite of soda is very cheap at the present time, and to stint its use is false economy.

Scotus.—The pictures on glass, which you say have the appearance of of being composed of bright silver, are nothing less than the "old glass positives." The method of getting the bright metallic lustre is to use an acid silver bath, and develope the picture with a solution of protosulphate of iron, acidified with *nitric* acid. A good formula for these pictures is fifteen grains of protosulphate of iron and five minims of nitric acid in an ounce of water.

J. Kinsley.—If you pour off the milky liquid you will probably find that it contains but a very minute quantity of bromide, the bulk having subsided in a firm "cake" at the bottom of the vessel. The separation of the bromide should take place perfectly in the time you name if everything has been done correctly, though it is not possible for us to say where you are at fault. Certainly the reduction of the quantity of gelatine is not the cause.

Photographic Society of Great Britain.—The next ordinary meeting of this Society will take place on Tuesday next, the 9th inst., at eight p.m., at the Gallery, 5a, Pall Mall East, when papers will be read by Mr. C. Ray Woods, on *Latitude in Exposure*, and by Mr. William Peek, on *Expression Photographs.*

Errata.—Owing to the non-arrival of the corrected proof of the article on *Iodide of Silver Spectroscopically Examined,* before our last issue went to press, a number of errors have crept into the text. On page 747, for "A T" or "K T" *read* "A I" or "K I." On line 32 from top of second column, instead of "the accompanying," *read* "the accompanying set of negatives." In next line, "Formula for the emulsions, Nos. 78, 79, &c., is the commencement of a new part of the subject. In line 40, for "analising" *read* "analysing." The sentence, line 6 from bottom of same column, should read:—"This fact, by itself, is certainly well known, but it is not equally well known that with varying proportions of iodide of silver the decrease to disappearance seems on the red side always to take place within nearly the same limits, but takes place much more gradually upon the violet side." In page 748, line 14 from bottom of first column, for "spacial" *read* "special." In line 10 from bottom, for "Abney's" *read* "Abney." The article should be credited to the *Wochenblatt* and *not* to the *Mittheilungen.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For two Weeks ending January 3, 1882.

These Observations are Taken at 8.30 a.m.

Dec.	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Sh'de Tem.	Min. Tem.	Remarks.
21	30·89	SW	49	48	—	50	35	Overcast.
22	29 83	W	39	38	—	45	35	Overcast.
23	29·53	NW	41	39	—	45	35	Cloudy.
25	29·58	W	58	44	—	54	34	Overcast.
26	29·45	SW	51	50	—	55	42	Raining.
27	29·45	W	54	44	—	60	47	Raining.
28	29·69	W	57	53	—	57	51	Very Cloudy.
29	29·57	SW	51	51	—	55	47	Overcast.
30	29·71	SW	53	50	—	58	46	Raining.
Jan. 1	29.80	W	55	54	—	56	49	Raining.
2	29.69	W	48	46	—	53	44	Cloudy.
3	29.96	NW	48	44	—	50	43	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1184. Vol. XXX.—JANUARY 12, 1883.

OUR ILLUSTRATION.

We are able to present to our readers with the present issue another specimen of the value of Messrs. Sprague and Co.'s process, which shows how readily it adapts itself to the rapid reproduction of photographic half-tone. The subject, *Water and Trees*, is by Mr. Edward Dunmore, who has been awarded, two years in succession, the first prize in the South London Photographic Society's "artistic competition." It is, therefore, a trebly-valuable specimen; for, in addition to its being a good sample of ink-photo. printing, it forms in itself an artistic study, and also indicates to those who have not the opportunity of inspecting the whole collection the standard of quality required, or reached, in the South London competitions, which are now entering on their fourth year.

From the nature of the present subject—more especially the dark shadows of the foliage—it is a difficult one to treat satisfactorily by the litho. process; but Messrs. Sprague and Co. are to be congratulated on the success of their reproduction.

BICARBONATE OF SODA IN THE ALKALINE DEVELOPER.

Many of our readers have, no doubt, been surprised by Mr. J. McKean's "new departure" in alkaline development, as described in his paper under that title read at the last meeting of the Edinburgh Photographic Society. Possibly, in addition to the feeling of surprise, there may have been also one of incredulity as to the success of the proposed "new departure." We must at anyrate confess to such a feeling on our own part. Reports received privately from one or two friends, speaking of the correctness of the statements contained in Mr. McKean's paper, induced us to try the matter for ourselves, and we were compelled to acknowledge that there was "something in it."

At the first blush, the idea of employing bicarbonate of soda as a *restrainer* in the developer appears a rather anomalous one. It is a salt much used in photography, and by many used indiscriminately with the carbonate (or washing soda) under the impression that they are one and the same, but that the bicarbonate is a *purer* form. The crude carbonate of soda—sold in this country under the name of "washing soda," and in America as *sal soda*—is at the present day rapidly finding its way into use as a substitute for ammonia in the alkaline developer; and some years ago the late Mr. Thomas Sutton recommended the bicarbonate for the same purpose in connection with dry collodion plates. It is also well known that ammonium carbonate (or, rather, the mixture of ammonium carbonates usually sold under that name) was for a long time preferred to *liquor ammonia* for developing dry plates. If, then, the carbonates of soda and ammonia are capable of performing the part of the active alkali in the pyro. developer, how are we to bring ourselves to look upon them or any one of them as restrainers? Such is the question that actually arises in the mind, and we shall proceed to attempt its explanation.

As we have said, upon trying Mr. McKean's formula we found to our astonishment that it was quite possible to develope, and to develope very good negatives, without any bromide at all, where the same plates refused to give respectable results with ammonia and pyro. alone, however much the alkali might be diluted. The action of the bicarbonate developer was slower in our hands with the particular kind of plates we used in our experiments—slower in the time occupied in the operation, that is to say—but, *cæteris paribus*, produced a better-exposed result with less evidence of fog or discolouration than when ammonia and bromide were used. But—and here comes the "but"—it does not act as a restrainer, or, at least, in the same way as a haloid restrainer. Bromide appears to be necessary to curb or to neutralise certain evil effects produced by the action of caustic ammonia upon the gelatino-bromide film. The cause of those evil effects being absent, it would appear that the necessity for restraining bromide in a great measure disappears. Thus, in employing the carbonate of soda formula it has been recognised that there is a lessened tendency to green fog and similar defects, while some operators aver that greater latitude in exposure is permissible. If these observations be correct, it is not difficult to point to the direction in which we should look for the explanation of the behaviour of bicarbonate of soda in Mr. McKean's mode of development.

Bicarbonate of soda (or, to use the names by which it is known by chemists, "mono-sodic carbonate," or "hydro-sodic carbonate.") is composed of one equivalent each of sodium, hydrogen, and carbonic acid. The "neutral" or disodic carbonate contains two equivalents of sodium to one of carbonic acid in its pure anhydrous state—*plus*, in the case of "washing soda," ten equivalents of water and other impurities, which may be ignored here. Thus, comparing the respective formulæ of the two salts we may place them as—

$$\underset{\text{Bicarbonate of Soda.}}{Na\,H\,CO_3 \text{ or } Na_2\,CO_3\,H_2\,CO_3} \qquad \underset{\text{Carbonate of Soda (anhydrous).}}{Na_2\,CO_3.}$$

The disodic carbonate of course contains a far larger proportion of alkali, or possesses a much stronger alkaline reaction, than the bicarbonate. The latter, moreover, is in solution a rather unstable substance, giving off carbonic acid slowly at ordinary temperatures, while a warm solution rapidly becomes changed to the state of disodic carbonate. So rapid is this change that if boiling water be employed to form the saturated solution it actually causes effervescence—a fact first pointed out to us by Mr. William Brooks, and which we have since corroborated. These points should be borne in mind in using Mr. McKean's process.

Now, let us consider the change that goes on when solutions of ammonia and bicarbonate of soda are mixed. Stating the case in the form of an equation, we have—

$$\underset{\text{Bicarbonate of soda.}}{Na_2\,CO_3\,H_2\,CO_3} + \underset{\text{Ammonia.}}{2\,NH_3} = \underset{\text{Disodic carbonate.}}{Na_2\,CO_3} + \underset{\text{Normal or diammonic carbonate.}}{(NH\,4)_2\,CO_3.}$$

In other words, the free ammonia abstracts one equivalent of carbonic acid from the bicarbonate, changing it to carbonate of soda, and becomes itself converted into carbonate. In Mr. McKean's formula there will, of course, be always excess of ammonia, so that his developer will contain caustic ammonia as well as the two carbonates. The addition of the bicarbonate, chemically speaking, acts only in the direction of weakening the alkalinity of the solution, though this is scarcely a sufficient expla-

nation of the change it effects in the behaviour of the developer. The subject is one which requires and deserves investigation, as it seems probable that new light may be thrown upon some of the reactions of alkaline pyrogallol with the haloid salts of silver.

SILVER PRINTING.

In our issue for last week Mr. J. Gale directs attention to the subject of silver printing and its shortcomings, and points out how little has been done in the way of improvement since the time of its first introduction, whilst in almost every other process of photo graphy considerable advancement has been made. We are sure that the sentiments of Mr. Gale will be re-echoed by every observant worker, be he amateur or professional. The weak point of silver printing, as pointed out by Mr. Gale, is that the finished picture is not a true transcript of the negative, and that so much of the more *extremely* delicate tints and gradations are lost in the processes of toning and fixing.

We have on several occasions heard many lament that a gelatine negative does not print so well as did a good wet collodion one, and they are inclined to attribute the fault to the process by which the negative was taken rather than to the printing; but is the charge well substantiated? We think not. It is quite possible, under exceptional conditions, to obtain all the delicate tints in a negative by the old process that we can in one by the new.

But, does a print from the one suffer less in the toning and fixing than the other? We venture to say that, as a rule, it does not. The contrary opinion has probably arisen in this way:—With gelatine these extremely tender and delicate gradations are obtained more often than they were with collodion, so that the loss sustained in the printing more frequently comes under observation, and, consequently, makes a greater impression. Hence, we shall dismiss the question of one process being inferior to the other in this particular respect.

That the albumenised paper itself is capable of rendering all the beauties of the negative no one can deny who will take the trouble to closely examine a picture while in the pressure-frame, when it is printed to just the depth it should be when finished. It is really in the toning or fixing, or the combined action of the two operations, that it is lost. If we carefully watch a print while in the toning bath, we shall note that as the action proceeds so the delicate gradations gradually disappear, and the longer it is continued the greater is the deterioration.

It will be noticed, in most instances, that prints which are only toned to a light-brown tint possess, when finished, a greater amount of delicacy than those in which the action of the bath is pushed on to the purple stage. It will also be observed that, although much will be lost in the gold solution, a further loss will be incurred in the fixing bath; so that, in the end, the finished picture is far inferior in delicacy to the unfinished one, as seen in the pressure-frame, which goes to show that it is in the toning and fixing that the injury is sustained, and that if these operations could be dispensed with better results would be obtained.

Now, to which of these two operations is the deterioration due? If we make a couple of prints from a negative of the same depth, and, after washing away the free silver from both, immerse one in the toning solution until it has assumed a rich purple colour, then fix it, and at the same time fix the untoned one, we shall note a marked difference in the delicacy of the two. The toned one will have lost much, while the other has lost very little, if any, though, of course, it will lack vigour, and will be of a disagreeable brick-red colour. If instead of over-printing, as in the former case, we print much lighter, we shall find that the picture still suffers very little indeed from the hypo. alone, which tends to show that it is to the toning operation the deterioration is principally due, the bleaching action appearing to eat away those tender, delicate tints in a greater proportion than the stronger, and at the same time further rendering what remains in such a condition that they are the more easily attacked by the hyposulphite of soda.

Of course, in the foregoing remarks we have not overlooked the fact that very much, in all cases, depends upon the condition of the two solutions; but we have assumed them to be used under the most favourable conditions. Still there will yet be a perceptible deterioration between what existed in the print when first removed from the pressure-frame and what it possesses when finished. From this it would appear that, if we could dispense with toning altogether and obtain the requisite colour without its aid, much would be gained; and if the paper could be prepared in such a manner that it would print to a pleasing colour, and retain it in the fixing bath, this would be accomplished. But how about the permanency of the image that has received no deposit of gold?

The opinion has been expressed by some good authorities that gold toning does not in any degree conduce to the permanency of the picture. This may be the case; but certainly prints toned only to the reddish-brown stage, which are found to retain the greatest amount of the most delicate gradations of the negative, can contain but an exceedingly minute proportion of that metal. We all know that prints made by development, when carefully fixed and washed, are, *per se*, more permanent than those on albumenised paper, and they contain no gold; so that the presence of gold is not really essential to permanence.

In what direction shall we look for improvement? Here is a wide field open for speculation and experiment; for it cannot be denied that something more than can be obtained by any of the present ordinary methods of printing is clearly essential, in order that the finished picture can do justice to all the beauties which exist in a perfect gelatine negative. That all these beauties can be reproduced from it is beyond question; for, if we make a transparency, either by camera or contact printing by almost any process, we may obtain all the tender gradations that are present in the original. Indeed, it is the possession of these delicate qualities to so great an extent that constitutes the principal charms of transparencies over paper pictures. How far the principle of producing a thin transparency, and then transferring the image to paper, may be utilised we are at present unable to express an opinion; but the matter may be worth the consideration of experimentalists, seeing that in a finished transparency we may have a perfect transcript of the negative, and that it is next to impossible to obtain it in a finished paper print as ordinarily produced.

TO ASCERTAIN THE FOCUS OF A LENS.

That a vast number of operators have but the dimmest of faint conceptions of the relative powers of the lenses they employ, and of the diaphragms belonging to them, is a fact that cannot be gainsaid. This may be explained in many ways, each as likely to be true as another; but possibly the most probable manner of accounting for it may be the apparent difficulty surrounding the modes of ascertaining or calculating the *data* in connection with the matter. A photographer of intelligence and skill, perhaps gifted with artistic taste and feeling, sits down resolved to mark his lenses and stops so that he may tell at a glance their relative powers. A system for doing so is ready to hand; it was proposed a dozen years ago in our pages, but was not taken up. Last year, however, the Photographic Society of Great Britain stamped a precisely similar scheme with their *imprimatur*, and now no one can do better than mark every lens and diaphragm he possesses in accordance with the Society's system. Any stop so marked, we have ventured to suggest, should be spoken of with the letters "U. S." (to signify "Uniform System") attached to the number marked upon it.

But the photographer after reading all the explanations, and being informed of the mode of calculating, finds he has (or thinks he has) a most onerous undertaking before him; but not thoroughly appreciating the actual advantages, and perhaps being a little uncertain of his calculating or mathematical powers—for he sees strange signs, symbols, and letters mingled with figures and fractions—he gives it up as a "bit beyond him." We know it is not really so, but what signifies that if he cannot see it in its true light.

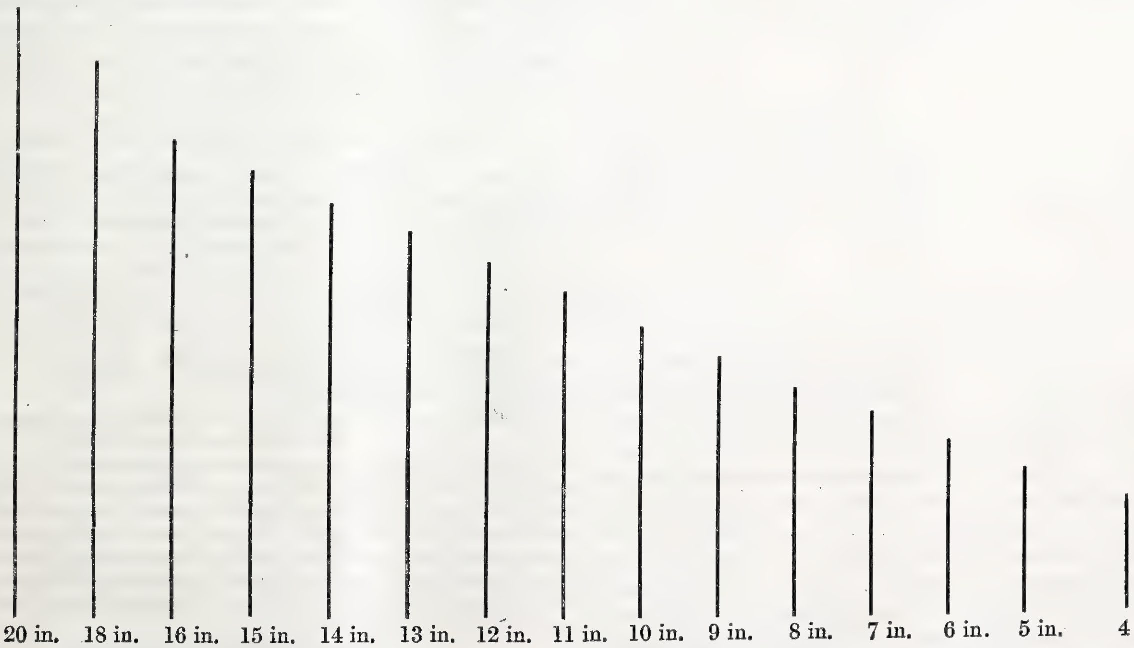
To render the matter as easy as possible, we last year (page 483) gave a diagram containing a series of circles of gradually-increasing

sizes, by means of which the photographer had nothing whatever to calculate. He matched the size of his "stop" by placing it over the circles, and then opposite its attached number he found the *U. S. number* in that special column headed by the focus of his lens. Nothing could well be easier and simpler than this, and the usefulness of the "U. S." method is almost beyond belief to those who have not adopted it or one of a similar kind.

"Granted all this," says the intelligent operator; "but I don't know the equivalent focus of my lens, and I cannot understand that farrago of figures telling me how to reckon it." This objection, too, has good grounds. In the cases of photographers possessing some four or five lenses whose foci were unknown to them, we opine that very few would be found capable of ascertaining those foci, and willing to spend the time if so capable. It is not done in a moment. The busy professional photographer cannot spare time, and the occasional amateur would rather be out with his instrument securing views; and so the bulk of lenses remain unnoted as to exact focus, and unmarked with any systematic number.

To aid as much as possible the busy, the indifferent, or the indolent we have devised a plan which will enable anyone, without apparatus or special contrivance, to ascertain the foci of his lenses at a glance and without any calculation whatever. It is well known that if the size of an object be ascertained, the distance of a lens from that object, and the size of the image depicted in a camera by that lens, a very simple calculation will give the focus of the lens. In compound lenses the matter is complicated by the relative foci of its constituents and their distance apart; but these items, in an ordinary photographic objective, would so slightly affect the result that for all practical purposes they may be ignored.

What we propose to do—what we have indeed done—is to make two of these terms constant in connection with a diagram, here given, so that a mere inspection may indicate, with its aid, the



20 in. 18 in. 16 in. 15 in. 14 in. 13 in. 12 in. 11 in. 10 in. 9 in. 8 in. 7 in. 6 in. 5 in. 4 in.

focus of a lens. All that is required in making use of it is to plant the camera perfectly upright, and place in front of it, at exactly fifteen feet from the centre of the lens, a two-foot rule, also perfectly upright and with its centre the same height from the floor as the lens, and then, after focussing accurately with as large a diaphragm as will give sharpness, to note the size of the image and refer it to the diagram. The focus of the lens employed will be marked under the line corresponding to the size of the image of the rule on the ground glass.

As our object is to minimise time and trouble to the utmost, we may make a suggestion or two as to carrying out the measuring. It will be obvious that any object exactly two feet in length, rightly placed, will answer quite as well as a "two-foot," which we selected as being about as common a standard of length and as likely to be handy for use, as any. The pattern in a wall paper, a mark in a brick wall, a studio background, or a couple of drawing pins pressed into a door, so long as two feet exactly are indicated, will answer equally well.

And, further, as to the actual mode of measuring the image on the ground glass (we may say that there is not the slightest need to take a negative): it will perhaps be found the readiest method to turn the glass the ground side outwards, when two pencil marks may be made with complete accuracy to register the length of the image, which can then be compared with the diagram. Whatever plan is adopted, if the distance be measured exactly between lens and rule the result will give the focus with exactitude sufficient for any practical purpose.

In conclusion: we would say that the above diagram, in connection with the former one alluded to (which will also be found in our ALMANAC), should render perfectly easy and simple the numbering of lens diaphragms on the Society's system, and the ascertaining of the foci rendered necessary.

It is very singular that photography has been made so little use of in processes of surveying. Photographic views, as everyone knows, always give perspective representations of the objects depicted; but more than one mathematician has taken the matter in hand and given methods of reducing perspective representations to plans on a uniform scale, and we believe that at one time a service on a considerable scale was organised by our neighbours across the Channel for the furtherance of such work in connection with military engineering, but was given up owing to the events of the great war. A clever draughtsman in a short time can produce a capital sketch of a fortification not possessing too many details; but, by means of a camera with a lens whose focus is known conjoined to certain definite measurements, photographs can be taken of the most elaborate works in a fraction of time, and yet be capable of reduction to an ordinary plan to scale. The advantages of such a method are not confined to military requirements, but are obviously capable of most advantageous application to a variety of processes in connection with everyday life.

Few substances, perhaps, have a more widespread use than has the syrupy-looking fluid glycerine, and though in photography its employment is less frequent than in other sciences, it has yet a distinct place therein. We need not be surprised, therefore, that with a rising market the sophisticators have been at work, and that a caution is needed to purchasers of the article. The latest sample of misplaced ingenuity is a pure fabrication containing no glycerine at all, the analysis by a competent authority giving it as a saturated

solution of sulphate of magnesia, with about three and a-quarter ounces of glucose added to each pint to cover the taste of the salt. The well-known bitterness of this sulphate cannot be effectually disguised; hence the tasting a sample of this fraudulent compound would at once reveal its character.

Glucose itself is one of the abominations of modern chemistry. An innocent-looking chemical enough, it is now employed in thousands of tons to adulterate sugar with; in fact, a pure cane sugar is at the present day most difficult to meet with. Every housewife can tell us how sugar does not sweeten as it used to do, and the photographer, in making his developer or adding to his gelatine, has now to reckon with a large percentage of glucose, instead of, as was once the case, with cane sugar, supposed to be found in its purest form in the lump sugar of the grocer; but, alas for commercial morality! more likely to be discovered as a technical curiosity upon the shelves of the chemist.

We have many times given formulæ for freezing mixtures, and drawn attention to any new combination for this purpose. The latest we have to chronicle contains some decided elements of novelty, in that no salt or acid is required, though the materials otherwise are less economical or readily available. The new method, invented by Herr J. Moritz, consists in mixing equal parts of snow and absolute alcohol (methylated, of course, would suffice), the reduction in temperature being from 4° C. to between —24° and —29° C.

The process of helio signalling which, as lately described by us, is proposed to be joined to photographic processes, is continually being developed. Thus, in Algeria, a message from Negrine, instead of taking as formerly three days to reach the nearest telegraph office, is now signalled by light, so that not half-a-day is lost. As such methods become more common, it cannot be doubted that photographic readings as a check against inaccuracies must become general.

Our readers may have read an account of the late display of the aurora borealis having worked an electric light. It appears that the electricity of the aurora did actually work an electric light, through a lamp being connected "to earth" and to a telegraph wire, an eight-candle lamp having thus illuminated to about half its full power.

We have given our readers full details of the result of the various expeditions for the transit of Venus observations, and it would, therefore, be a pity to break the completeness of the record by omitting to mention the latest account to hand, published, it appears, in the *Bristol Times.* The writer wishes to state that the recent "severe weather was attributed to the transit of Venus *through the sun.*" . . . . "Many dark spots have been observed on the sun more or less for the last five or six years, and they have been the cause of many wet summers." . . . . "But now that Venus has passed triumphantly *through* the sun, and having taken with her all the dark spots and specks," . . . . "I venture to predict that we shall be blessed with a series of beautifully fine and productive summers." Though the writer's vaticinations are cheering, we cannot say the premisses upon which they are founded are verified by photographic observations.

The comet photographs taken by Mr. Gill at the Cape of Good Hope observatory were, with some of the Venus transit photographs, exhibited at the last meeting of the Paris Academy of Sciences for 1882. It is stated that the sixth and last photograph occupied one hundred and sixty minutes in exposure! and that, spite of this greatly-protracted time, the stars at the centre of the picture were quite sharp. It is quite evident from this fact that the production of the proposed map of the stellar vault is a matter of but little difficulty; as to its value there cannot be two opinions. It would be a perfectly simple affair to produce the pictures in duplicate, or even in triplicate, to avoid any possible chance of a speck or stain being represented as a planet or star, though with gelatine plates such *contretemps* are of the most distant probability.

The Hon. Secretary of the Postal Photographical Society recently submitted to us for our inspection the prints contributed by its members in competition for prizes offered in landscape, figure, and a set subject of an artistic character announced beforehand. The collection is really a very creditable one, and includes some work of high-class excellence. It is now, we are informed, circulating among the members for their votes, the prizes being decided by the votes of the whole body of members themselves, who act thus, as it were, as their own judges—a system upon which we have remarked before. In the present instance each member is provided with three votes in each class—one being for the best negative as far as can be judged, one for the best print, and one for the best picture pictorially. This analysis and separation of the pictorial and the technical qualities possess many points worthy of thought, as the least consideration will show that the best photograph technically need not necessarily be the best pictorially, and *vice versâ;* and, while each is entitled to credit, it should be distinctly understood, in reference to any photograph, whether it is its technical or its pictorial qualities in respect of which it gets that credit. We were also shown the second album of prints contributed by members which is now circulating, and found that the system adopted is always to require every member to send on a printed form the following particulars:—Subject, Time of Day and Date, Light, Plate, Development, Lens, Stop (in terms of focal length), Seconds, Toning, and Remarks. These particulars are gummed in to the albums with the prints, and form a useful explanation of the work sent. The Hon. Secretary informs us that he hopes to start the third album this month, that he has already contributions towards the fourth, and that the number of members, being now nearly forty, seems to show that the Society supplies a want felt by many amateurs too remotely situated to belong to any of the other local societies. Another competition is announced for April next.

THE AMMONIO-NITRATE QUESTION.

Our readers will scarcely take a vivid interest in what is to follow; but, as a matter of justice and fairness, we print a communication received from Mr. A. L. Henderson some time ago, to the publication of which he attaches importance. It has already secured publicity, having been read as a paper at a recent meeting of the Society of which Mr. Henderson is a member. It is intended as a reply to our monthly correspondent "Argus," and runs as follows:—

A REPLY TO "ARGUS'" ATTACK ON THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION, AND ON MYSELF PERSONALLY.

[Read at the meeting of the London and Provincial Photographic Association, on Thursday, December 14th, 1882.]

Gentlemen,—Many of you have seen the remarks of this anonymous writer in The British Journal of Photography of Friday last. I will, with your permission, reply to most of his statements. I am not quite sure who the writer "Argus" may be, but I have a very good idea. One thing is certain: he shows an amount of animus strongly in keeping with the unscientific boiling-process advocate. He may be an aspirant to literary fame who, having partially succeeded, reminds one of the nursery rhyme of—

"Humpty Dumpty who got on a wall.
Humpty Dumpty cried out, "I'll fall!"
All his friends, both great and small,
Couldn't or wouldn't support him at all."

Now, gentlemen, you are aware how the ammonia question arose. The Editor of The British Journal, in his obituary notice of the late Dr. Monckhoven [British Journal of Photography, October 6th, 1882, page 569], says:—"It should be borne in mind that though others have tacitly claimed the credit, Dr. Monckhoven was the first to use ammonia for the purpose of giving sensitiveness to a gelatine emulsion without heat or prolonged cooking." It should be quite clear that I am right when I stated that I had previously advocated the use of ammonia nitrate at the Brittlebank meetings, and, for the edification of "Argus" and others, I will now give the name of the party whom I made the compound for—Mr. J. Thomson, of China and Cyprus renown. Mr. W. Cobb also reminds me that he heard of this at the time.

But how good and considerate of the Editor of The British Journal of Photography to give Dr. Monckhoven the credit (one can be liberal with another's property) when, according to "Argus," showing it is due

to Mr. J. T. Taylor, and he, moreover, gives the date June or July, 1879, as the time Dr. Monckhoven published his method. I have carefully looked over the journals, and the first notice I have come across is dated September 5th, 1879—three months later than the first Brittlebank meeting, which, I believe, took place on the 11th June, 1879. In THE BRITISH JOURNAL of September 29th, 1876, Mr. J. Johnston gives a new emulsion process, in which he adds a new silver salt, but no mention is made of the nature of the new salt, so that "Argus" is again astray, and is presuming, showing that he can do a "twist of the wrist."

Then "Argus" goes on to say that I claim the introduction of alcohol. I never laid claim to originality in anything; I merely gave a formula in which alcohol and ammonia play an important part. Nor do I wish to rob Mr. Foxlee, "*Ostendo non Ostento*," or even the Editor of THE BRITISH JOURNAL of the credit of discovering the wonderful power of alcohol in dividing matter, especially when it is acting on the optic nerve of a living subject, or its antiseptic property of preserving anatomical specimens from decay.

I quite agree and sympathise with "Argus" in his last paragraph, when he says he is sorry to occupy so much space over matters of such trifling importance. Oh! but I forgot—he is a "penny-a-liner." The members and "Argus" may be surprised to learn that, after all, the author of the unscientific boiling process is not Mr. W. B. Bolton. With apologies to that gentleman for the *exposé*, A. L. HENDERSON.

With regard to the greater portion of the above we need not say one word; but there are one or two points on which we may possibly say a word or two in order to set matters straight, and to show that "Argus" has not misstated facts. As respects the relative dates of the Monckhoven publication, perhaps nothing can be decided on either side. Mr. Henderson gives no date whatever in connection with this suggestion of the use of ammonio-nitrate of silver; and though Dr. Monckhoven's ammonia process was published in the continental journals some time before (we cannot just now refer to the exact date, though it was probably in August, 1879), it did not appear in our pages until October 14th of that year. Turning to the statement that Mr. Johnston made no "mention of the nature of the new salt" employed in his process, we must refer Mr. Henderson and our general readers to the following quotations, the references having been given to us by "Argus" as a proof of his *bonâ fides*.

Speaking of the "new salt" on page 461 of our volume for 1876, Mr. Johnston says:—"It is a similar salt to that mentioned by M. Cazeneuve, in the Journal of the 1st September." Turning back to page 417 (Sept. 1st) of the same volume we find in a quotation, too long to reproduce here, a distinct mention of a double salt, the components of which are silver nitrate and ammonia.

But on page 565 (December 1st, 1876) the following reference should prove that "Argus" has not indulged in a "twist of the wrist." In an article on *Ammonio-Nitrate of Silver* the Editors, after speaking of their method of preparing that salt and its action in *collodion* emulsion, go on to say:—"We next repeated our experiments with gelatine in place of collodion, using ammonium instead of cadmium for bromising. In this case, also, in place of Mr. Johnston's salt, we used ammonio-nitrate *solution*—not the crystals. Sixty grains of gelatine were allowed to soak in water until swelled, and then dissolved by means of heat; twenty-five grains of bromide of ammonium and sufficient water to make the bulk up to two ounces and a-half were then added and thoroughly mixed. In a small glass flask forty-two grains of silver nitrate were dissolved in three drachms of cold distilled water, and ammonia added, drop by drop, until the solution became quite clear." * * * The solution was then "poured, while still hot, into the bromised gelatine and thoroughly mixed." This, it appears to us, is a very complete exposition of the most modern of modern ammonio-nitrate processes, so that Mr. Henderson can scarcely charge "Argus" with being "again astray."

In the matter of the introduction of alcohol into the emulsion: as Mr. Henderson himself disclaims any desire or credit for originality, then either "Argus" or the reports must be in fault.

IODIDE OF SILVER IN EMULSION AND EXCESS OF SOLUBLE BROMIDE.

I HAVE just read the translation in THE BRITISH JOURNAL OF PHOTOGRAPHY of a paper by Herr Schumann, which appeared in the *Wochenblatt*, and its editor's remarks thereon. I should not have written anything on the subject of the experiments *in re* the spectrum work, since from their description discrepancies between other researches and those quoted might be expected, had not a statement been made that I had said plates containing iodide might be used in a room lighted with yellow light. I, however, never said anything of the kind. What I did say in my original paper was this: that when one-sixth part of iodide is used "development and tone take place in a room in which the ordinary wet process is worked, *always supposing that the glass or covering of the window really admits only orange light.*" With smaller proportions of iodide "ruby and orange glass combined are sufficient protection during development, which is more than can be said when silver bromide alone is used." It should be remarked that I never said anything regarding the preparation of the plates, but only the development—a marked difference. This was written nearly three years ago, and I do not see anything to alter in it, as the latter light is still what I use for such plates.

It would be as well for the experiments to be repeated with a couple of simple prisms of 60° before a *coup de grace* is to be given to work which has been repeated and confirmed by myself and others. There is no instrument which can utter greater libels than the spectroscope if certain precautions are not taken. Can it be that these experiments have some of those instrumental errors connected with them? There is one feature which I cannot help alluding to, namely, the insensibility of Ag Br to the ultra violet. This certainly is new.

One other word *in re* translations. Some little time ago I noticed that the editor of the *Mittheilungen* had condemned as useless emulsifying silver bromide in gelatine with good excess of bromide, basing his opinion on an experiment that if he did so emulsify and then washed before boiling he got the same rapidity as he did by boiling and then washing. The "Abney-Wilson theory," as he christens it, is condemned because of this experiment. A series of experiments were made by myself and, I believe, also by Mr. Wilson, and we stated our results at different times, Mr. Wilson having priority. Notwithstanding this condemnation, I am not aware that any one has adhered to the exact combining proportions of the soluble haloid and the silver nitrate, and I certainly do not advise it. If you want fog, slowness, and unlimited boiling to bring about the desired molecular change, by all means keep the proportion of bromide low. If you want to get the same characteristics in another way, wash before boiling the emulsion. What has been called the "Abney-Wilson theory" is hardly a theory, but a statement of fact, which anybody can try, and which plenty of workers have tried.

W. DE W. ABNEY.

CHLORIDE OF GOLD FOR TONING.

THE consumption of the precious metals in photography is a matter of such importance to the professional photographer that it behoves him at every point to see where he can economise. In careful hands, and with an efficient system—as every photographer knows, or should do—a very large proportion of the metals used can be recovered from the so-called "waste;" but still, after every care bestowed in this direction, there is a large value of silver and gold sent away in the form of pictures, not to speak of waste and loss through accident and careless (or worse) fingers. I think few photographers save a larger proportion of metal from their residues than I do myself, still I find, as is natural, that the receipts from residues are a long way from balancing the expenditure on silver and gold.

While nitrate of silver is sold at a price equivalent to change for a shilling such is not the case with chloride of gold, which, purchased in bulk, costs the buyer about twenty-five per cent. above the intrinsic value of the contained metal, while if bought in the small fifteen-grain tubes the proportion is still larger; and, as the "savings" from gold are but slight, one may estimate that the percentage named is so much dead loss.

To make chloride of gold for toning it is, however, unnecessary to reduce it to the partly crystalline form, in which, in combination with soda or potassium, it is now vended. So long as it is not too acid, and that it is of definite and known strength, it is a positive advantage to have it in the form of solution. Few photographers, I should think, weigh out their chloride each time they make a batch of "toning solution;" I know I do not. Whatever the form in which I obtain it in the first instance I always prefer to keep it ready for use in the shape of solution—generally of the strength of a grain to the drachm. In fact, with most of the laboratory chemicals in common use I adopt the same plan. The bottle is labelled with the salt and its strength, and it saves much time, trouble, and mess to pour out a nice, clear liquid containing exactly the amount of salt required and ready dissolved. I do this with the silver also, and find it an advantage.

I can assure those of my professional brethren who have not yet tried it that the making of chloride of gold is a far

simpler matter than they might suppose, the chief difficulty being the restraining of the experimenter's impatience while the precipitated gold is subsiding. If he find this too much for him he can pass all the liquid through a *double* filter, and, when the liquid is all run through, pop the filter and all in the fresh *aqua regia* he has ready to dissolve the gold; the paper will do no harm.

I am presuming my readers to be acquainted with the routine of the process—at anyrate theoretically. Dissolve a gold coin in a mixture of one part of nitric and four parts of hydrochloric acids, and heat gently till dissolved (four or five drachms of the mixture is sufficient for half-a-sovereign). Dilute largely with water, precipitate with a filtered solution of "iron"—the same salt that is (or was) used for developing—and wash and redissolve with acid. The only difficulty, as I have said, is the waiting for the precipitated gold to separate, which is in such fine particles, and perhaps also the want of a suitable vessel in which to make the precipitate. Photographers do not care to keep many chemical vessels, still I do not recommend a jug; and it is in this case best to buy a special vessel. The glass precipitating jars, wider at the base than the mouth, are to be preferred, as the gold is less apt to settle upon the sides.

I am, however, writing at the present time with the object of narrating my experience with a still simpler method of procedure—no new plan, but one that has been both condemned and praised by various experimentalists. It is, perhaps, not necessary to state that while silver coin does not contain its nominal value of silver metal gold coins do. Thus, a sovereign contains a pound's worth of gold; hence in making chloride we may be sure in using coins we get the full value of the raw metal. I do not think the authorities would interfere, though I believe it is against the law to deface or destroy coin of the realm.

For our purpose Australian coins are the best, as they contain less copper than English. The plan I am now recommending is simply to dissolve the coin in the mixed acids, and, after evaporating the bulk of the acid when solution is complete, to dilute with water to any required strength, and use the liquid without further treatment to make the toning solution, just as though it were the salt bought from the dealers. It will, further, be well, before diluting, to add a little chalk or whiting and to at once filter from the sediment, as chloride of gold solution, if fully neutralised by chalk, changes in chemical composition and gradually decomposes with keeping, depositing upon the side of the vessel, with the effect of lessening its strength. In dissolving the coin it is well to use a little heat, or the dissolution will occupy too much time, and require more acid.

With regard to the results of toning by this impure solution, or "gold-copper solution," as we might term it: I must say I fail to detect the slightest difference between it and the best chloride I can make or purchase. I have tried the two side by side with the same class of print from the same negative, and could see no difference; and though, now and then, when my printers have obtained a batch of prints in which some have been less satisfactory than usual, I have been inclined to doubt the gold, I have always found full and sufficient explanation in other directions. I may say that the gold-copper solution allows me to make a toning bath (with acetate) that gives prints bright, rich, and vigorous.

G. Watmough Webster, F.C.S.

TRIAL OF BURTON'S EMULSION PROCESS.

As the above process, though introduced to the notice of the photographic world by my friend Mr. W. K. Burton as far back as the 14th of November, in an address delivered at the meeting of the Photographic Society of Great Britain, is still to a certain extent *sub judice*, a few remarks upon it by one who has given it a careful and unprejudiced trial may not be out of place. In every branch of science there is a danger that what claims to be an improvement may really be a retrograde movement, and this holds good particularly of photography. I do not think, however, that Burton's emulsion process can by any possibility be placed in this category of equivocal innovations.

Winter is, *par excellence*, the season for manufacturers of emulsions. The cold is advantageous, while actual photography being at its minimum the photographer cannot do better than prepare for future campaigns. Though lack of time has caused me to fall back on commercial plates of late, it has been my custom, as far as possible, to prepare a stock during the winter months which should suffice for the whole of the summer.

With this laudable object I was about to start with my old favourite, the boiling process, when I noticed the publication of Mr. Burton's modification. It recommended itself to me at once as being an improvement over everything which had gone before. The only objection which I could see against it was the great length of time from the beginning to the end of the manipulation, and this in my own case proved to be a positive advantage; for, having my time taken up with professional business, and being liable to interruption, I have under any circumstances to extend my operations over several evenings. Observe particularly that, in Mr. Burton's process, although the whole time needed is comparatively long, still that occupied in actual manipulation is shorter than is the case in any ordinary process. It commends itself to a busy man or to any amateur, situated like myself, with intermittent and irregular periods of leisure.

The details of the process have been already dwelt upon in The British Journal of Photography, but still I may briefly recapitulate them for the benefit of anyone who may, notwithstanding, be hazy as to the details. Any formula may be retained during the early part of the process, as the special features are only introduced after the boiling is completed. Mr. Burton recommends, however, the employment of an unusually large amount of water, under the impression that it favours a fine state of division in the bromide of silver—a supposition in which I consider him to be perfectly correct. After cooling the emulsion down to 120° Fahr., or thereabouts, strong ammonia and alcohol are added. This causes the bromide of silver to be precipitated, and the solution containing the gelatine and soluble salts may be poured off. This process is repeated, the former precipitate being stirred up in a fresh quantity of water, and allowed to settle once more. It is then washed by decantation, mixed with gelatine, and the emulsion is complete.

An excellent rough-and-ready method of improvising the necessary boiling apparatus is to use a jam pot covered by an inverted flower-pot saucer, and placed standing in a good large saucepan with the lid on and half full of water. The whole is placed upon an ordinary cooking burner. This arrangement will be found to answer quite as well as a more pretentious one, and to give most satisfactory results. In this manner I have prepared plates more rapid than any I have got before, and of excellent quality. The emulsion needs some keeping, however, before it attains its maximum of sensitiveness. I find that, as a rule, the plates will not stand so strong a developer as pure, boiled emulsion plates; but, on the other hand, they will give density with a weaker one.

I have read with considerable interest a communication upon *superficial fog* in The British Journal of Photography, by the originator of this process. In it he remarks that it only makes its appearance in the case of emulsions which are very rapid, and which are capable of giving dense images with clear shadows. My experience entirely corroborates Mr. Burton's researches in this matter. I have formed my own conclusions, however, as to the cause of the phenomenon. I believe it to be due to alkalinity of the emulsion, combined with the predisposing nature of the silver bromide. It is, I find, by no means uniformly amenable to the treatment recommended, namely, the addition of alcohol and preservative, though this has undoubtedly very frequently the desired effect. I find that the addition of any mineral acid (hydrochloric, for example) to neutralise the alkilinity of the emulsion, will invariably cure it. Care must be exercised in adding it, however, as any considerable excess of acid has the effect of slowing the plates, and should, therefore, be avoided.

Another point worthy of notice in connection with the addition of acid is that ammonia has to be added to the emulsion to cause it to ripen by keeping. Hydrochloric acid is added to neutralise this ammonia, and, of course, chloride of ammonium in the film is the result. This, it must be remembered, is a powerful restrainer, so that the less there is of it present the better for the efficiency of the emulsion. The least possible quantity of ammonia, therefore, should be added in the first instance.

I have read the excellent editorial article, which holds out some prospect of doing away with the ammonia and of requiring a shorter time for precipitation. I shall certainly try it, and shall, with the Editors' permission, give the result to your readers in a future communication.

A. Conan Doyle, M.B., C.M.

LANTERNS AND SLIDES.

No. I.

The South London Photographic Society—all honour to it!—has for some years devoted a special evening at this season to an annual exhibition of lantern slides. The last, held at the House of the Society of Arts on Thursday, the 4th inst., was more numerously attended than any previous annual gathering; and this fact, coupled with

the great number of photographic transparencies sent for exhibition on the screen—upwards of 350—is one of many indications forthcoming on every side which seem to prove that the lantern is steadily rising in favour as a source of amusement and instruction.

The day cannot be far distant when the lantern will be universally used as a means of education; and this instrument—already employed at Rugby, Marlborough, Eton, and many other large schools and colleges within my own knowledge—will be in daily use in every school. All that is wanted is good slides in place of the atrocious rubbish with which the market is flooded. The field is illimitable; a demand will spring up for every conceivable subject if we can only get good pictures on the screen.

It will be generally allowed that the excellence of the slides shown at the recent meeting reached a higher average than on any former occasion; but it is also certain that a great number of those exhibited were very bad. Let those who were disappointed when they saw their pictures on the screen take heart and try again; their failures are the best teaching they can have. They can be sure of one thing—that their slides were put on the screen at their very best, and that what faults there were were not in the light, or the lantern, or the manipulation of Mr. Wm. Brooks. But little, therefore, was wanted for the 1883 meeting to have been a great success.

In the first place, these gatherings are attended by many who go for instruction rather than amusement. I feel sure that many, like myself, would have been glad if the processes by which the various slides had been produced had been announced. Secondly, it was a pity that some exhibitors had not paid due attention to the clear instructions as to the size of the pictures. It cannot be too widely known that the size of the glass on which the picture is taken is important; that it must be three and a-quarter inches high, this being the standard adopted in all countries. The length of the glass is of less moment. The French slides, for instance, are three and a-quarter inches high and nearly four inches long; the Woodbury (and American) three and a-quarter inches high and four and a-quarter inches long; while the current English size is $3\frac{1}{4} \times 3\frac{1}{4}$. The mount is of less importance, but it should invariably so mask the picture as to cut off all clear glass at the edges. Inattention to this materially affected the brilliancy of several pictures shown the other evening.

Uniformity in size and shape of the mask or mount is hardly to be expected. All subjects do not look equally well in a square mount. As a general rule, a square mask with the corners rounded (cushion-shaped), two and three-quarter inches either way, or a trifle wider, is the best where the subject will permit it. It is better that the four corners should be rounded rather than dome-shaped, for the reason that the condenser, which is found most efficient and economical, is four inches in diameter. A little must be allowed for the mount or cell, and it will then be found that the utmost such a condenser will illuminate is the size I have mentioned. Any lantern with condensers of less diameter must be considered as a toy.

Slides of the highest excellence can be produced by a great many different processes. Two qualities only are absolutely essential, viz., purity of the whites and transparence of the shadows. Those who were fortunate enough to have shown slides that evening with which they were satisfied on the screen will have a standard of reference by which to judge the quality of other subjects; but others who were not so fortunate may be glad to know how they can judge if a transparency will be effective on the screen.

It is very simple and absolutely certain. The two essential qualities, I have said, are purity of the whites and transparence of the shadows. The first can *only* be judged by laying the unmounted slide, face downwards, on a piece of white paper. The highest lights must then be pure white. If there be the slightest trace of fog throw it away at once; it is utterly useless as a lantern slide. Do not attempt for a moment to delude yourself with the idea that with the lime light a little filminess will not matter. It is absolutely fatal to brilliancy with either lime light or the ordinary oil-burning lantern. When lying on the paper the most delicate tones, which held up to the light would be almost invisible, will be distinctly seen. If they are thus seen they will be faithfully shown upon the screen; but any hard, white patches thus seen upon the paper will be just the same in the lantern, like some we saw the other evening, when sun-lit roads and trees looked as if they were powdered with snow, and were by some actually imagined to be so. On the paper very nearly all the half-tones should be *clearly* visible—not all the detail in the shadows; if so, the picture on the screen will be poor and weak.

The final examination of the slide must be done by transmitted light; and this is best done in the evening by one's ordinary lamp. I find nothing better than the opal globe of a Silber lamp. After it has been alight for some time the eye has become accustomed to it—judgment far more easily effected with a comparatively uniform light than by daylight, which varies so much. The details in the shadows which were confused when lying on the white paper must now be *clearly* visible against the opal globe. It should be a *moderately* vigorous picture, full of detail in the shadows. If the slide will stand these two tests it will give a perfect picture on the screen with any lantern and any light. No greater mistake can be made than to suppose that a denser slide is required for lime light than for oil light. A good one is equally good with either.

And now as to tone. This is to a great extent a matter of taste, and, I venture to say, of comparatively little moment. Experts were probably struck with the great variety of tones of the slides exhibited at the recent meeting; but I doubt if, great as the range was, any would have failed to thoroughly please on account of its tone being either too warm or too cold, if otherwise harmonious. It was a point which I was particularly watching, and judging from the applause with which the various pictures were greeted, tone had very little to do with it.

Colouring is unquestionably a mistake. It is so nearly impossible for the minute details of a photograph to be accurately coloured that the expense of really effective colouring puts it quite out of the reach of the ordinary tax-payer, and inferior colouring is out of the question with such an optical arrangement as we had, where every slip of the brush or impurity of the colour is prominently brought out as a blotch on which the eye *will* fix itself. I have always found—and last week's meeting was no exception—that good slides are gladly welcomed, uncoloured. However, as there is a demand for coloured slides, I must add one word of advice on the subject: let the slide be a good one, to begin with; no colouring will improve a bad one. If the colours are not transparent they are useless for lantern work; and if they are transparent they will not obscure the shadows. If the slide be of a proper depth of tone before colouring—well, you may not spoil it. George Smith.

NOTES FROM ITALY.

I received from my friend, Emile Pricam (not Pegram, as printed in my letter), a communication which will be interesting to your readers as the experience of a thoroughly-successful professional photographer. He says, by the way, that the plates he uses are not from a French manufactory, as I supposed, but from Monckhoven's, and he is quite satisfied with them. I have tried them here, but, testing them in Montabone's studio, side by side with the English plates I use, we found the Monckhoven plates to demand double the exposure required by the English plates.

The experience of Mr. Pricam in the iron development is the part of his letter which has the most value for the Journal, and I translate it entire:—

"One of the causes which have induced certain operators to reject the iron development is probably the use of a bad quality of oxalate of potash. It is requisite to try each lot of oxalate with test-paper to be certain as to its neutral conditon. If there be the least alkaline reaction it is impossible to get rich and vigorous negatives. When I find this state of the oxalate I correct it by the addition of a few drops of oxalic acid, one-tenth of its normal strength. In the instructions which accompany the plates it is recommended to add some drops of sulphuric acid to avoid decomposition of the developer, but in practice I find this rather injurious than otherwise, retarding the development. A five-per-cent. solution of iron decomposes in a few minutes, but this is not the case with a solution of thirty per cent. The latter keeps several days without any alteration. It is unnecessary to say that the use of pure sulphate of iron is indispensable.

"Though I rarely need to strengthen my negatives I have tried the Edwards' intensifier, but find my negatives grow yellow under it. I obtain the same advantages by the use of nitrate of uranium and red cyanide of potassium. To reduce the intensity of negatives I employ the perchloride of iron in a solution of three per cent. I made very lately a series of trials of an interesting character on an over-intensified negative. After having reduced it with the perchloride until the image had nearly disappeared, I attempted to restore the intensity by the use of citrate of iron (employed in the gelatino-chloride formula of Dr. Eder). I succeeded perfectly, and even made my negative stronger than before; then, washing carefully, I applied rapidly to the plate a solution of cyanide of potassium at four per cent., and almost instantly the intensity was reduced to excellent printing density. The film did not, during all these experiments, show any tendency to frilling, nor did a single spot appear.

"Before closing, I desire to say a word on the subject of diaphragms. Two lenses in my stock—a rectilinear by Hermagis, and a rapid rectilinear by Dallmeyer—show a considerable difference in the focus when I focus with the full opening and then put in a small diaphragm; but, on the contrary, an aplanatic by Steinheil shows no difference whatever. I do not know, not being strong in optics, the reason of this difference, the two lenses in fault giving, however, excellent results."

Apropos of this last point, I have made a series of negatives with lenses from five inches to twelve inches (rapid symmetrical, by Ross and

Co.) to ascertain the effect of focussing with their full opening, and then stopping down to the smaller and smallest diaphragm ($\frac{f}{80}$), and find, as I always have believed, that there is not the slightest evident change of focus. The question is of importance, as the advantage of focussing with a full opening and brilliant image is very great, and I should consider it a fault in the construction of a lens if it changed the focus in the least under the circumstances.

I have been experimenting in transferring and "lifting" gelatine negatives, and enclose one of my experimental results. It is slightly cockled, owing to my coating it with collodion on one side after it was detached from the support. I have not yet ascertained all the conditions of success, as some films I find very obstinate; but when I have got reasonable certainty I will report. W. J. STILLMAN.

Florence, January 2, 1883.

NOTES ON PHOTOGRAPHY.

LECTURE VI.—THE GELATINE PROCESS.—HISTORY.*

GELATINE has been employed as a vehicle in which to suspend sensitive salts since the earliest days of photography.

1863. In a paper of this date, by M. Gaudin, we have, however, the first account of its employment for emulsion purposes.

1871. Dr. R. L. Maddox introduced the first workable emulsion process with gelatine, and showed some negatives produced by his process to Mr. J. Traill Taylor. He added an excess of silver nitrate to a solution containing gelatine and cadmium bromide, and coated plates with the resulting mixture. When dry they were exposed and developed with plain pyrogallic acid.

1873. Mr. Burgess advertised gelatine emulsion for sale in the photographic journals. The method of preparation was not published. —— Mr. King pointed out the necessity for removing the useless products in emulsions, and described the use of dialysis for that purpose. He also pointed out the beneficial property possessed by alcohol of assisting the production of the silver of bromide in a fine state of division.——Mr. Johnston also in this year recommended that the soluble bromide should be in excess of the silver salt—a recommendation which is now universally adopted.

1874. Mr. R. Kennett gave a great impetus to the new process by the introduction of his gelatino-bromide pellicle, and in June of the same year published his method of preparing the pellicle. His process differed from Dr. Maddox's in that he kept the soluble bromide in excess, and, after allowing the emulsion to set, scraped it into small pieces, which were allowed to soak in water to dissolve out the soluble products. It was then dried and preserved for use.

1878. Mr. C. Bennett (an amateur) generously published his discovery that by prolonged digestion at a moderate temperature (about 90° Fahr.) gelatine emulsions containing excess of soluble bromide increased in sensitiveness to a most remarkable extent. He also exhibited some wonderful results he had obtained with very short exposures on plates coated with emulsions which had been digested—in some instances as long as seven days.

1879. Captain Abney published his simplified process by precipitation from aqueous solutions and washing by decantation. This is the most simple process known, and with a little care yields satisfactory results.—— Dr. Monckhoven published his process with silver carbonate and hydrobromic acid, and his discovery of the accelerating action of ammonia.—— Mr. G. Mansfield discovered that by boiling an emulsion for a short time the same effect is obtained as by prolonged digestion at a lower temperature.——Finally, Mr. W. B. Bolton, in an editorial article in THE BRITISH JOURNAL OF PHOTOGRAPHY, described a practical process utilising Mr. Mansfield's discovery, and which process forms the basis of most of the methods now employed.

1880. Captain Abney pointed out the advantages derived by employing a small quantity of silver iodide in conjunction with the bromide.— Mr. W. J. Wilson (winner of the Paget prize) showed the important part which the excess of soluble bromide plays during digestion, and the necessity for keeping the emulsion slightly acid during the same period.

GELATINE.

Gelatine being the all-important substance in this process, its properties and peculiarities should be very carefully studied. Gelatine is a complex organic substance composed of four elements—carbon, hydrogen, oxygen, and nitrogen—united, according to Scherer, in the following proportions:—

Carbon	50·4
Hydrogen	6·9
Oxygen	23·8
Nitrogen	18·9
	100·0

It is obtained as a product when bones, hoofs, skins, and various other kinds of animal matter are heated for some time with water, more especially if the water contain free acid or alkali. There are many different methods employed in the arts for the extraction of gelatine. Thus, in England Nelson employs caustic soda and Swinburne water only, while in France hydrochloric acid is generally employed. They are all, however, in practice somewhat complicated.

* See *The Rise and Progress of Gelatine Emulsion Photography.* By W. B. Bolton.—BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, 1880.

Dr. Ure thus describes the method employed by Nelson:—After washing the parings, &c., of skins he scores their surfaces and then digests them in dilute caustic soda lye during ten days. They are next placed in an air-tight vat lined with cement, kept at a temperature of 70° Fahr., then washed in a revolving cylinder apparatus with plenty of cold water, and afterwards exposed to the fumes of burning sulphur in a wooden chamber. They are now squeezed to expel the moisture, and finally converted into soluble gelatine by water in earthen vessels enclosed in steam cases. The fluid gelatine is purified by straining it at a temperature of 100° or 120° Fahr., allowed to set in thin sheets, and dried on nets.

Properties.—Pure gelatine is a neutral, transparent solid, without taste or smell. At the ordinary temperature it is somewhat soft and flexible, and contains from fifteen to twenty per cent. of water. Dried over the water bath it becomes hard and brittle, and may be powdered in a mortar. Immersed in cold water it swells up, absorbing a large quantity (from five to ten times its weight—Abney) of water, and becoming very soft and flexible; it does not, however, dissolve. The swelled gelatine heated to about blood heat (90° Fahr.) melts into a transparent liquid. On cooling this liquid again to about 70° Fahr. it solidifies or sets into a tremulous jelly. The quantity of gelatine compared with water required to solidify in this way varies considerably with different samples, but is usually very small. A quarter of an ounce of a good sample will set with no less than a pint (twenty ounces) of water. As a rule, five per cent. or one ounce of gelatine to the pint of water, is a fair quantity to employ to form a firm jelly. The addition of a small quantity of alum, or a still smaller quantity of chrome alum, hardens gelatine and raises its setting and melting points.

A solution of gelatine by continued boiling or frequent setting and reheating undergoes a change in properties, so that it refuses to set when cold and disolves readily in cold water. Free acids and alkalies, ammonia and ammonium salts—such as ammonium bromide and nitrate—greatly accelerate this change. In contact with water gelatine putrefies in a few days, first becoming acid and then strongly alkaline with evolution of ammonia. The time taken for this putrefaction varies considerably according to the weather, the occurrence of a thunder-storm frequently setting up very rapid putrefaction.

Thymol, salicylic acid, carbolic acid, acetic acid, alcohol, alum, and some other substances, if added to gelatine, retard or prevent this decomposition. Dissolved in dilute hydrochloric acid and dialysed a solution of gelatine is obtained which does not putrefy (Graham).

Chlorine, bromine, and iodine combine with gelatine. If chlorine or bromine in excess be added to a solution of gelatine a precipitate is thrwn down insoluble in water. If, however, the gelatine remain in excess the free halogens disappear, but no precipitate occurs. Iodine combines with gelatine, but does not readily precipitate it. Many other powerful oxidising agents, such as chromic acid, carbolic acid, &c., also precipitate gelatine if added in excess. Alcohol also precipitates it by extracting the water. Silver nitrate, if kept for any time in contact with a solution of gelatine, especially if the temperature be high, combines with it, the gelatine gradually assuming a reddish tinge, and the resulting compound is not decomposed by soluble bromides unless the solution be boiled. Gelatine is readily soluble in dilute acid or alkaline solutions, and is also readily soluble by the aid of heat in glycerine and anhydrous acetic acid. It is insoluble in alcohol, ether, and other spirituous liquids; but soluble, however, in weak alcohol, with the aid of acetic or other acids.

Commercial Gelatines.—The best of commercial gelatines are anything but pure products, and vary very much in quality. They all contain more or less dirt or insoluble matter. Some contain free acid, and others free alkali. Some are practically colourless, while others are strongly coloured. Some are very hard, and others very soft. Some contain grease, and others a quantity of sulphur. They also vary in other respects, which are not so readily detected unless a trial emulsion be made.

METHODS OF PURIFYING AND REMOVING SOLUBLE MATTER, GREASE, &C., FROM GELATINE FOR EMULSION PURPOSES.

A. *Dirt and Insoluble Matter.*—If the gelatine be not already acid, the addition of a small quantity usually dissolves up a large portion of the insoluble matter. The larger particles can be removed by straining through fine flannel several times. It is entirely removed by the following method:—Soak the gelatine in water and liquefy it. For every ounce weight of gelatine take the white of one egg well beaten up, and thoroughly incorporate with the former at a moderate temperature; this is best done in a deep beaker. Now place in a bath consisting of a saturated solution of calcium chloride or sodium sulphate, and heat until the gelatine solution boils; simmer for a minute or two, and while still hot strain through fine flannel. The albumen of the egg in coagulating imprisons the insoluble matter, and when the gelatine boils rises in a scum to the surface, leaving a perfectly transparent solution.

B. *Soluble Matter, Grease, &c.*—Add methylated alcohol to the liquid gelatine, stirring during the operation until the whole of the gelatine is precipitated. Pour off the liquid containing the impurities, and add a little more alcohol to remove the last traces. Break up the precipitated

clot into small pieces, and allow to swell in clean water. The albumen method also removes every trace of grease. E. H. FARMER.

P.S.—An additional short lecture on *Elementary Photographic Chemstry* will be given next Saturday and succeeding weeks, at 8.15 p.m., for the benefit of the students attending the course.—E. H. F.

Meetings of Societies.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting of this Society was held on Tuesday last, the 9th inst., at 5a, Pall Mall East, Mr. James Glaisher, F.R.S., President, in the chair. After the minutes of the previous meeting had been read and approved,

Mr. C. RAY WOODS read a paper on *Latitude of Exposure.* He said it was a very common complaint that it was a difficult matter to correctly time the exposure for gelatine plates, and that some even talked of a plate which ought to have had but five seconds' exposure being spoiled by six. He thought that no such difficulty ought to exist, and, indeed, he preferred to give an exposure of about fifty per cent. above what he considered normal to secure certainty. Recently, with a plate which had been intended to receive but two seconds' exposure, movement of the subject had taken place at the commencement of exposure, and he had given ten seconds, but had easily restrained the iron developer with bromide to get a good negative. He described numerous interesting experiments, and showed the results of several. He exhibited two transparencies—one exposed to the light of a lucifer match, and the other for a similar length of time at the same distance from a magnesium light. Similar transparencies were produced in each case. He had given exposures varying as much as 1, 3, and 9, and even as 1, 3, 9, 27, and 81, and had by the use of bromide got similar results. His experiments had all been performed with the ferrous oxalate developer. Probably in cases of *under*-exposure it might be possible to compensate best with the alkaline developer; but certainly he considered that in cases of over-exposure there was a great power of restraining in the iron as in the pyro. developer.

Colonel STUART WORTLEY considered that the alkaline developer was incapable of giving the same latitude of exposure as the iron. He was not afraid to give an ample exposure. He referred to the question of green fog, remarking that he would be sorry to use plates on which it was possible to produce it.

Mr. WILLIAM PEEK wished to corroborate Colonel Wortley's remarks on the alkaline developer. There was great latitude; nevertheless, he believed the best results could be obtained only from correct exposure.

Captain ABNEY remarked on the colour of the transparencies, the long-exposed and much-restrained one being browner than the other. This corroborated experiments made by him some years ago. He undertook to produce green fog on *any* plate given him; and advised all *commencing* work with ferrous oxalate to use a little bromide as a restrainer.

Mr. T. SEBASTIAN DAVIS referred to his use of phosphate of soda in the developer. He used a solution in water of about fifteen per cent. He treated the plate with this first, then worked up density with a strong developer. The resulting negative resembled one on an old preservative plate.

Mr. HERBERT B. BERKELEY referred to the great latitude allowable with a bromo-iodide plate if backed. He had given exposures varying as 20 to 1 and got good results with all *without altering* the developer.

Mr. W. K. BURTON expressed the opinion that a well-restrained developer allowed latitude simply by the length of time the plate was allowed to lie in it.

Mr. BEDFORD said that there was a vast difference in the latitude allowable with different plates. A plate giving a good gradation of density allowed much latitude of exposure; a plate subject to reversal of the image but little.

Colonel WORTLEY took exception to Mr. Burton's remarks. He always got hardness if he commenced with a much-restrained developer.

Mr. V. BLANCHARD referred to the advantage, in cases of under-exposure, of placing the plate first in ammonia solution.

Mr. WOODS, in reply, said that he did not mean to say that there was *less* latitude with the alkaline than with the iron developer. He agreed with Captain Abney that green fog could be produced on any plate.

A vote of thanks was proposed to Mr. Woods for his paper, and passed with acclamation.

Mr. WILLIAM PEEK then read a paper on *Expression in Photographs.* He touched on the subjects of lighting, posing, &c., and especially on the study of the characteristic expression of the model. He passed round examples.

Mr. SEBASTIAN DAVIS mentioned experiments in which currents of electricity were used to stimulate certain facial muscles, and thus obtain different expressions.

Captain ABNEY referred to Darwin's book on the expression of the emotions, and mentioned a set of heads, all photographs of the same young lady, yet so unlike that it was difficult to believe that they were not from different models.

Mr. L. WARNERKE described a set of pictures of individuals pronouncing certain sounds, which so forcibly suggested these sounds that the spectator involuntarily repeated them.

Mr. FRANCIS ELIOT said it was, doubtless, advisable to get a characteristic expression; the difficulty was to know which *is* the characteristic expression.

Mr. PEEK, in replying, mentioned that a certain eminent photographer was in the habit of asking his intended sitters to breakfast with him, so that he might study their expressions.

Mr. WARNERKE showed a new form of lime light, the invention of M. Kchotinsky. The peculiarity consists in the burner, which is vertical instead of horizontal, the flame shooting upwards, and in the use of a special hard magnesium pencil, the flame impinging on the end of it. Common coal gas and oxygen are used. The light will burn for 300 hours without adjustment. In Russia, where oxygen is specially prepared at a cheap rate, it costs less than coal gas for the same amount of light.

An interesting discussion followed Mr. Warnerke's demonstration.

The CHAIRMAN announced, in the course of the meeting, that the progress medal had been awarded to Mr. W. B. Woodbury for his stannotype process.

THE usual technical meeting of this Society was held on Tuesday, December 19th last—Captain Abney, R.E., F.R.S., Vice-President, in the chair.

Mr. C. RAY WOODS said:—The experiments I wish to bring before your notice this evening are somewhat imperfect in their scope, but may, in connection with the experience of others and the discussion I wish to open this evening, be possibly of a little value. I should like first to give a few of my experiences in the preparation of gelatine plates. In the first emulsion giving green fog that I prepared I omitted to put in the two drops of hydrochloric acid that the formula required. I stopped the boiling considerably before the proper time, and have no doubt I checked the evil to some extent. Since then I was not troubled with green fog for some considerable time, until I began to use a fresh sample of bromide, when I had some difficulty to prepare plates in which this pest did not appear. Proceeding to examine the two samples of potassium bromide I noticed this:—

OLD SAMPLE.	NEW SAMPLE.
Neutral, containing a trace of bromate. On addition of a drop of hydrochloric acid a trace of bromine was set free, which was rendered more apparent by the addition of potassic iodide, due to the consequent liberation of iodine.	Very faintly alkaline. No bromate present.

The emulsions in which I used the above samples of bromide contained chloride, bromide, and iodide. Emulsions of exactly similar character, but prepared entirely with salts of ammonium, gave no green fog *under ordinary circumstances.* The chloride and bromide were both perfectly neutral, but became acid on boiling, and therefore no free acid was added in the mixing. The iodide was old, of a dark yellow tint, containing a certain amount of free iodine. In addition to these facts I have noticed, so far as my experience goes, that green fog seems to occur more frequently when the gelatine and silver are mixed first, than when the gelatine and haloid salts are mixed, and then the silver added. I very much prefer the first method of mixing, and have tried to persuade myself that it is not more liable to bring about green fog. In spite of my wishes, however, I have not been able to bring myself to believe this is the case; while very far from asserting that the bromide into silver *plus* gelatine has more tendency to bring about green fog, my own experience tends towards this view. It may be asked, if nitrate of silver added to gelatine tends to green fog. How can green fog occur when the silver is added to gelatine *plus* bromide where the haloid salt is ready to receive it? It must be recollected that the bromide is surrounded by the gelatine, and combination between gelatine and silver may in this case also take place, the boiling with excess of bromide being unable to undo the mischief. I have also noticed, in connection with some experiments of another character, that if a plate coated with emulsion be treated with a solution of nitrate of silver, washed well after a short time, placed in a dilute solution of bromide to destroy all trace of free silver nitrate, and then developed, a fog is found on the plate, somewhat resembling what is known as green fog. This fog is more intense the longer the plate has been in contact with the nitrate of silver; and is this a sort of cooking? To sum up: I have found that emulsions prepared with a distinct trace of acid during the boiling seem less subject to green fog than emulsions perfectly neutral, and the latter less subject to green fog than emulsions at all, if only slightly, alkaline. Moreover, emulsions prepared with a slight trace of free bromine or iodine seem less prone to green fog than emulsions containing no free halogen. It would appear probable, therefore, that at least one of the causes of green fog is the formation of a small quantity of some compound of silver and gelatine, and aggravation of its fogging properties by boiling, this compound not being decomposable by salts of the halogens, but decomposable by the halogens themselves. I am speaking now of green fog occurring *under ordinary circumstances.* Why I make use of this phrase I will explain presently. And now for a few experiments relative to the circumstances under which green fog appears on development. I need scarcely refer to its well-known tendency to appear with pyro. development, nor to the fact that it is especially liable to come up on forcing with ammonia; but it may be new to some that it may be obtained with ferrous oxalate development, but *only* under certain circumstances. Some time since I found, and pointed out to Captain Abney, that plates liable to green fog showed green fog with iron developer prepared with *ammonic* oxalate. The developer was slightly alkaline (with ammonia), and, when rendered acid with oxalic acid, no green fog appeared. Now, to ordinary iron developer prepared with potassium oxalate and ferrous oxalate you may add just a slight trace of ammonia without precipitating oxide of iron. A developer so treated will bring up green fog. If ammonic carbonate be added to the iron developer green fog is not produced; but a yet further amount of free ammonia may then be added, and developer so treated is the most powerful producer of green fog that I know of. Here is a plate placed for a short time in such developer without having been exposed; part of it is not fixed, but the fixed part is so dense that I have but little doubt that, if it had been left in the developer sufficiently long, there would be nothing left to fix out. The appearance of green fog on a plate, therefore, is plainly due to the action of free ammonia, together with an agent capable of reducing a sub-haloid of silver. If the iron developer be made slightly alkaline with potash or soda, grey

fog is produced on plates liable to green fog. If fog be produced when the developer is acid, it is doubtless due to some other cause. It has frequently been stated that sulphite of soda is a producer of green fog. The capability of getting green fog with iron developer gave me a good opportunity of testing this statement. Sulphite of soda was mixed in considerable quantity with iron developer, but no green fog resulted when a plate was immersed in it. Another plate was immersed in ammonia and sulphite for forty-five minutes with no result. I am inclined, therefore, to think that sulphite of soda does not tend to produce green fog, excepting by the slightly longer time required to develope a plate when it is present. I may mention, also, that I immersed a plate prone to green fog in a very weak solution of iodine in alcohol; the only result was, that the part immersed was slower considerably, green fog being equally prominent over the plate, showing that, though iodine might check the evil in course of preparation, it was incapable of curing it afterwards. I have also tried immersing a plate in bichromate of potash, as has been suggested; but green fog was only slightly, if at all, reduced. By the way, every one who has had any experience of green fog must have noticed that it appears strongest on parts not acted upon by light. I have seen no specimens in which such has not been the case. If a plate subject to green fog have one half of it slightly exposed to white light, and then be exposed and developed in the ordinary way, the part acted on by light shows little or no signs of green fog, if the first exposure be suitably timed, but a slight veil is apparent. Probably, if plates subject to green fog *under ordinary circumstances* were first exposed to light, and then treated with bichromate of potash or chloride of copper, their tendency to fog might be stopped. I have not tried this, but think it likely. In connection with this subject I have made use of the phrase, "under ordinary circumstances." What I mean by this will appear from the following:—Captain Abney told me, a short time since, that he could produce green fog on any plate if he left it in the developer long enough. I thought that, if that be the case with alkaline developer, I could do the same, only much more so, with iron developer and ammonia. Here is a plate not liable to green fog *under ordinary circumstances*, that has been so treated, and you will see that it possesses a dense ruby tint, and might be used for a dark-room window. Another interesting question is—What is the absolute nature of the green fog itself? It is usually regarded as a deposit of silver, and that I certainly consider it is to a large extent; but this, I believe, is only half the truth. Future experiments may, perhaps, throw some light on the subject.

The CHAIRMAN said that Mr. Woods' experiments were very interesting, and inquired if any one had had any experience in that direction.

Mr. A. COWAN showed an example of a green-fogged emulsion cured by treating with bichromate, as recommended by the Chairman.

Mr. WOODS remarked that he coaxed the green fog up to get it at all.

Mr. COWAN remarked that on that very day he had another experience. He had received a bottle of "leucine," and in the emulsion made with it he found traces of green fog, when developed with the usual quantities of bromide and ammonia, but on reducing the strength of the developer to one-fourth, a perfectly clear plate was the result, therefore he thought that the cause of green fog was not always in the emulsion, but might be also due to the development.

The CHAIRMAN said that he could get green fog in any plate; he did not think it was in the emulsion. A very simple test was to develope a plate with plenty of ammonia in a fair amount of red light. After developing a positive image would appear, a reduction of silver taking place where the transparent parts ought to be. In photographing the spectrum he got a similar result, and he recollected when photographing the transit of Venus, eight yeare ago, that when a very short exposure was given, and the image refused to develope, if he opened the window and exposed to white light he got a positive. Green fog is clearly traceable to a solvent of silver which must be present. Mr. Woods has passed round a specimen of green fog quite ruby by transmitted light. The spectroscope tells us that it would make an excellent medium for glazing windows—better than ruby glass. I do not agree with him that mixing silver with the emulsion produces green fog. My experience is limited. I mix bromide into the gelatine containing the silver; I do it on principle, and never have a trace of green fog. Mr. Woods has added oxalic acid to the developer. Acetic acid would also have a good effect.

Mr. COWAN remarked that a point not yet settled was what the proper proportion of ammonia to pyro. ought to be.

The CHAIRMAN said he used a ten-per-cent. solution of ammonia and a two and a-half per cent. solution of bromide, one drachm of each to four ounces pyrogallic solution.

Mr. ASHMAN stated an experiment he had tried that afternoon. A plate upon which four exposures had been made, of two, four, six, and eight seconds, respectively, was developed; on the shortest exposure no green fog was visible, but very much was seen on the longest exposure.

The CHAIRMAN said he hoped no one would throw a plate away on account of green fog, because it could always be made right by the plan he recommended of using ferric salts, which turned the green colour into grey. He (the Chairman) then inquired whether any one had had any experience with irridescent stains on plates, and stated an experience he had with two chloride plates—one developed with hydrokinone, which showed them very much; the other, developed with pyro., showed no trace of discolouration whatever. The hydrokinone used was half a grain to oue ounce water; it kept better than pyro. Ammonia was added, but no bromide.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual lantern meeting of this Society took place as usual on the occasion of the first ordinary meeting of the year, namely, on Thursday evening, the 4th inst. The large Hall of the Society of Arts was crowded to excess, many visitors being unable to find places, even in the ante-room.

Mr. William Brooks again had the management of the lanterns, while Mr. F. A. Bridge, the indefatigable Secretary and Treasurer, undertook the duties of lecturer, and also presided at the piano. It is needless to say that both gentlemen acquitted themselves to the entire satisfaction of everybody. A disc of about eighteen feet diameter was shown, and upwards of three hundred pictures were passed through the lantern, the exhibition lasting from seven to nearly half-past ten p.m.

Amongst the contributors of slides were Messrs. F. Beasley, Jun., F. G. Short, J. C. Cohen, John Nesbit, W. Brooks, F. A. Bridge, J. C. Andræae, M. Whiting, A. L. Henderson, F. Howard, J. Gale, C. G. Cutchey, Sciopticon Co., W. J. Wilson, S. Charters White, P. H. Fincham, W. M. Ayres, E. Dunmore, Dr. Huggins, F.R.S., and F. York.

The proceedings were varied at intervals by instrumental and vocal music. Amongst the performers were Miss Harding and Mr. Valentine Blanchard, Mr. Bridge accompanying.

The meeting is pronounced to have been one of the, if not *the*, best of the South London lantern meetings ever held.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 4th inst., Mr. A. Cowan occupied the chair.

The CHAIRMAN showed a box for storing gelatine plates made upon the plan recently described by Mr. Schwartz. The box, however, was made of double size, so as to hold two stacks of plates side by side, and as the separating strips were only of cardboard a great many plates could be packed in a small compass.

Mr. J. BARKER suggested that with extra pads and movable divisions the box might be arranged to hold several sizes.

Mr. A. J. BROWN showed a negative developed with alkaline ferrous oxalate, and strongly green-fogged.

Mr. W. COLES showed a negative with semi-transparent spots. These had come on whilst the negative was left for a night in a flat dish of acidified alum solution.

Mr. F. W. HART suggested that while the plate was drying in the coating room some particles of oxide of iron had fallen upon it. These, being converted into perchloride of iron by the hydrochloric acid in the alum solution, had reduced the intensity of the image in their immediate vicinity.

Mr. A. L. HENDERSON said he considered it important that light should not get at the ammoniacal silver salt before adding it to an emulsion. If, to a solution of nitrate of silver, ammonia were added in the light, but only in quantity sufficient to redissolve part of the precipitated oxide of silver, and then this solution were added in the dark room to a solution of gelatine and bromide of potassium, the emulsion would not be so clear as if the ammonia had been added to the gelatine and bromide solution, and the silver poured in in the dark. The last-named plan also gave a finer quality of emulsion. He (Mr. Henderson) attributed the fogging in the first-named emulsion to the influence of light upon the oxide of silver, which would render it capable of reduction by pyro. and ammonia.

Mr. W. E. DEBENHAM said that it was by no means clear that the fogging of the emulsion described by Mr. Henderson was due to the action of light upon the oxide of silver. It might be due to the use of oxide of silver, and not allowing sufficient time, or excess of soluble bromide, for its complete conversion. Oxide of silver did not require the action of light to render it reducible by pyro. and ammonia, which would act upon it without any exposure to the luminous rays. He (Mr. Debenham) also said that at a previous meeting a question had been asked—Why if there were any emulsion on the back of a plate did it develope dark, whether exposed or not? He thought the reason was that if emulsion were poured upon a plate that was not clean the dirty places would develope with green fog, or if the development were pushed this green fog became grey or black. Now, contact with the slab would be sufficient to set up this fogging action, even if the backs of the plates were clean.

Mr. W. K. BURTON believed that this was the reason for the effect mentioned. He had noticed that when coated plates were dried on three points emulsion spilt on the back did not develope dark, but that if the plates were put upon a slab to set it would do so.

It was announced that at the meeting of the 18th instant Mr. W. K. Burton would demonstrate the method of making emulsion recently published by him.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

ON Wednesday, the 27th ult., a special meeting of the Board of Management was held for the purpose of considering an application for assistance. The sum of £5 was granted.

On Wednesday, the 3rd inst., the Board held its usual monthly meeting at 181, Aldersgate-street. The minutes were read and confirmed, after which Mr. S. O'Reily was elected a member of the Association.

It was decided to hold the annual general meeting on Wednesday, the 24th inst. The chair will be taken by W. S. Bird Esq., at 8 p.m. Members are requested to make an effort to be present, and all friends are cordially invited.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THIS Association met in the Religious Institution Rooms, Buchanan-street, on Thursday, the 21st ult.,—Mr. J. Parker, President, in the chair.

After the transaction of general business and the various questions in the question-box had been replied to, Mr. J. C. Annan read a paper on *Carbon Printing*. Mr. Annan was awarded a cordial vote of thanks. [Mr. Annan's paper will appear in our next issue.]

The meeting was then adjourned.

HALIFAX PHOTOGRAPHIC CLUB.

The usual monthly meeting of this club was held on Tuesday last, the 9th instant, having been postponed one week on account of the holidays,—Mr. J. B. Holroyde, President, in the chair. After reading the minutes of the last meeting,

Mr. W. C. Williams was called upon to give the second part of his paper on *Photographic Enlargements*, including views, portraiture, &c. The first part was devoted to the qualifications all should possess who hoped to succeed with enlargements—the qualities necessary to take a proper negative, and the size and class of negatives best fitted for the purpose in views, the lighting and study of composition, and the æsthetic side of the question. In the second part he fully desribed the best form aud arrangement of enlarging camera, to obtain an even and subdued light. He placed a ground glass one yard from the gas or other light used for illumination, and took a transfer on carbon tissue which always has a fine, even texture, and by which, with careful manipulation, stains and other defects are prevented. Fine cloud and other effects can be introduceed and printed in, and other modifications made in the picture, such as sunlight and moonlight. He showed a beautiful negative 5×4 enlarged to 15×12 with a Grubb's aplanetic lens, a carbon negative and a print from it *(Clovelly Bay, Devonshire)*, and also a sea view, $8\frac{1}{2} \times 6\frac{1}{2}$, with magnificent clouds, which was produced to show a grand mooonlight effect. He exhibited a diagram which was graduated in shade from 0 to 7, and reversed to 0 to show the density a negative ought to possess to be a good one. He considered No. 6 to be the proper and most appropriate depth to produce a good print from, and the development might be pushed to No. 6 on the descending side without having a bad effect. He also described the method of enlarging with the magic lantern and solar lantern as being best adapted for carbon pictures; life size—the cost of such large lenses, &c., greatly reduced their popularity. He gave several hints as to various exposures with different lenses and stops, &c., to be used to obtain the best results. He recommended plates intended for negatives to be coated with burnt sienna in distemper as a great preventive against reflections while taking or exposing the plates, and never to use a shorter-focus lens for the enlarging of pictures than the one used for taking the original negative. He also showed another diagram that exhibited the optical arrangement which took place in producing an enlarged picture from a small negative, showing the curvature and angle of aperture made by the lens between the negative and the enlargement produced.

A cordial vote of thanks was passed to Mr. Williams for his most able and instructive paper; and the Chairman desired Mr. Williams to allow the two papers to be printed and presented to the members, which he consented to do.

Several marvellous instantaneous negatives and prints were then passed round with dashing, crested, and breaking waves, and wonderful cloud scenery.

A hearty vote of thanks was then passed to Messrs. D. H. Cussons and Co. for presenting each of the members with a copy of their pocket *Almanac and Reminder* for 1883, containing an instantaneous photograph.

Correspondence.

January Meeting of the Photographic Society of France.—Capt. Joly on Cold Emulsification.—New Shutter.—Value of Photography in Detecting Fraud.—Exhibition at Amsterdam.—Paper for Trays.—Magnesium Lamps.—M. de la Noë's Presentation.—Diplomas for Photographic Operators.—Poitevin Subscription, &c.

The first meeting in 1883 of the Photographic Society of France was held on Friday last, the 5th instant. Probably on account of the New Year's festivities, the meeting was poorly attended.

A letter was read by the Secretary from Capt. Joly, all in praise of cold emulsification, as proposed by Mr. A. L. Henderson. The learned Captain says that by following to the letter Mr. Henderson's formula it is impossible not to succeed in making an excellent emulsion.

M. Léon Vidal presented a new instantaneous shutter invented by Mr. G. Hare. See *fig.* 1. It is composed of a cardboard box about a quarter of an inch thick, in which a movable disc revolves, or partly revolves, by pulling a string. This makes the slit in the disc to pass more or less rapidly before the hole left in the cardboard box. This box is held or fastened upon the lens by means of three wooden screws, on the same principle as Mr. Cadett's circular shutter. Now, if this shutter has been thought of for cheapness the inventor must have succeeded in that; but, as to its working value, although it revolves with ease in pulling the string, great doubts were expressed as to the certainty of obtaining a sharp image with such an instrument worked by hand. To set it at work the handle B is pulled down until the tassel D touches the bottom of the box; the holes are now in a line one with the other, and focussing can be done. If handle B' be pulled down (as in *fig.* 1) the disc will take the position as shown in *fig.* 2. The higher handle (when all is ready) is pulled down more or less rapidly and the exposure given. It is a very simple machine indeed; but as regards its efficiency we must wait the results of further experiments.

FIG. 1.

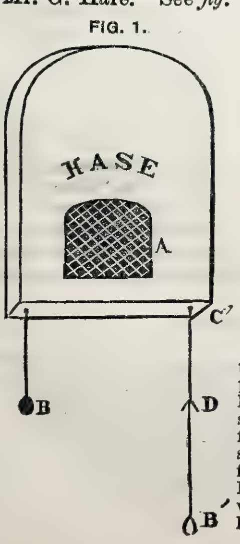
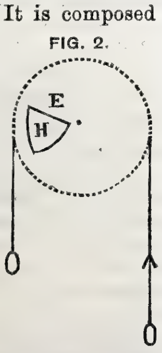


FIG. 2.



A Hole before which the slit in the disc passes. B B' Wooden handles attached to the string C C'. D Tassel fixed upon the string to show when the hole is full open for focussing. E disc. H Hole or slit, which can be made larger or smaller at will.

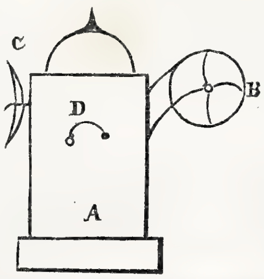
M. Léon Vidal then drew the attention of the members to the value of photography in detecting fraud. He informed us that one of the officials of the Geneva post-office had purloined a post-office order for a large amount, and in order to hide the theft he had poured some ink over the numbers upon his receipt book. He denied more than once having received the cheque. At last the Government put the book into the hands of a photographer, who made a reproduction of the leaf, which brought to light the figures hidden by the blot of ink. An enlargement was made, and the figures stood out and caused as much terror to the modern official as the "Mene, Mene, Tekel, Upharsin" did to the Babylonian King. M. Vidal passed round the book, the reproduction, and enlargement, which were inspected with great interest by all present.

The directors of the proposed exhibition at Amsterdam officially informed the Society of the project they had in view, asking their help to ensure success in their undertaking. A discussion took place upon the advisability of conforming to this desire, as the French Minister had been put upon his guard in this wise ;—It appears that in that country the old patent laws have been repealed and they have not yet been replaced, therefore, it is to be feared that models, drawings, intentions, &c., will be pirated to a great extent.

M. Lacollé, an inventor of an impermeable paper for damp houses, presented specimens of the paper, which he thought would serve as photographic trays by simply bending up the edges and holding the corners by a simple spring. Whether the resinous matter with which the paper is impregnated can resist certain solutions—such as neutral oxalate of potash, which is often alkaline—remains to be proved. No doubt the paper trays would render great service to amateurs in their excursions.

M. Loiseau presented to the Society a very pretty model of a magnesium lamp worked by clockwork (*see fig.* 3). The chief features in it are its portability and the smallness of the curvature of the reflecting surface. The lamp was lighted and gave great satisfaction.

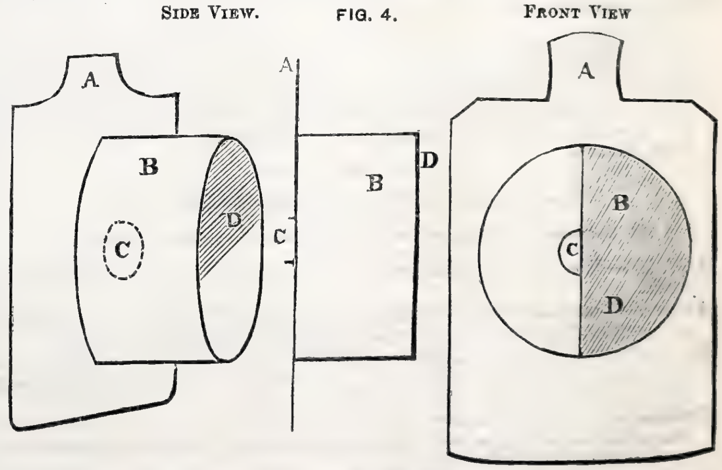
FIG. 3



A Brass box containing clockwork. B Wheel grooved to hold wire. C Reflector. D Key to wind up.

M. de la Noë informed the Society that he had discovered a simple means for reproducing unequally-lighted objects. For instance: let us suppose that a student desires to reproduce an engraving or a map hung against a wall of one of our museums, but lighted only on one side. If he cannot place a reflector, it is impossible to obtain a good result. M. de la Noë found that by placing a box about half-an-inch high upon the diaphragm, half the lid being taken off (see *fig.* 4), the box can be turned round so that the opening made by the taking away of the half of the lid can be placed in any position. A map was then exhibited, and also the reproduction of

Side View. FIG. 4. Front View



A Diaphragm. B Box as seen in different positions. C Hole in diaphragm. D Lid of box.

the map under similar circumstances—that is to say, unequally lighted. Another reproduction of the same was shown, only made by employing M. de la Noë's "dodge." The reproduction was perfect—equally lighted all over. I beg to call the attention of the readers of The British Journal of Photography to this "dodge." It may prove of great value even for landscapes in which the foreground is dark, and the distant objects are in full light. I forward three sketches of a diaphragm as proposed by M. de la Noë, as the idea is worth a trial and is not expensive.

The "Chambre Syndicale de la Photographie" informed the Society that they had inaugurated a committee of examination in order to give a diploma to photographic operators. The examination will be theoretical and practical. The first will be public. These examinations will, I am certain, raise the standard of photographic operators; they will, above all, render great service to established photographers in want of operators, as the diploma in the possession of the operator will give the master the means of judging of the capabilities of the person in want of a situation and of fixing the value of services offered. Many operators have already applied to pass the examination, in order to have a proof on hand of their photographic knowledge. It would be well for England and other countries to organise such a commission. It would compel good operators devoted to their profession to study carefully in order to become more and more competent in the profession they have chosen, and so raise photography to a level with the fine arts in the estimation of the public at large. Bad operators will then be rapidly driven from the field, and their places filled by a better and more cultured class of men. It would be well, indeed, for the community at large if all persons, even down to our cooks and other household servants, were compelled by law to pass an examination, and thus give proof of their capacity to fill the positions they seek.

M. Gherri showed some fine specimens of photo-engraving by means of a sand-blast.

The committee for Poitevin's monument have already received nearly 8,000 francs. Mr. E. L. Wilson, proprietor of the *Philadelphia Photographer*, informs me that he has received subscriptions to the amount of £20. Englishmen are very backward at present in coming forward to do honour to the father of the carbon and photolithographic processes. It may be forgotten that the subscription is opened at No. 2, York-street, Covent Garden, London, and at my residence in Paris, where any subscriptions would be thankfully received and duly acknowledged in the public journals.

The jury for the Gaillard prize were again chosen, comprised of nearly the same names as those of last year. M. Frank de Villechole was named to replace M. Fortier (deceased). M. Vidal refused to be nominated, in order, as he said, to be able to criticise the decision of the jury. During three years this prize has been contended for, and one of these days the history (behind the scenes) of this prize will, no doubt, be published to show that criticism is often needed in the best of societies.

M. Michaud explained the apparatus by which he obtained proofs of the late eclipse of the sun by the planet Venus.

The meeting broke up at half-past ten o'clock. E. Stebbing, *Prof.*
25, *Rue des Apennins, Paris, January* 9, 1883.

EXCHANGE COLUMN.

Wanted, good camera, lens, &c., in exchange for excellent, nearly new tricycle, cost £18.—Address, Harrison, 162, Cooksey-road, Birmingham.

In exchange, for a Dallmeyer or Ross's cabinet lens, a tricycle of best make, just new, with arrangement for carrying apparatus. — Address, A. Copsey, Sudbury, Suffolk.

Wanted to exchange, Ross's whole-plate portable symmetrical for a whole-plate rapid symmetrical by same maker; difference in price adjusted.—Address, C. Birch, 32, Newton-road, Bayswater.

What offers in photography for a Victoria camera and lenses, best English made, never been used, in exchange for a good whole-plate portrait lens, or cabinet lens preferred.—Address, M. Norris, Preston Station, Lancashire.

I will exchange the following:—Stile and outdoor background, by Bull; cottage window, by Bull, cost £5 5s.; Shew's whole-plate changing-box for dry plates; *carte* roller; two porcelain baths, 16 × 12 and 11 × 9, with stand and box. Wanted, cabinet embosser, interior background, a mast of ship, and cloud background.—Address, A. Ward, 54, Brixton-road, London.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

R. F. W.—We will try some experiments, and answer your query next week.

Artist.—You can produce enlargements on canvas by either the "dusting-on" or the "carbon process," each of which will yield good results.

Braithwaite.—If Messrs. Marion and Co. cannot supply the picture, we are unaware where you will get it. You might meet with it by inserting an advertisement.

Ceruleum.—We do not at present remember the date of the discussion in our columns as to the cause of blueness of sky. Perhaps some of ou readers can give a reference.

E. Wheeler.—We have received no letter from you that has remained unanswered. If you have written, the letter must have miscarried. Kindly repeat, and it shall have every attention.

D. C. (Greenock).—You can obtain what you require at any linen draper's, under the name of "unbleached sheeting." It's price varies according to quality and width. The commoner qualities will answer quite well for backgrounds.

L. Fausten.—Bigelow's *Album* is such a work as you require, but we fear it is now out of print. Liesegang's *Handbook of Photographic Processes* also contains some useful information on the construction of studios and lighting the sitter.

J. T. L.—Asks—"What part of Australia would be best to commence a photographic business in, and would club work be likely to take there?" ——We are unable to answer the question; perhaps some correspondent would kindly supply the desired information.

H. O. H.—The lens of eight and a-quarter inches focus will be quite long enough for most purposes, though for very distant views one element of the doublet may be used. Such a focal length would, however, be totally useless for general purposes, as the angle of view would be too small.

John Milne.—1. The circular washer will not—or ought not to—tear the prints unless the paper is very rotten indeed. Perhaps you leave them in the water an unnecessarily long time; if so, that may account for it. We have heard very favourable accounts of both apparatus.—2. If you will kindly send us the articles we shall then be able to form an opinion.

Meretoire.—The pictures are very promising indeed. A little longer exposure in several instances would have been an improvement. Personally we have not had any experience with either of the lenses you mention. The maker has a very fair reputation. Perhaps you might be permitted a trial of both lenses before you purchase; you would then be able to judge which of them was most suitable for your requirements.

A Young Beginner.—1. It is impossible, without seeing the lens, to say if it be of modern construction or not.—2. We do not understand this query.—3. Possibly the slowness is due to the bad quality of the light at this season.—4. If you have the bath of the proper strength at present, the further addition of nitrate of silver will not increase its sensitiveness. —5. Treating the plate in the way you suggest would produce nothing but hopeless fog.

Robert Wrenching.—1. You certainly cannot be a reader of any photographic publication or you would not require to ask this question. The colour is a sufficient guide.—2. Not if the solution be preserved in a stoppered or corked bottle, and not used a second time.—3. Imperfect washing is the cause of the spots to which you allude. A certain proportion of hypo. has been allowed to remain in the film, which, on contact with the silver paper, produces the stains of which you complain.

Hypo.—The spots appear to be caused by a sulphuretting action—doubtless due to air-bubbles adhering to the print while in the fixing solution. Under some conditions air-bubbles will adhere very tenaciously to the prints, and are only removed with difficulty. It is on the first immersion that they do the injury, even if they be allowed to remain for a very short time only. After they have been in the solution for a few minutes they will do but little harm. It is on the first immersion that the injury is incurred.

A Professional on Amateurs.—A correspondent, who breaks our ordinary rule by sending no name or address, writes as follows on an unsigned post-card, the post-mark of which forms the only clue to his identity:—"Why allow such a lot of amateurs to rush into print? Their experience is something like their pictures. Fancy a trade journal, such as a printer's journal, &c., being instructed by amateurs; and such is the case in the Almanac. Leave a few perambulating photos. to subscribe: they could tell more dodges than ever enters the brain of an amateur in his lifetime." —— Most amateurs and, indeed, most professionals will, we fancy, be amused at this singularly-original expression of opinion.

⁂ In consequence of unusual pressure on our space this week articles by "Argus;" H. H. Cunningham; Cosmo I. Burton; A. Donald; J. J. Acworth, F.I.C., F.C.S.; John Nicol, Ph.D.; and Lyddell Sawyer are unavoidably crowded out.

Failures in the Photographic Profession.—From Mr. Richard Seyd's statistics of failures in the United Kingdom during the past three years we find that the number of photographers who "succumbed" during those years was as follow:—In 1880, 22; 1881, 18; and in 1882, 18. Among opticians the failures in those respective years were 4, 2, and 8.

Soirée of Employés.—On Friday last, the 5th instant, the *employés* at Messrs. Elliott and Fry's silver and carbon printing works, at Barnet, held a *soirée* on the premises of the firm, Talbot House, Barnet, kindly placed at their disposal for the occasion. The various rooms were artistically decorated with evergreens and flowers, together with appropriate mottoes. Conspicuous among the latter was one, "Success to the Firm," on either side of which, standing out in bold relief from some effectively-treated evergreens, were well-executed, life-sized crayon vignettes of Mr. Elliott and Mr. Fry. The proceedings commenced with a selection of vocal and instrumental music, while for those whose tastes inclined in a different direction ample entertainment was provided. At the supper which followed, the chair was taken by the genial and respected manager, Mr. H. Ottoway, and the vice-chair by Mr. Skelton. The toasts, "Prosperity to the Firm," "The Manager," "Visitors," &c., were proposed and responded to; after which, the tables having been removed, dancing was indulged in and kept up with spirit till an early hour, when the proceedings terminated with the national anthem, and the company dispersed, all having thoroughly enjoyed themselves.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1185. Vol. XXX.—JANUARY 19, 1883.

CLOUDS IN LANDSCAPE ENLARGEMENTS.

The demand for photographs of a larger size than those produced in the ordinary course of everyday practice a few years back is evidently on the increase. As the *carte* picture was to a great extent superseded by the cabinet size, so the latter appears likely to be considerably replaced by those sizes known as "promenade," "panel," &c., which, fortunately for photographers, the gelatine process enables them to produce with much greater facility, so far as optical appliances are concerned, than was possible with collodion. Not only is the taste for direct pictures of larger dimensions on the increase, but we much question if at any previous period of the history of photography has the demand for enlargements been so great as at present; as witness the enormous number of the so-called "club pictures" that must now daily be produced, either as "collodion transfers" or as enlargements on gelatino-bromide paper, to say nothing of enlargements in carbon and by development on iodised paper.

At the last meeting of the Halifax Photographic Club, Mr. W. Clement Williams brought forward the subject in a paper on *Photographic Enlargements.* In a recent number our esteemed contributor, Mr. William Brooks, had an excellent article on the same topic. We also have on several occasions of late given some practical details on enlarging, and we now propose to offer some further practical notes on the same subject.

In his communication Mr. Williams recommends that the transparency should be made by the carbon process, and describes how cloud and other effects can be introduced by double printing. But the question occurs—Is double printing in the transparency the best method in practice of introducing clouds in a landscape enlargement? We know that they are often produced—and with charming effect too, as many of the pictures shown at the last exhibition of the Photographic Society of Great Britain testify—by simple washes of water colour or dilute black varnish applied to the back of the enlarged negative. But this treatment is not always practicable; for, unless the sky be so thin that it would produce a decided tint when printed, it is clear that it cannot be treated successfully in this manner.

It is quite true that a skilful operator can generally dodge the development and intensification of large negatives so as to preserve the sky from excessive density; but with those of limited experience this is not easily accomplished, neither is it when gelatine plates are used for the enlarged negatives, as is done by Mr. Brooks. Hence, under these circumstances, we are compelled to obtain the clouds in the transparency by some means or other. All who have attempted double printing by the carbon process know that considerable experience is necessary before it can be satisfactorily accomplished; for, apart from the trouble of securing perfect registration—a matter of no serious import, it is true, in the case of clouds—there is the difficulty of obtaining the two exposures in unison with each other.

Some time since we were shown several very excellent enlargements from carbon transparencies, in which clouds had been introduced from a second negative, and it was done in this manner:—The skies in the original negative were stopped out with black varnish, so that in the transparency they printed quite white—clear glass. A second transparency was then made from the cloud negative on another piece of glass, and when completed was adjusted and secured in the correct position at the back of the first one, after such portions of the film had been scraped away as might interfere with the landscape itself. The advantage of this method over double printing on one piece of tissue is very great. The difficulty of timing the relative exposures, so that both printings will prove of the proper depth when the transparency is developed, is avoided, no accurate registration is required, and the same cloud transparency may often be utilised for several different enlargements, if thought desirable, in the same manner as one cloud negative is often made to do service in many different landscapes.

Although excellent results may be obtained by each of the methods indicated above, when judgment is exercised in the selection of a cloud negative suitable to the picture, yet, in most instances, the effect would have been still better if the clouds could have been secured in the original negative at the time it was taken; for it is seldom that clouds artificially introduced (so to speak) harmonise so well as would the natural ones. With gelatine plates these are generally secured, but frequently they are too feeble and delicate to show in a finished paper print. Now, although such a negative may not yield those delicate details in a paper picture, if a transparency be made from it we shall be able to obtain them, or at least a very good indication of them, so that they may be easily strengthened artificially and brought up to the requisite strength.

With a carbon transparency this is readily accomplished with a leather stump charged with powdered blacklead, as the carbon film takes that powder very readily indeed. One precaution, however, is necessary in applying it, and that is not to use too much, as its power of obstructing light is much greater than many would imagine. The best plan of applying it is to put a small pinch on a piece of coarse paper, and work it well into the surface with the finger; then, if a clean stump be rubbed on the paper, sufficient lead will be taken up for the purpose. The blacklead may also be used to strengthen the shadows or soften the lights if the transparency should require it.

In all cases where carbon transparencies are employed the glass supporting them should receive a preliminary coating of insoluble gelatine, and the tissue one of collodion. By these means the tender gradations or faint indication of clouds will be the better preserved during development. If these precautions be neglected there is great risk of such gradations being lost, unless the tissue be in an exceptionally good condition. Mr. Williams specially recommends carbon transparencies to be used in making enlargements, but we know that those made on dry plates are now largely and successfully employed; and it is these that Mr. Brooks advocates in his article, both for transparency and the enlarged negative. We may possibly have something to say on this subject on a future occasion.

In concluding this article we will add another practical hint. In his communication Mr. Williams says a shorter-focus lens than that with which the original was taken should never be used for making

the enlargement. Our advice is that in all cases a longer-focus one should be employed, so as to secure a more even illumination as well as better definition at the margin of the picture without having to unduly stop it down, which often occasions a great loss of brilliancy in the enlargement.

BOTTLES AND THEIR STOPPERS.

It may be said that there is little to be written, and less to be learned, upon such a topic as this; but let anyone go through the photographer's stores, and not merely survey his (perhaps) well-kept dark room—his tidy shelves—but peep under the sinks, pry into his cupboards, and thoroughly overhaul his accumulations of rubbish, and what will be seen? Bottles round, bottles square, bottles with three, four, five, six, seven, eight, or any number of sides; bottles stoppered, bottles corked, numberless bottles empty and half empty; but how many clean?

It is so handy to send to the nearest chemist's for a new empty bottle, and to throw away, or allow to get entirely encrusted with dirt, an old empty bottle, that there are many who will take no trouble to clean or keep clean an "old bottle," notwithstanding that no reason exists to prevent it from being made quite equal to a new one with the most trifling amount of labour. Yet this is often neglected, and the consequence is the accumulation of such a mass of bottles, all dirty, that the success of an experiment is often enough endangered by the use of one of them "rinsed out," all sorts of chemically-contaminating possibilities being indicated by the coating on its sides or the deposit on its bottom.

And so, too, is accounted for the motley collection of bottles (no two alike), commonly seen in the dark room, that are used to contain stock chemicals for constant working with. We do not refer to those for containing solutions which are in daily use; some photographers hold it an advantage (and we agree with them) to have those bottles frequently used and likely to be mistaken for one another selected so as to be all different in shape, as then mistakes are prevented in the dim light of the developing-room. But that is no excuse for an ill-fitting cork, perhaps broken, or too slack or too tight for the bottle whose contents it is supposed to protect from contamination or from being dissipated in the surrounding air; nor is it an excuse for the putting of a stopper into a wrong bottle, which necessitates at least one other stopper being wrongly fitted.

Every well-arranged dark room or laboratory should, besides a small stock of cleaned and dried bottles, be supplied with a moderate store of corks of good quality, varied in size; and it is an excellent plan to collect together all stoppers of broken bottles, the results of accidents which must happen in the best-regulated studios as in the best-regulated families, for no one can tell when a new stopper may be needed. If one anywhere about the necessary size can be found it may with no great expenditure of time or labour be made to fit most accurately.

Cork *versus* glass stopper was an oft-debated question in the matter of collodion, and though there was much to be said for the cork the glass on the whole got the best of the argument. But glass-stoppered bottles are so much dearer than corked that is is not possible to omit that consideration from calculations with a pecuniary standpoint. Stoppered bottles should always be employed for storing certain liquids, such, for example, as ether, because in a corked bottle it is so volatile, and liable to loss through evaporation; ammonia, because its strength is so rapidly dissipated; and acetic acid, because of the manner in which a cork becomes acted upon by its vapour.

Then, again, there is a disadvantage in the use of stoppers when the temperature of the room in which the bottles they protect are stored is too high, owing to their liability to be shot out of the bottle and their contents rapidly wasted in consequence, before the flown stopper is detected. This may be prevented by "locking" the stopper, as it is termed, which consists in giving it a combined screwing and pressing action that so tightens it as to make it almost a part of the bottle itself, and after a while, also, as difficult to get out as though it were. There is an instrument known as a "stopper-wrench"—an oblong piece of wood with a hole cut into it to receive the head of the stopper—which is used by the packers who fill the bottles to give extra force in this locking or screwing, and it so tightens the stopper that a similar instrument is needed to extract it.

It is not every one who knows how to fit a cork into a bottle. Unless the cork be of the very finest quality it is most likely that two out of every three attempted to be fitted by the inexperienced hand will get split or broken in the attempt. A cork press cannot be expected to find a place in any ordinary photographer's laboratory, yet a cork should be pressed, to render it more elastic, before being used. It is not a very clean idea to press it by biting or nipping it with the teeth; but it is effectual. The best method of all, however, and especially useful with a large cork, is to wrap it in paper and roll it under the foot, using a slight pressure at the time. A cork so pressed is capable of being fitted into a bottle neck almost one-half its size.

Many operators prefer corks before glass stoppers on account of the ease with which they can be extracted if wedged or glued in, little thinking of the great waste caused—in collodion, for instance—by a few pieces of cork dropping into the bottle, or the whole cork itself getting accidently pushed into the interior. Judging by the number of bottles so often seen in the latter condition it might almost be imagined that no attempt is ever made to get the errant cork out again; yet a piece of string doubled in two and the loop pushed down through the neck into the bottle will, dexterously used, fish up a cork in a very brief space of time.

The question of corks *versus* stoppers is not settled only by the ease or difficulty of their removal. When volatile liquids are enclosed evaporation is sure to take place through a cork, and even, though in a less degree, when stoppers without luting are employed. A recently-published work states that experiments were tried with ether in this direction. A tray of fifty one-pound bottles was put in a cool cellar and weighed every month. It was found that each bottle lost one ounce per month in weight. We cannot say that our own experience points to anything like so large a percentage of loss; but it cannot be questioned that a great amount of loss does occur, even in stoppered bottles, with very volatile liquids. There is a difference in this respect, some bottles being fitted in an exceptionally-accurate manner with stoppers, and of such bottles and stoppers it is most desirable to take care when found.

In the removal of stoppers cases may arise—such as in the storage of caustic potash, &c.—when the bottle itself may as well be destroyed (if the contents can be secured) when the stopper has become fast, as the surfaces would be so corroded as to be useless. Other cases of tight fitting, however, are far better cured, if possible, rather than remedied, in this Gordian-knot manner; and it is astonishing what can be done by time and patience.

If the stopper be fastened through some resinous accumulation, a cloth wetted with warm water and held to the neck will often loosen it; at other times it will be necessary to run a few drops of alcohol over the top of the stopper and to keep renewing it from time to time. When the accumulation is thus caused to be dissolved the stopper will come away with a slight twist.

We have alluded to the locking of a stopper; a turn in a contrary direction or the use, as indicated, of the wrench will often loosen it. We have seen scissors tightly grasped used in place of a wrench for this purpose, the neck of the stopper being enclosed in the space between the handles and the pivot.

Of all measures, however, for removing a stopper few are so generally efficacious as a steady tapping with a hard piece of wood. The bottle is held firmly to the table or bench with the left hand, and a series of steady, smart taps administered in a slightly upward direction—first to one side and then the other of the stopper. After a while it will very frequently be found that the stopper has become loosened. Some operators we have seen hold up the bottle a very short distance from the table by the stopper and tap the neck. This plan is useful, but is apt to crack the neck or bottle through the administration of a tap just as the separation is taking place.

Water, however, is, perhaps, as good a remedy as any, and we will conclude our remarks by describing an excellent method of treatment with water alone after all other remedies have failed The immersion of a bottle in hot water is not treated of, as, with the

excessively-volatile liquids used in photography, it might lead to dangerous results.

A bucket or other vessel containing lukewarm water is obtained, the bottle with the difficult stopper placed in it on a slant (to avoid the occlusion of air-bubbles), and allowed to remain over night. The experimenter, of course, will not cover the label or it would float off. In all probability the stopper will have become loose by morning. If it should not a still further length of time must be allowed to elapse—if necessary prolonged to three or four days—and it will almost always happen that by this time the loosening will have taken place.

These are but a few, yet the most generally useful, of the methods that can be employed; and, if by our remarks we shall have given some hints or some help towards keeping the laboratory or dark room and its shelves in a tidy condition, and with a saving of expense, we shall be sufficiently gratified.

One of the most puzzling things the tyro has to contend with is the varying modes of describing the same substance employed by the various scientific periodicals as well as the photographic press. Everyone is familiar with the story of the photographer who sent to London for a stock of chloride of sodium, ignorant of the fact that a plentiful supply was most probably obtainable in his own kitchen, table salt being nothing but a fairly-pure specimen of chloride of sodium. But we refer to difference in scientific nomenclature rather than that between colloquial and scientific terms. Up to the present time chemists are far from being agreed upon the exact mode to be employed to designate certain compounds; but it may be useful to call the attention of our readers to the scheme of nomenclature recommended by the Council of the Chemical Society for adoption by those gentlemen who prepare abstracts of the chemical reports in current literature for that Society's journal. They will be found in full in the *Chemical News* for January 12th, and will give, in a brief space, an excellent idea of the scope and bearing of modern nomenclature.

Some while ago we mentioned the photographs, panoramic in character, which had been taken in the Alps by M. Civiale. That gentleman has now published a scientific treatise upon the Alps, illustrated by a few of the pictures he has taken. The work—*Les Alpes au Point de Vue de la Géographie et de la Géologie*—contains the results of a ten years' vacation survey of the Alps in a somewhat dry form, and by no means embraces the whole of the views he took. The few given whet the appetite for more, and have been received in a very satisfactory manner by the critics, one of whom says:—"Great credit is due to M. Civiale for constructing a photographic apparatus moving on a pivot, and capable of adjustment like a theodolite. This ingenious apparatus enabled him to take rounds of bearings, and to obtain a complete panoramic view by means of fourteen pictures exactly fitting to each other. His system of surveying has since been used with considerable success in Tunis."

It is stated that a new glass of very remarkable properties has been discovered by a continental chemist. It is said to have neither silex, potash, soda, lime, nor borax in its composition, being thus the extreme opposite of ordinary glass, in which some one or other of these constituents is an essential ingredient. The new glass is said to be equal to the common crystal—perfectly transparent, white and clear, and capable of being cut and polished. Further: we learn that it is not soluble in water (ordinary glass being, it is well-known, acted upon by water), nor is it amenable to the influence of fluoric acid, though hydrochloric and nitric acid will corrode it. Finally, it will, when melted, adhere to iron, bronze, and zinc. The *Weinner Gewerbe Zeitung* is responsible for these details.

We glean the following formula for making a powder for luminous paint:—"Take oyster-shells and clean them with warm water, and put them into the fire for half-an-hour; at the end of that time take them out and let them cool. When quite cool pound them fine, and take away any grey parts, as they are of no use. Put the powder in a crucible with alternate layers of flowers of sulphur. Put on the lid, and cement with sand made into a stiff paste (*sic*) with beer. When dry put on the fire and bake for an hour. Wait until quite cold before opening the lid. The product ought to be white. You must separate all the grey parts." This is to be made into a paint with gum water. We must observe that, though we do not suppose there is any chance of the patentee interfering with any one making paint for his own use by this formula, it must yet be remembered that Balmain's luminous paint is patented—*not* for the production of a luminous powder, but for the making such powder into a paint.

Salicylic acid and carbolic acid have both been recommended for use in photographic operations, and, now, a new aspirant for antiseptic honours has been brought forward—naphthaline, a nacreous crystal known for the greater part of the present century, but, until recently, not as an antiseptic. It is said to be superior in many points to other materials used for like purposes, and is less expensive to purchase than salicylic acid, now frequently employed in gelatine emulsion. It is, however, insoluble in cold water, though very slightly miscible with hot; but in ether and alcohol it dissolves freely. When examined the crystals are perceived to have a distinct smell suggestive of coal tar, from which they are derived. It is only by continual trial of all likely reagents that those best adapted for use in photography can be known; and we merely note this newly-recommended antiseptic without comment upon the probability of its usefulness.

The use of asbestos for filtering chemical solutions has long been known and recommended; but it appears that many complaints have been made that either it causes too much time to be occupied in the filtration, or the liquid that passes through is milky when a filter is made by pouring a thin paste of the material over a perforated platinum disc in the manner described by the inventor. He now supplements his first information by a description of the method of preparing the asbestos. This is done by rubbing any commercial quality over a sieve of ten openings to the inch, and then washing the material that passes through with water over a sieve of smaller (Nos. 25 or 30) mesh to wash away the finer particles. The asbestos left is boiled with strong hydrochloric acid, washed with distilled water till all acidity is removed, and afterwards heated in a crucible. The preparation can then be kept in bottles ready for use.

The theory of the method in which the haloids displace one another would seem to be well known and established; but Berthelot has shown it to happen in a rather different mode from that usually explained. He shows that even with equal equivalents a displacement to a certain extent in inverse order is quite possible, and he has been induced to repeat his experiments with the consequence of discovering certain hitherto unknown intermediate compounds, such as metallic perbromides, chloro-bromides, and the chloride of bromine. This inverse substitution is least with potassium chloride, greater with barium chloride, and most marked with silver chloride. We have thus the possibility of a fresh series of factors to consider in the question of an emulsion of mixed bromide, iodide, and chloride.

The details of Tommasé's experiments, as before alluded to, are briefly as follow:—A little less than an ounce of freshly-prepared bromide of silver was exposed under water for three minutes to the action of the sun's rays. It was then found that 2·3 per cent. of bromine had been liberated, and the whole of the precipitate had turned brown. The author considers the action here to be what he terms "dissociation" and not decomposition (by dissociation he means a slow instead of a quick change). He considers the bromide in sunlight undergoes a partial decomposition, depending on the surface exposed, the time of insolution, and the intensity of the light. A small quantity is transformed into Ag_2Br, which, in prolonged exposure, decomposes into silver and bromine, and contains in conse-

quence variable proportions of argentic bromide, Ag Br, argentous bromide, Ag_2 Br, and metallic silver.

A NEW form of funnel is described in a foreign technical journal, and may be useful for travelling photographic outfits. The material is *papier maché* coated with a strongly-resistant varnish, which is unacted upon by undiluted sulphuric acid, strong alkalies, ether, alcohol, benzole, and bisulphide of carbon. No description of the compositions of the varnish is to hand, though, as it is, perhaps, a secret preparation, we are not likely to have it. Collodion would seem to answer most of the requirements above named, though we apprehend it would be too fragile for the purpose. If the new material be likely to become an article of commerce we see no reason why developing trays should not be made from it. They would be less brittle than ebonite.

A PLEA IN FAVOUR OF SILVER PRINTING.

ON reading the *Lament and a Wish*, by Mr. J. Gale, on the subject of photographic printing, in your issue of the 5th inst., as well as the editorial article on the same subject a week later, it struck me that the complaint was a little far-fetched, and in many respects unreasonable.

It would, doubtless, be a *desideratum* if photographic processes could be so much further simplified that we could all obtain, with a "dead certainty," the exact results we wanted without being trammelled with any conditions whatsoever in the attainment of those results. But the principle of "no cross no crown" will, I fear, always hold good in photography as in all things else, however highly the art-science may be yet developed; and a thorough mastery of minor details, as well as an intelligent insight into all the bearings of the situation, in every stage of the process, must be the alone conditions of success.

It is certainly, I admit, a regrettable thing that manufacturers of albumenised papers do not (as I think has been suggested in the columns of this Journal) label the reams they send out with the strength as well as the nature of the salting solution with which their various papers are prepared. To the intelligent printer who sensitises the papers as he uses them such information would be a veritable boon, as it would enable him, by using different strengths of silver solutions, so to classify his sensitive papers as to adapt their suitability to the varied demands of his negatives.

But as to the insinuation that no photographic paper printing process faithfully represents, in all its details, the beauty of the original negative, I should like to ask—What about the charming productions, by silver printing on albumenised paper, of H. P. Robinson, G. W. Wilson, Vernon Heath, Payne Jennings, and a host of other high-class workers, including a fine series of 10 × 8 pictures of Alpine scenery recently taken by Mr. England, and printed, by the way, from gelatine plates?

I have seen and examined the above works with all the deliberation and scrutiny that I have been able to bring to bear on them; and, not to rely on my own judgment, I have heard the opinions of many competent judges; but not a single word of complaint as to the remissness of the process in carrying out to the highest perfection the feeling and spirit of the work. They are simply faultless; yet they are produced by this much-maligned though universally-adopted process.

That silver printing has its shortcomings no one can deny; but as yet no rival process has been able, effectually, to give it the "cold shoulder." However, admitting that some of the finer details may be, and often are, denuded of their original bloom and sparkle by the bleaching action of the toning solution, I contend that the negative is more at fault than the printing process, for there are negatives *and* negatives; but that is a form of expression I very much dislike. What I do mean is that there is a high quality attainable in a negative, but not always *obtained*, even by many of the cleverest photographers; and that quality, though very difficult of explanation in the absence of an actual example, may be summed up in the expression "softness and sparkle"—the absence of density and obliteration in the strongly-lighted parts on the one hand, and the relative fulness and vigour of details in the heaviest shadows on the other.

It is the precise knowledge of these essential conditions, and withal the ability to deal with them successfully, that enables a few superior spirits (for in every department of science, art, and industry there always are superior spirits who lead the van) to produce negatives in which the harmony of the various parts shall be so admirably balanced that, notwithstanding the denuding effects of both toning and fixing operations, the finished proofs shall have all the bloom and delicacy that the most cultivated critic can hope for.

Whilst I have pen in hand I should like to say a word on the subject of the scurrilous and unsigned post-card mentioned in your *Answers to Correspondents* last week. I know not whether it was intended as a joke, or was the spiteful ventilation of a very narrow mind. If the former it is a woefully lack-lustre one, and I fail to see in it anything to amuse. If the latter it is certainly beneath notice on its own merits; for there is no being I hold in such utter contempt as an anonymous libeller.

Passing this matter over, however, as unworthy of further notice, I will, as a professional photographer, here record my high appreciation of the amateur element, and my sense of the important part it has played in the history of photography from its very dawn until now.

I have in my mind's eye a grand phalaux of departed worthies, including Fox Talbot, the noble-minded and scholarly Sir John Herschell, Robert Hunt, the admirable and lamented Scott Archer, and a host of lesser lights of an early period, to which may be added, in our own day, the names of Dr. R. L. Maddox, Captain Abney, and others, to whose unpaid and untiring researches the present and past prosperity of professional photographers has been mainly due. I doubt if in any other department of human progress so much can be said to have been done by the persevering and disinterested labours of amateurs as has been done in building up to its present state of perfection the art-science of photography. J. POLLITT.

A NEW USE FOR OLD COLLODION.

How to utilise old collodion that has become red and insensitive has been a problem which has never received a satisfactory solution since collodion was introduced, for it will not pay to recover the solvents. Cleaning glass plates has hitherto been the only use to which it could be put; but the pungent fumes evolved militate against its use even for this purpose, and, I believe, it generally gets thrown away.

By dilution with water and straining it becomes an excellent detergent for removing the greasy, sooty deposit from the studio lights, though the quantity at the disposal of most photographers is insufficient to do much good, even in this way. Gelatine plates have, however, come to the rescue. By the simple addition of aurine to it an excellent backing for dry plates is at once secured.

Therefore, do not throw any more away but retain it for this purpose, for which nothing could be better.

EDWARD DUNMORE.

ON MEN AND THINGS.

IT is not now very frequently that one gets the chance of trying anything new in connection with gelatine plates, but Mr. W. K. Burton's proposed method affords an opportunity of at least starting in a new direction, and that a good one. As Mr. Burton himself says, the process, as laid down by him, does not recommend itself to amateurs on account of the uncomfortably-long period over which the operations are extended, though the actual time occupied in the different stages is so short as to bring about a direct and decided gain to those who work daily at emulsion making. It is not, however, upon the question of time saved or wasted that I should judge the process—though even here there is a probability, according to the Editors, that Mr. Burton's process may be improved—but upon the possibility of an actual advance in the quality of result obtained.

* * *

The *bête noir* of gelatine emulsion, by whatsoever method prepared, has always been the alleged partial decomposition of some portion of the gelatine itself during the process of emulsification, and the consequent production of various evils in the shape of frilling, fog—green and otherwise—besides many difficulties of a more or less mechanical character. In Mr. Burton's process, however, any possible action which the decomposed gelatine may be supposed to have on the quality of the resulting emulsion is alleged to be entirely got rid of by the complete removal, along with the soluble salts, of every trace of the original gelatine employed in emulsifying, whether decomposed or not. Certainly, if this claim be well founded, Mr. Burton's process commends itself to our notice as a step in the right direction; but, arguing on the analogy of other methods, it is not by any means certain that decomposition of

the gelatine during emulsification has such a deleterious effect as many suppose—at least in the direction of producing fog.

* * *

Take, for instance, Captain Abney's precipitation method, or the more recent modification of it which bears Professor Stebbing's name. Here surely we have at least as complete an elimination of the gelatine used in emulsifying as in Burton's process; yet the dreaded green fog does not fail to make itself apparent when other circumstances favour its production, though green fog is perhaps not the only form of fog that may be charged to the account of decomposed gelatine. Still it is incontestably the fact that in the processes I have mentioned the most perfect absence of decomposed gelatine that it is possible to conceive does not altogether free the emulsion or the plates from tendency to fog and discolouration—green and otherwise—when independent circumstances favour their production.

* * *

It has been suggested as possible that a minute trace of gelatine combines—mechanically, perhaps—with the silver bromide at the moment of the latter's formation, serving the purpose, in these precipitation methods, of assisting in the re-emulsification of the precipitate after it has been freed from soluble matter. It appears probable, if such combination does actually occur, that the harm is done in the very first stage of emulsification, and that the seeds of subsequent trouble exist in connection with the bromide itself rather than in the decomposed gelatine that is poured away.

* * *

Such, at least, is probably the case in the Abney method, though in Burton's process, or in any boiling process, other conditions prevail. The silver haloids, as is well known, are easily reduced to the metallic state by the combined action of alkalies and certain organic substances, especially the glucocides; and one of the best and readiest methods of recovering the silver from waste emulsion consists in boiling it with caustic potash or soda, by which the gelatine is decomposed, and in conjunction with the alkali reduces the bromide of silver, which is then easily separated from the mixture. Now a similar action, it may readily be conceived, may possibly go on, on a small scale, during the boiling of an emulsion in the process of preparation, unless special care be taken to provide that it is not alkaline. Yet, even in this case, the mischief is performed before the separation of the decomposed gelatine takes place; for we cannot but believe that if a portion—a minute portion, no doubt—of the bromide suffer reduction, the reduced portion will remain mixed with the precipitate and show itself subsequently in the shape of *chemical* fog.

* * *

On the whole, therefore, I am inclined to think that the advantages claimed by Mr. Burton for his method, in the shape of freedom from fog and discolouration in the resulting films, is due to causes other than the elimination of the decomposed gelatine, namely, to the use of acid during the boiling operation and to the presence of a large excess of soluble bromide. It is true that a considerable quantity of ammonia is subsequently added to the emulsion, which is thus rendered strongly alkaline; but this only occurs at a comparatively low temperature, when the reducing action, if it proceed at all, is very much feebler than at boiling heat.

* * *

That the action of decomposed gelatine upon silver bromide is harmless, except in the presence of an alkali and at a high temperature, as I have described, there is plenty of evidence, the latest coming from Mr. W. Horseman Kirkby, who, in a recent number, describes his experience with completely-decomposed emulsions. In Mr. Kirkby's case, the decomposed gelatine having been replaced by fresh, the emulsion was as good as could be wished; but I would go even further than this, and predicate that, if a sufficient quantity of fresh gelatine were added to give setting power to the emulsion, the presence of the decomposed gelatine would not have the slightest effect in producing fog, but would more probably act in the opposite direction.

* * *

I should not again have alluded to the question of priority in the use of ammonio-nitrate of silver in connection with gelatine emulsion had not Mr. Henderson brought the matter before the London and Provincial Photographic Association, in a communication in which he implies that the references I gave in my last notes were incorrect. As I am unwilling, if I inadvertently fell into error, to allow that error to stand, I have looked carefully back, and have given to the Editors exact references to past numbers of the Journal, from which it will be seen that I was literally correct with regard to what I stated in connection with Johnston's emulsion process. As regards Dr. Monckhoven's process: I find that the first publication in THE BRITISH JOURNAL OF PHOTOGRAPHY was in October, 1879—not, as I surmised from memory, in June or July. I hope, therefore, that Mr. Henderson and others will absolve me from the charge of wilful misstatement. ARGUS.

CONTROLLING TEMPERATURE—A SUGGESTION.

IN the BRITISH JOURNAL ALMANAC for 1883, which I have just received, I find a short article by Mr. F. C. L. Wratten on the subject of lowering the temperature of the dark room during the manufacture of emulsion.

The plan he there proposes is to propel by means of a fan a large quantity of air, cooled with ice, through his rooms. He intends, I think, to surround the pipes with ice, though, surely, it would be better to propel the air through a chamber packed with lumps of ice. However, this is merely by the way. What I have to suggest is, that it might be better or cheaper to erect a pump and drive air at great pressure through fine jets, when a temperature far lower than the freezing-point of water may be produced. It is very generally known that in compressing air considerable heat is evolved. With a special apparatus the heat can be made so great as to ignite tinder. So the air after it is compressed, and before being discharged into the room, would need to be cooled either with water or ice, then the result of the sudden expansion of the air when freed from pressure would be a very low temperature; the lower the greater the pressure had been.

A good illustration of this effect is seen when the jet of a bottle of liquid carbonic acid is opened, when a white cloud of carbonic acid snow is at once produced. In this case the pressure of the carbonic acid is between 700 and 800 pounds on the square inch, and the temperature produced considerably lower than 100° below zero Centigrade, as is proved by the fact that carbonic acid cannot be solidified by freezing mixtures whose temperature is lower than 100° C. C. I. BURTON.

DRY PLATES AND THEIR DEVELOPMENT.

[A communication to the Edinburgh Photographic Society.]

THOSE of us who had the pleasure of hearing Mr. M'Kean's paper, read at the last meeting of this Society, and of witnessing his practical demonstrations, could not fail to be very much interested; and the subject of dry-plate development being one of much importance it was decided to devote a portion of this evening to its consideration.

I was asked by our worthy Secretary to lead the discussion, and consented to do so; but as Mr. M'Kean in his opening remarks alluded to one or two things about which various opinions have been expressed in the journals and elsewhere, I would like just to notice them before proceeding with the subject specially recommended for our consideration.

In the first place, Mr. M'Kean speaks of uncertainty in working with commercial gelatine plates. As I have proved to my own satisfaction I would like to prove to yours that uncertainty need not exist, and if we had ever before possessed as reliable a process as the gelatino-bromide I would not take exception to his remarks. If we compare the gelatine process with the wet collodion, I think that most will allow that the silver bath is a constant source of anxiety to those who use it. If it work well today you cannot be sure that it will work as well to-morrow; whereas, get a batch of gelatine plates from a good maker, give them proper treatment, and such uncertainty need never trouble you. We get through gross after gross of plates, and I seldom trouble to ascertain when we are finishing the one batch or beginning the new, as they are all so much alike.

Only this afternoon I exposed a dozen plates (of a kind I have not been accustomed to) on as many different copies, deferring the development until all were exposed. All proved satisfactory but the last, which was wanting in exposure owing to the sudden vanishing of the light. This was a more severe test for the plates than ordinary portrait work, as the exposure had to be so much varied to suit the different subjects copied. So much for the reliability of the commercial gelatine plate.

As I have just been speaking of copying, I would like here to say that I have heard some object that dry plates are not suitable for that purpose; but I hold the opposite opinion, and even in reproducing black and white, such as sketches, engravings, &c., can obtain any amount of density by careful development without after treatment. I use a slower plate for copying, but the quicker ones will do as well if more bromide be added to the developer. This photograph, No. 1, is a copy from a small figure in a group. I am sorry I have not the original to show you, as the copy is by far the better of the two.

Some photographers still hold up the wet plate as their standard of excellence, while it is generally used as a standard by which to gauge the rapidity or sensitiveness of dry plates; but I think a wet plate at its best cannot sustain a high position in either case. It is undoubtedly capable of producing very fine results, and good results have been

obtained under very disadvantageous circumstances, but what uphill work! Here are two cabinet photographs taken four or five winters ago on a dull afternoon. No. 2 got five minutes and No. 3 seven minutes exposure. Now, how many of our clients or friends could we ask to sit for that length of time without moving a muscle? I was favoured in this instance with an exceptionally good sitter, or I need not have made the attempt; but with the gelatine plates we are now using I might have obtained as good results in twenty or thirty seconds, or, if necessary, with a special developer in one-third of that time—say seven or ten seconds.

This photograph, No. 4, was taken on a dry plate, on an afternoon in November last. It was late, and so dark that with a strong magnifying glass I could not feel sure that the picture was properly focussed. Now I believe that no amount of exposure in that kind of light would have impressed such an image upon a wet collodion plate, and it would be equally impossible with the wet process to produce by ordinary gaslight, &c., such photographs as I shall presently show you. Now, I trust Mr. M'Kean will excuse me if I differ with him on one other point. After speaking of "that uncertainty which naturally takes hold of one before applying the developer," he goes on to say—"Doubts arise as to the length of exposure, which in the bustle of a thorough-going studio is practically impossible to remember." Bustle or hurry is a thing that a photographer should not allow—in the studio or out of it. Whether exposing your plate or developing it you must exercise your memory and have the power of concentrating your thinking faculties upon the work in hand, and I find little difficulty, as a rule, in judging of the exposures, *particularly if very busy.*

I will now say a word regarding the relation of the exposure to the development, for I hold that the latter should be begun with confidence; and to that end you should know if your plate has had just sufficient exposure, or more or less than the subject required. We will admit that gelatine plates will allow of great latitude in exposure, but unless that statement be qualified it will prove misleading to those who have not had much experience; for, unless we are prepared to be constantly varying our developer, the exposure must be very correctly timed. I think the only way to acquire proficiency is to ascertain the method of development best suited to the plates we are using, and then endeavour to time every exposure to suit that particular treatment. The want of a proper regard to this, and perhaps a too frequent change in the kind of plate used, may in a measure account for the variety of developers recommended, if not for the extraordinary nature of some of them. One I notice as being composed of twelve constituent parts, involving an amount of trouble in the preparation which would suit but few, unless some decided advantage were gained by its use.

To speak of developers more particularly: I do not approve of any formula that necessitates the keeping of pyro. in solution. I cannot see that anything is gained by it, though something may be lost, and I find it very easy with the dry pyro. in a small, wide-mouthed vessel and a common bone egg-spoon, to measure out in a moment, as required, one, two, three or more grains, and so accurately that lately, when trying some experiments, I, for greater certainty, measured and weighed also, but found the weighing quite unnecessary, and the pyro., if in good condition, dissolves as soon as the water covers it.

Of the developers I have tried I will only notice two specially, viz., that introduced by Mr. M'Kean (the bicarbonate), and the one I have found most reliable in my own practice, which is an ammonia-bromide. The latter is similar to that recommended for Wratten's plates, only I find that a two-grain solution in place of a three-grain solution of pyro. is sufficient in portraiture to give all the density required; and our mode of working may not be exactly what is prescribed with their formula, but it is simplicity itself. It is as follows:—In an easy-stoppered dropping-bottle we have a solution prepared thus—

Ammonia	5 ounces,
Brom. potass	5 drachms,
Water	10 ounces,

and that is the only solution we need for ordinary work. Of course we have separate solutions at hand of bromide and ammonia in case they are required.

To develope a plate we put it into a dish with sufficient water to cover it, then measure the pyro. into the cup, and pour the water from the dish upon the pyro. and back again. The ammonio-bromide is then dropped into the cup, and the solution from the dish poured upon it and returned to the plate, when the image soon makes its appearance, and if rightly exposed is fully developed in about two minutes—sometimes less.

This formula appears to suit other plates than those it was specially intended for; but with Wratten's (which are the plates I have done most of my dry-plate work with) I find it not only suitable for all kinds of work, but equal to almost any emergency. But we are occasionally (now that instantaneous photography is thought to be so simple) asked to take a sitter when the light is so far gone that focussing is pure guesswork, or we have to take an instantaneous picture of a child on a very dull day; but, even though ordinary methods fail, our resources are not at an end, for, by dispensing with the restrainer in the developer, and using pyro. and ammonia alone, you may give one-third of the exposure you would give for ordinary treatment, getting very good results, as this photograph, No. 5, will show you. It was obtained in that way, when by other methods it was a hopeless case. I have developed plates with three drops of pure ammonia to the ounce of pyro. solution without fog, and with the ordinary developer fogging is of rare occurrence with us.

I find that most good plates will stand a considerable quantity of ammonia-bromide if applied at first with the fresh pyro. You may take a half-plate, knowing it to be under-exposed, develope it with thirty or forty drops right off, and get a good clear negative; but begin a similar one with ten drops, then add twenty or thirty more when the developing has proceeded some length, and the probability is you will get a thin, foggy negative.

I will now say a word or two concerning Mr. M'Kean's bicarbonate developer. In trying it side by side with Wratten's I was compelled to give the latter the preference, the bicarbonate requiring a much larger amount of pyro. and giving a less brilliant image.

I have here some negatives which I made in the course of my experiments to test their relative value; they are arranged in such a way that I think you may understand them without further explanation here. I will only mention, in regard to this set of three negatives—No. 1 developed with ammonia, No. 2 with ammonia-bromide, and No. 3 with bicarbonate—that if you take them in the order in which I have placed them I think you take them in their order of merit.

In reference to these photographs, taken by gaslight, I may explain that they were taken with a single lens. No. 6, girl blowing the fire, was taken by the light of one ordinary gas burner, exposure about seven and a-half minutes. In this case the stop was removed to try how the lens would act without it. In one of the other interiors, No. 7, you will see that the negative has been as well exposed as if done in daylight. These were all developed with the ordinary formula, as also No. 8, part of a street by gaslight. There being no light but what came from the shop-windows, this is under-exposed; but I obtained a better-exposed negative, which is unfortunately still in the printing-frame. This one, No. 9, was taken by moonlight, by Mr. Frank Moffat, and developed without a restrainer.

As I fear I have occupied too much of your time already, I will bring my remarks to a close by suggesting that a developer should be simple in its formula and mode of application, should do its work well in a reasonable space of time, and last, though not the least important, it should do its work in such a manner that the operator shall without difficulty estimate the density. S. Tamkin.

A LITTLE EXPERIENCE

At Whitsuntide I rowed down from Oxford to Richmond, and provided myself with some five or six dozen quarters. I had a Lancaster's "instantograph," and fired it off some six to twelve times a day. I found I never wanted more than twelve shots a day. I say "shots," because by the plan I adopted they were all shot from the shoulder like a gun.

The legs go into a sort of fishing-rod case, and the little strap with which I fasten the camera up when folded I use to strap it on to the folded legs. Putting one end of them on my right shoulder and holding it steady with my left hand, I am able to focus it with my right. The focussing-cloth has some elastic sewn down one side, and is fitted with a button and button-hole so as to fasten it over the camera.

Having focussed the view selected I observe what object occupies the middle point of the ground glass. I now put in the dark back, still under the focussing-cloth, and draw the slide, having previously set the shutter. By now looking along the top of the camera, and getting the front and back top corners on the same side of the camera, in a line with the object previously observed to occupy the middle of the field of view, and seeing that the camera is horizontal laterally, I know that the camera is pointed at the view focussed. The right hand now fires the instantaneous shutter and the view is taken.

I have found this extremely useful, especially in taking moving objects, as I am now perfectly sure of getting them included in my picture, and not, as formerly, finding sometimes that I have been too soon or too late to catch it on the plate.

I recommend every instantaneous worker who wishes to catch moving objects to *sight* his camera. It is very simple, and it depends on the same principle as that on which guns are sighted. Any two points on or attached to the camera are taken on a line parallel with the axis of the lens and camera; and when these two points are brought into a line with an object that object is focussed at the axis of the lens on the ground glass.

The plates above referred to were developed in my bedroom each night, and when washed were dried by being stood up on end, and in the morning were packed in the empty box, being fixed when the trip was over. I was never troubled with fog due to not fixing at the time.

It might be thought that the hand would hardly hold the camera steady enough, but I never found such to be the case, even when taking views from one steamer of another passing on the Thames. I only set up the tripod the last day of my trip, when the light was very bad, and I had to set the shutter to go very slowly. H. H. Cunningham, B.A.

CARBON PRINTING.

[A communication to the Glasgow Photographic Association.]

In reading this paper I am quite conscious that I am not bringing anything new before you. It was only at the very urgent solicitation of our

much-tried Secretary that I promised to do my best to fill up an evening. And in the hope that the subject might be interesting to some of you, I have hurriedly prepared this paper on carbon or autotype printing.

This first observation of the photographic properties of bichromate of potassium, which plays the most important part in our process, dates from the year 1838, when the English chemist, Mungo Ponton, noticed that a sheet of writing paper soaked in a solution of this salt turned brown when exposed to light and that a paper so prepared placed under a copperplate engraving, and exposed to the sun's rays for some time, yielded a negative copy. This copy can be freed from the soluble chromate by washing in water, and, thus fixed, *i.e.*, protected from further alteration.

Then M. E. Becquered discovered that the turning dark, under the action of light, of the paper soaked in the bichromate was connected with the presence of size in the paper. This, then, is the principle on which the process is based, that organic substances such as albumen or gelatine, mixed with bichromate of potassium or ammonia, become insoluble in warm water after exposure to light.

Carbon prints, as most of you know, are printed direct from the negative in frames the same as silver prints. The sensitive paper used is called "carbon tissue." Why it is so called I do not know; perhaps Mr. Swan gave it that name because of its gelatinous composition. In Germany it is called "*Kohle-Papier*" (carbon paper). It is prepared by coating a piece of paper with a mixture of pigmented gelatine and bichromate of potassium. To make it in large quantities a machine is required; but as some of you might wish to make it yourselves I will describe a method by which small quantities may be prepared by anyone. To begin with, a solution composed of the following should be prepared:—

Nelson's No. 2 flake gelatine	4 ounces.
Sugar	½ ounce.
Glycerine	1 to 2 ounces.
Water	1 pint.

In damp weather one ounce of glycerine will be quite sufficient, but in dry weather nearly two ounces will be required to keep the tissue soft, as it is apt to get very dry and crack. This must be allowed to stand till the gelatine has absorbed the water and become quite soft. The vessel containing these ingredients must then be placed in water about 120° Fahr. till the gelatine is dissolved. Great care must be taken that the temperature is not allowed to rise above 120° at the very most, as the setting quality of the gelatine becomes very much deteriorated, as dry-plate makers know to their cost. When the gelatine is quite dissolved the solution must be well switched up with a fork or a small egg-beater. It is then allowed to stand till all the air-bubbles come to the surface, when they are removed with small strips of paper. The colouring matter must next be prepared. There are two rules which must always be borne in mind in choosing the colouring matter. The first is that the colour must be a pigment and not a dye—that is, a colour which is capable of being ground to an impalpable powder, but which will not dye or stain either the gelatine or the paper; the second is that the colour must be permanent. Everyone knows how some colours fade away when exposed to strong lights. Lamp-black or Indian ink, which is pure carbon—the most permanent thing in nature at ordinary temperatures—usually forms the basis of the colour; hence the name "carbon process."

When lampblack or Indian ink is used alone the finished print has a dirty greenish appearance, owing to the action of the chromic acid. To counteract this other colours must be used. I give a few formulæ for producing different colours which may be useful to you. For the ordinary photographic tone use—

Indian ink	4 grains.
Carmine lake	3 „
Indian red	5 „

Or this may be used—

Bone black	3 grains.
Carmine lake	3 „
Burnt umber	2 „
Indigo	1 grain.

Dark brown tones are obtained by using a mixture of—

Vandyke brown	2 grains.
Venetian red	3 „
Indigo	1 grain.
Carmine lake	1 „
Bone black	15 grains.

A very pleasant red brown is obtained by mixture of—

China ink	3 grains.
Carmine lake	4 „
Vandyke brown	4 „

Red chalk tissue is prepared by mixing—

Indian ink	4 grains.
Burnt sienna	3 „
Venetian red	2 „

Tissues for making transparencies, either for the lantern or for enlarging from, can be prepared by using a warm-toned sample of Indian ink, either alone or mixed with a little Indian red or carmine lake.

You will have seen by this time that any colour may be produced that is desired, and variations in the colour shades in the formulæ I have quoted may be obtained at will, by giving prominence to the colour required in the mixture containing it.

Very beautiful effects can be obtained by using the two colours, one on the top of the other. This is done by coating the tissue (say) with a very dark, almost black, colour; and after this is dry, or nearly so, giving it a second coat, very thin, of warm brown colour. The warm colour being on the surface gives very delicate tone in the half-tones and high lights, and the thicker black coating gives beautiful deep black shadows.

To return to our stock gelatine, which we have almost forgotten. About sixty grains of dry colour will be required for the quantity which we have prepared. When the colours to be used have been decided upon they must be powdered as fine as possible in a mortar, and then mixed with enough water to form a thick paste and a very little of the stock gelatine. This paste is then thoroughly ground on a smooth paint slab with a muller, in the same way that a painter grinds his colours. The colour is then added in small proportions at a time to the warm gelatine solution, which must be kept thoroughly stirred while the pigment is added, in order that the latter may be evenly distributed through every part of the gelatine. The bichromate of potassium may be added now, but it is much better to prepare the tissue insensitive, and sensitize it as it is wanted, as it will only keep good about a week, or at most a fortnight; three-quarters of an ounce of very finely-powdered bichromate would be required to render the gelatine sensitive. It must be added like the colour, with continued stirring. The mixture is filtered or strained through fine muslin, and is then ready for coating. There are two methods by which the amateur can do this: it can be floated on the mixture—or, rather, drawn over its surface—or it can be placed on a glass plate which has been covered with the gelatine. The first is preferable for the manufacture of tissue in large quantities, and the second is best when only small quantities are required, as it needs no special utensils, and only so much of the gelatine mixture is used as is necessary for coating the tissue to be made. I will describe the latter first. The gelatine mixture must be put on warm; the bottle containing it is therefore placed in warm water, or the gelatine is kept fluid in some other way. A sheet of plate glass is carefully cleaned, allowed to stand in rain water, and then rubbed with ox-gall. It is next placed in a perfectly horizontal position. The gelatine is poured on to the middle of it, and by a gentle lifting and lowering action it is made to flow over the surface as quickly and evenly as possible. Air-bubbles are got rid of with a fine brush or a bit of paper. The gelatine soon sets. Before it dries a piece of paper is so far damped that, without being exactly wet, it is still thoroughly saturated with moisture. The moistened paper is now carefully and gradually laid down on the glass plate, commencing with one corner, so as to avoid air-bubbles. After a short time a knife is passed along the edges of the plate, and with the required care the paper is then lifted off evenly and not too slowly. The gelatine adheres to damp paper much better than to dry; the damp paper is also smoother. To prepare a whole sheet of paper 17 × 23 inches in the manner just described requires from seven to nine ounces of the gelatine mixture. The paper, by the way, must be rather porous and under-sized. To prepare the paper on a flat dish is not so easily done as with albumenised paper—by merely floating it. It requires to be drawn over the mixture. The dish which holds the gelatine is therefore narrow, and only corresponds in width with the paper to be drawn over it. The gelatine is kept in solution by placing the vessel containing it in a second vessel, which is filled with warm water. The quicker the paper is drawn over the gelatine the thicker the coating is, and the slower the thinner it is. If the tissue be then hung up at night in a room where a fire has been burning all day it ought to be dry next morning. When dry the tissue is sensitised by soaking in a solution of bichromate of potassium. As the paper is but little sensitive in the wet state it can be prepared in subdued daylight; but before it begins to dry the room must be quite darkened, as the dry carbon tissue is much more sensitive to white light than the sensitised paper for silver prints. Another reason for drying the tissue in absolute darkness is that no change manifests itself to the eye when decomposition sets in, and it is not until later, during the development, that any imperfection is discovered. To obtain uniform work the strength of the bichromate bath must be regulated according to the temperature. The warmer the weather the weaker the bath must be. In winter, to one part of bichromate of potassium thirty parts of water are added; in summer, fifty; and in very hot weather a hundred parts of water will be required. After repeated use the bath becomes dark coloured, and must then be thrown out. In summer the bath must be kept as cool as possible; if necessary the vessel containing it should be placed in ice. The stronger the bath is the softer the prints will be; the weaker the bath the harder will be the prints. Therefore, to print from a hard negative a stronger bath should be used; to print from a very weak negative a very weak bath is necessary. It must be remembered that tissue sensitised in a weak bath is necessary. It must be remembered that tissue sensitised in a weak bath is less sensitive, and, therefore, requires longer exposure. Too weak a bath yields no half-tones; too strong a one produces reticulation (a network structure in the print).

When the tissue has been cut to the required size it is carefully wiped with a soft, smooth duster to remove any dust that may be sticking to it. It is then immersed in the bath. Air-bubbles which attach themselves to both sides of the tissue are removed by means of a soft, fine sponge, and then it is allowed to remain, face downwards, in the bath until the

gelatine film feels soft, or until the edges of the tissue begin to curl upwards. If it be taken out sooner the film will not have been equally impregnated, and spots will be produced. For the same reason a liberal quantity of the solution should be used. The time the tisssue should be allowed to soak depends both on the solubility of the gelatine and the temperature of the bath. It ranges from one to four minutes. When the tissue has been removed from the bath it is either hung up at once by wood clips, or over a roller on which are several thicknesses of blotting-paper; or, what is much better, it is placed, face downwards, on a clean sheet of zinc or glass, and the superfluous moisture removed by passing a squeegee gently over it lengthways and crossways. A squeegee is merely a strip of india-rubber fixed to a wooden handle. The tissue is then hung up to dry, which will take several hours. If it dries too slowly excessive sensitiveness is developed, and it becomes tough and insoluble, causing uncertainty in exposing, and great difficulty in development. On the contrary, if it is dried too quickly it requires a very lengthened exposure, and even then there is a deficiency in the half-tones. The dried sensitised tissue, if well kept from light and dampness, should keep good from ten to fourteen days.

As there is no apparent change in the tissue after it has been printed it is necessary to have some means of regulating the exposure. For this purpose we have a small instrument called an actinometer or photometer. There are a great many different forms of this instrument, but, as usual, the simplest is by far the best; in fact, the only practicable one I have tried. Suffice it to say that almost every actinometer that has been proposed for testing the rapidity of gelatine plates has been tried for regulating the exposure of gelatine tissue, with this difference—that a piece of silver paper prepared in a very acid bath to make it slow is put in the actinometer instead of a gelatine plate. This actinometer, introduced by Mr. Johnson, and called the "cube photometer," consists, as you see, of a little disc-shaped tin box with a double lid. In the upper lid there is a round opening of three-quarters of an inch in diameter, covered with glass, on which, with oil paint, the chocolate-brown colour-tone is painted, which silvered albumen paper takes in about one and a-half minute's exposure to sunlight. In the middle of the glass there is a narrow slit half-an-inch long and an eighth of an inch in width, which is left uncoloured, as you see; inside the box is a roll of durable sensitised silver paper half-an-inch in width, and which can be drawn past and in contact with the inner side of the transparent space in the glass, without its being necessary to open the box. The silver paper used is albumenised paper sensitised with nitrate of silver solution, to which a little citric acid has been added. Paper prepared in this way will keep good for a year. The number of tints (that is, the number of times the paper will have to be shifted after assuming the tone that has been painted on the glass) which any negative will require will, of course, depend entirely on its density. A negative of medium density will require about four tints; but a little practice is all that is required to be able to tell at once how many will be needed. If the printing be done in direct sunlight, the exposure must be comparatively shorter than in diffused light, silver paper and carbon tissue not possessing an equal rate of sensitiveness in weaker light. If a negative require five tints in diffused light only four will be required in the sun. Any ordinary negative will do to print from, the only difference being that it must have a safe edge; that is, an edging of some perfectly opaque material. Any ordinary printing-frame may be used, provided the packing be kept dry. It is a good plan to put a piece of oil paper or American cloth, a little larger than the tissue, between it and the packing. Before being put in the frame the tissue should be examined, and any dust (which sticks to it very readily) must be brushed off with a soft cloth. When the tissue has been printed a long time should not elapse before development, as the change produced by the light's action is continued in the dark. When prints have to be left over night, about one tint is allowed for the extra printing that goes on. The tissue is now ready for development. Originally this was done by merely washing away the unacted-upon gelatine by soaking in warm water; but, do what they would, nothing could be got but a black and white picture, half-tone (the chief beauty of the silver print) could not be obtained.

The explanation of that is as follows:—The photogenic film, consisting of gelatine and pigment, possesses a certain thickness, and lies wholly on the surface of the tissue. Where the light finds free entrance through the negative it acts quite through the film, and fixes it in these places to the paper, so that when the film is washed the black gelatine remains and forms the shadow of the picture. In the lights the sensitive film is protected by the negative from the action of light, and these being still soluble, are dissolved out in the washing, and form the lights or whites of the picture. In the half-tones the light cannot act quickly, and reaches, as the action commences from above, perhaps to but half the entire thickness of the film. In washing, therefore, only half of the film would dissolve away, and through the remaining half the white paper would be partly visible, and thus form a kind of grey, representing the half-tones. Thus, in theory, the carbon process must yield half-tones. But one little matter had been overlooked. As the half-tone forms the outer part of the film it does not come into direct contact with the paper; and as in the washing the soluble part under it is dissolved away, the half-tone is also carried away with it. J. C. Annan.

(To be concluded in our next.)

SEPARATION OF THE COARSELY-GRANULAR FROM THE FINE BROMIDE OF SILVER.

Plener's method of separating coarsely-granular, already-fogging bromide of silver from the fine and clearly working, seems actually for the first moment to be almost the only one which can come into use. It is so, doubtless, when it is a question of universality—that is to say, applicability—to every emulsion without exception. Yet it is questionable whether it cannot in many cases be replaced by a simpler method, which under certain circumstances would be even superior to it. I am busy at present with experiments in this direction, so that I cannot yet declare precisely what the results will be, though it is allowable to say that those already given by the process are extraordinary.

When one works by Burton's or Lohse's method of precipitation or by any other similar process, in which at least one-twentieth to one-thirtieth of the gelatine which is to be used, is added at the beginning, and when the decomposition of the gelatine, which is to render the deposition of the bromide of silver possible, is introduced by acetic acid or ammonia, an action takes place which is quite similar to, only very much slower than, Plener's process. Here also the coarsest particles of bromide of silver settle most rapidly to the bottom, while the finer particles remain suspended above. Therefore, when, after the lapse of a certain time one carefully decants the emulsion off from the sediment, the latter can be suspended by itself in gelatine. One would then find that these coarsest particles of bromide of silver already give fog, while the emulsion decanted off, when allowed to stand and again suspended, is highly sensitive and furnishes clear and brilliant pictures.

The whole proceeding is also quite explainable, and it is quite evident that the result must be similar to that of Plener. This process is, however, so far preferable that it is not only simpler, and can be employed without large apparatus, but the most various degrees of fineness can be secured by it with ease. For example, I am at present busy carrying out the following experiment:—In a wash-bottle of two litres' capacity an emulsion was prepared according to the formula by which Pizzighelli and Hübl have worked, only the 100 c.c. of water employed there for the silver solution was used here for the gelatine solution, while the silver was added in crystals to the bromised gelatine and dissolved in it by shaking. After the emulsion had then digested cold for five hours, six c.c. of strong ammonia was added, the emulsion was diluted to two litres, and set aside to settle. At the end of five hours I poured the fluid off from the deposit into a second wash-bottle, and emulsionised the deposit with gelatine. The emulsion poured off was repeatedly treated in the same way, and thus a number of emulsions, with particles which gradualy became finer, were obtained. This series of formations is at present not yet ended; and with the emulsions so prepared test plates are immediately coated, two of which, which I have examined meantime, gave the results indicated above. As soon as the whole investigation, which I intend to repeat several times, is finished I shall publish the results.

There is one particular advantage which is undoubtedly uncommonly well secured by this method, namely, the coarsely-granular bromide of silver, which is so apt to cause the formation of fog, is thoroughly withdrawn from the emulsion, and this fault is completely prevented, so that the plates may be relied upon to show a cleanness which is only exceptionally to be met with in those prepared by ordinary methods.

It would give me very great pleasure if some one else would undertake the same or similar experiments, because this process gives to the individual photographer who prepares his emulsion himself the results which Plener can only obtain at considerable expense when manufacturing emulsion in large quantities. Franz Stolze, Ph.D.

—*Photographisches Wochenblatt.*

NOTES ON PHOTOGRAPHY.

Lecture VII.—The Gelatine Process (Continued).

The Photographic Properties of Silver Chloride, Bromide, and Iodide in Gelatine.

Silver Bromide.—The photographic properties of this substance vary very much according to what physical condition or state of aggregation it is in, its modifications in this respect being very numerous. If solutions of silver nitrate and a soluble bromide containing gelatine be mixed with proper precautions the silver bromide formed first appears as an opalescence, the particles being in the finest possible state of division, and, if examined by transmitted light, appear of an orange colour. Plates prepared with the silver bromide in this condition are of excellent quality, but very slow; if, however, this orange modification be heated or digested with an excess of soluble bromide or other solvent the molecules of silver bromide gradually agglomerate, forming larger and larger particles as the heating is prolonged. At the same time, and dependent on this increase in size of the particles, the silver bromide increases rapidly in sensitiveness. This double change continues until the particles attain a diameter of about $\frac{1}{8000}$ of an inch (Eder), and become some twenty times as sensitive as the orange bromide. This experiment illustrates how greatly the physical condition of the silver bromide influences its sensitiveness.

Dr. Stas (who first studied and minutely described these modifications of silver bromide) divides them into three principal kinds [specimens shown], viz.:—A, flaky bromide of silver. B, powdery bromide of silver. C, granular bromide of silver. Granular bromide of silver is far more sensitive than the other modifications, and forms, in conjunction with gelatine, the most sensitive substance for receiving a latent image yet known. It is described by Stas as an extremely-fine dust, having sometimes a matt and sometimes a glossy yellowish-white appearance. Boiled with water it remains wholly in suspension, colouring the water white. It is this granular silver bromide which is formsd when the orange modification is heated as described, and also by the other methods which are employed for preparing very sensitive emulsions.

These different modifications also vary in their sensitiveness to different-coloured lights and behaviour in development. The extremely-fine orange bromide is practically insensitive to red, orange, and yellow light, while the granular bromide is sensitive to all these colours, although much less so than to blue light (Abney); hence the necessity for such care (as regards the light employed) in coating and developing rapid bromide plates. The action of developers seems to be proportional to the size of the particles of silver bromide; for, while the finest possible orange bromide will stand a very powerful developer without fogging, as the particles become larger so the tendency to reduction and necessity to restrain the developer increases, till finally, when they get larger than the granular modification, they are reduced without previous exposure to light, and hopeless fog occurs. It is very important to remember that all these modifications have the same composition—that is, they all contain silver and bromine only, united in the same proportion by weight.

Causes which Influence the Sensitiveness of Silver Bromide in Gelatine.

(a) State of Aggregation.—This is the most important determining cause, and, as before stated, the granular condition is the most sensitive. The finer modifications, if present in any quantity, reduce the sensitiveness. The sensitiveness also apparently varies somewhat according to the method of preparing the granular bromide. Thus, the granular bromide prepared by the action of ammonia is never so sensitive as that prepared by boiling (Abney).

(b) Gelatine by its affinity for oxygen and the halogens acts as a sensitiser to the bromide. To exert its most favourable action in this respect it should be as pure as possible.

(c) The gelatine should be as soft as is consistent with safety, and, before coating the plates, should have a liberal supply of water with it if great sensitiveness be required (Abney).

(d) Finished gelatine emulsions when kept for a few days frequently increase considerably in sensitiveness. This Captain Abney believes to be due to the fact that the particles of silver bromide, to be in the most sensitive state, must be placed entirely beyond any state of strain. During preparation a strain is probably given to the particles of silver bromide, and by subsequently keeping the emulsion in the state of jelly this strain wears off.

(e) The excess of soluble bromide employed should be very thoroughly washed out. The presence of one per cent. excess of ammonium bromide reduces the sensitiveness to one half (Eder). The cause of this energetic retarding action of the soluble bromides was fully explained by Captain Abney in his Cantor lectures. He showed that, at the same time that light reduces silver bromide to sub-bromide, it also decomposes any ammonium (or other) bromide present, with the result of re-converting the silver sub-bromide to bromide. Thus the sensitiveness obtained is only the difference between these opposite actions.

(f) Alkaline carbonates and alkalies, more especially ammonia, added in small quantities to emulsions increase their sensitiveness (Eder). Fuming a dry plate with ammonia increases its sensitiveness (Col. Wortley). Treating a plate with very dilute silver nitrate and thorough washing before development increases its sensitiveness (Eder).

(g) Free halogens, oxidising agents, acids, soluble bromides, iodides, oxidised organic matter, &c., reduce the sensitiveness to a greater or less extent, and in some cases destroy it altogether.

Silver Chloride.—This substance is not so sensitive as silver bromide, and is, therefore, not employed alone for producing negatives. A small quantity in conjunction with the silver bromide in an emulsion gives density on development and increases the sensitiveness somewhat (Bolton).

Silver Iodide.—This body is very insensitive and very difficult to develope alone with gelatine. Captain Abney, however, in 1880 pointed out that a small quantity in conjunction with the silver bromide in an emulsion confers very valuable properties upon it without reducing the sensitiveness. In the first place, it takes away the sensitiveness which pure granular bromide has to red light, and so enables a comfortable light to be employed in development. In the second place, it acts as a restrainer of fog, giving brighter images with clearness in the shadows. Thirdly, it allows greater latitude in exposure; and, finally, by producing a more opaque film, prevents halation. In Dr. Eder's experience it reduces the sensitiveness slightly, has a tendency to give thin images, and prolongs the time of development.

Methods of Preparing Emulsions.

Extremely sensitive silver bromide in conjunction with gelatine can be prepared in many ways. Thus, it may be prepared by careful precipitation from aqueous solutions, washing by decantation, and subsequent emulsification in gelatine (Abney); by producing the fine orange bromide by double decomposition in a solution of gelatine, digestion with an excess of the soluble bromide and subsequently washing the set emulsion (Bennett), or by precipitating a solution of bromide of ammonium in gelatine with ammonio-nitrate of silver, and subsequent washing (Obernetter), &c. They nearly all, however, arrange themselves under one or other of three principal types, viz.:—1. Precipitation processes. 2. Boiling or acid processes. 3. Ammonia processes, and of which the above three methods are examples. In some cases these methods are combined together, as in Mr. Burton's recent process. They may again be divided into those which contain silver bromide only, silver bromide and iodide, and silver bromide, iodide, and chloride respectively. In England the second of these types, or the boiling method, containing silver bromide and iodide, seems in most general favour, and will therefore be employed by us.

E. H. Farmer.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATION FOR PATENTS.

No. 101.—"Improvements in the Application of Eosine in Photographic Processes." C. D. Abel; a communication from P. A. Attout and J. Clayton, of Paris, France.—*January* 8, 1883.

ABRIDGMENTS OF BRITISH PATENTS.

No. 2621.—"An Automatic Adjustable Photographic Exposer." G. L. Addenbrooke, 9, Mecklenburgh-street, London.—*Dated April* 4, 1882.

This invention is for the purpose of enabling photographers to obtain the exact exposure which they may deem proper to give photographic plates in the camera. Several forms of photographic shutters are now in use to which this may be rendered applicable:—A closed box—say eight inches long, four inches broad, and one and a-half inch thick—through the lower part of which a hole is made—say three inches in diameter. This box should have inside it two grooves, in which work freely two slides of such size as to cover the aperture. These slides are attached by elastic or springs, one to the top and the other to the bottom of the box. When required to be set, one slide is drawn down to cover the aperture, and the other is drawn into the space above, both being retained by catches. On the shutter is fixed in any convenient place a simple clockwork train almost exactly similar to the striking train of a clock, and consisting of a long spring preferably with stopwork to prevent its being wound more than one turn. To the barrel of this spring is on one side geared a revolving fan, the gearing being such as to cause the fan to make (say) from 300 to 600 revolutions for one revolution of the spring barrel. The barrel of the spring is also geared into a cog wheel of rather smaller diameter than the barrel. The arbour of this cog wheel projects through the case of the clockwork, and to it is fixed a metal disc. This has on the under side a projection, and a lever working on a central pivot is placed so as to come in momentary contact with this projection, as the disc revolves. This lever is connected by a simple metal rod to the lower catch of the shutter, which is made with an arm projecting at right angles so as to receive it, so that whenever the projection on the disc moves a lever the catch is withdrawn, and the slide it holds is liberated also. The disc is a movable radial arm, having another projection rather farther from the centre than the first; and by any convenient means, such as a series of holes at graduated distances round the edge of the disc, this second projection may be set at any required interval from the first. This second projection acts on another lever similar to the first described, and connected in like manner with the upper catch of the shutter. It is thus clear that, the disc being set to revolve in a certain number of seconds (say three), the two levers will be moved by the two projections at an interval which bears the same relation to the time taken for a whole revolution of the disc as the arc distance between the points does to the whole circle, the result being that the operator, having wound up the spring, sets the radial arm to give a required exposure, and the slides of the shutter, on liberating the clockwork, rise and fall respectively at the interval fixed upon.

No. 2,156.—"Improvements in the Preparation of Photographic Plates for Subsequent Typographic or other Multiple Reproduction of Living or Dead Objects." Frank Wirth; a communication from George Meisenbach, Munich, Germany.—*Dated May* 8, 1882.

This invention consists of a novel method, by which any object, living or dead, can be delineated direct by photographic means with stippled or hatched shading without having to first make a drawing, and such delineation can be multiplied by printing, or engraved as a plate for the reproduction of copies. In order to produce a typographic block the method to be employed is as follows:—A transparent plate is hatched or stippled in parallel lines, a transparent positive is made of the object, the two plates are joined preferably face to face from the combined plates, and a definite negative is photographed in the ordinary manner. In order to cross-hatch and break the lines of the shading for obtaining a more plastic appearance of the printings made from the typographic or other block, the hatched or stippled plate is shifted or moved once or more during the production of the said definite negative. This negative is transferred in the usual manner on to a plate of suitable material, which is graved or etched in the usual manner to form a typographic block. For the engraving plates the negative is transformed into a positive, and the latter is transferred on to the etching-plate in the usual manner. The negative produced from the combined plate may also be used for the production of photographs and photolithographic plates. Both the object and the hatching or stippling may be produced photographically on one and the same plate in place of using two separate plates, and this plate used direct for the production of an engraved plate. On the other hand, when typographic blocks, photographic or

photolithographic plates, and the like are required, a negative must be made for transfer. To obtain cross-hatched or broken shading its original is moved during photography.

No. 2403.—"Improvements in Frames Employed for Printing Photographs Especially Adapted for Direct Photography or 'Blue Printing.'" J. M. JUSTICE; a communication from G. S. Street, of Moncton, New Brunswick, Canada.—*Dated May* 22, 1882.

This invention relates to that class of frames which are employed for photographic printing, and particularly to the frames for direct photography or "blue printing." It consists in the means or arrangement of parts whereby the tracing cloth, paper, or other material may be readily arranged and held closely in position during the operation of printing. This is effected by the application of a water or other pressure cushion in the place of crossbars and set screws as ordinarily used, and by the improved arrangement and combination of parts. The advantages gained by the use of this invention are—First, the pressure applied is uniform, and lessens the liability of breakage to the glass; second, the pressure can be applied instantaneously; third, the apparatus is entirely self controlled, there being no parts which it is necessary to remove to accomplish the work in hand. To the carriage are secured two equal-sized frames, to one of which is secured the air cushion, while the other carries the glass, said glass being secured to the frames by pieces of tin let into the frames and bent over the glass or any other suitable manner, the frames being rebated to receive the glass. The pressure cushion is formed of two sheets of rubber the same size as the frame, and is secured thereto in any convenient manner; the joints between the sheets can be made in various ways. Instead of making said pressure cushion of two sheets of the same material, the lower sheet only need be of flexible material, which may be secured to a stiff backing of zinc, tin, iron, wood, or other suitable substance. The two frames are hinged either with straps or butt hinges; but preferably with strap hinges at intervals, the number depending on the size of the frame. On the opposite side of the frame is placed a system of levers, which will operate in such a manner that it is only necessary to fill the pressure cushion once, after which the required pressure can always be obtained by the use of the levers. The hooks or claps which hold the frames together are so made that they can be turned round so as to disengage with the top frame and be dropped down below the level of the glass, thus allowing tracings and paper to be easily put into and removed from the frame. When the cushion is filled the frames will not come freely together at the front, and consequently when drawn together by the hooks or clamps and levers, the pressure is greatly augmented. When the frames are drawn together and the pressure is on, the levers are held in position by a spring catch which has a shoulder, which will catch and hold the said levers. If the levers are released the cushion will rise as far as the hooks will permit, to disengage which entirely it is necessary to give them a quarter turn; the cushion frame is then free to rise to such a height as to enable the operator to easily remove or place his subject to be printed. The frames are held apart by quadrants provided with spring thumb catches. The adjustment of the levers is effected by nuts. The frames are prevented from swinging and are held at the desired angle on the stand by a clamp screw in connection with the pivots or axles. The cushion may be filled by a pair of small bellows, an air pump, or a small blower, the pressure required being very small. The cushion can be easily filled by simply blowing with the mouth through a suitable pipe. Water or other liquid may be employed for filling the pressure cushion; but air is deemed preferable, while a safety valve may be attached to the cushion to prevent the application of too great a pressure. At either end of the frame containing the glass may be placed a box for the purpose of holding tracings which are more than the length of the printing-frame, and have to be printed in sections. On each box there is a lid or cover. In small-sized printing-frames the combination of levers and quadrants may be dispensed with, the two frames being pressed together by hand and secured with a catch spring.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 24	Bristol	Studio, Portland-st., Kingsdown.
,, 25	London and Provincial	Mason's Hall, Basinghall-st.
,, 25	Liverpool Amateur	Free Library, William Brown-st.
,, 25	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association held on the 11th instant Mr. W. E. Debenham occupied the chair.

Mr. A. COWAN referred to a box for storing plates, which he had made on a plan described by Mr. Schwartz and exhibited the previous week. He said that if thought desirable to pack the plates even closer than with the two strips of cardboard between each pair of plates, it would suffice to place the strip at one end only, and between the next pair to lay a strip at the opposite end; thus the thickness of the enclosed plates was only increased by one thickness of card to every four plates.

Mr. C. G. COLLINS said that he had some years since made a store box for albumenised plates for Mr. F. Bedford, on a plan very similar to that adopted by Mr. Schwartz. In his case, however, triangular pieces of card were used, one at each corner of the plate; the corners of the box were recessed away, so that the card, fitting loosely in these recesses, was prevented from slipping over the surface of the glass.

Mr. J. GOLDING said that the card in contact with the plates might cause a marking upon them. He had seen some that had been packed with pieces of yellow millboard between the edges, and wherever the millboard had touched the plate it was insensitive.

Mr. COWAN suggested the use of strips of ebonite, bone, or celluloid, instead of card, for separating the plates, if any ill result arose from the use of the latter material.

Mr. COLLINS said that he had recently unpacked and used plates prepared by a well-known maker two years ago. These plates had thin paper between each pair not reaching quite to the edge, but no mark was visible where the paper had lain.

Mr. J. BARKER had found chrome yellow paper best for placing between sensitive plates. After two years' storage he had found no marks on plates thus packed.

Mr. A. J. BROWN said the deterioration in plates which had been kept, that he had noticed, was at the edges and gradually creeping inwards towards the centre. He had not observed that to take place when the plates were kept in grooved boxes instead of packed parcels.

A MEMBER suggested that the insensitive marking spoken of, as produced by contact with card or millboard, might be caused by pressure.

The CHAIRMAN believed that the deterioration of plates at the margin was due to the action of impure atmosphere, and principally from the presence of gas vapours.

Mr. W. H. PRESTWICH showed some specimens of "filigrane" or prints produced by pressure upon paper, a specimen of which process appears in the current issue of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC.

Mr. A. L. HENDERSON showed a print from a negative, taken with pinhole instead of lens, by an amateur, Mr. Taylor, with five minutes' exposure. He also exhibited a negative of a white bust obtained with pinhole opening, and taken at one of Professor Tyndall's recent lectures. The bust had been placed at a distance from an electric arc of five feet nine inches. The exposure given was forty-five seconds, and was insufficient. The pinhole, which had worked most satisfactorily, was drilled for him by an optician at Southampton.

Mr. A. HADDON suggested that a piece of charred card would be the best plate in which to make the pinhole.

Mr. SMITH said that a small circular hole could be made by passing an electric spark through a piece of card.

The CHAIRMAN suggested that a tool making a very wide bevel should be used to make a depression nearly through a plate of metal, which could then be ground away from the back till an opening of the desired size was obtained.

Mr. Léon Warnerke was elected a member of the Association; and votes of thanks were ordered to be transmitted to the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY and Messrs. Cussons for copies of almanacs received, and to Mr. Beach, of the *Scientific American*, who had sent a copy of that journal, with an intimation that he would send it regularly.

A letter was read from Mr. W. K, Burton expressing regret that unexpected circumstances would prevent him from demonstrating the precipitating process of emulsion-making at the meeting for the 18th inst., as had been previously arranged, and the following Thursday (the 25th) was fixed in lieu of the former date.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE third ordinary meeting of the current session was held in 5, St. Andrew-square, on the evening of Wednesday, the 10th inst. The President being unable to attend through indisposition, the chair was occupied by Mr. Norman Macbeth, R.S.A.

The minutes of the December meeting having been read, approved, and signed, Mr. R. Smith Brown was unanimously elected an ordinary member.

The SECRETARY intimated the receipt of a letter from Mrs. Dobbie, acknowledging receipt of extract-minute of sympathy and condolence; also the following presentations to the Society:—

1. *Madeira Spectroscopic*—a very handsome volume, illustrating most laborious and painstaking investigations, by Professor Piazzi Smyth.
2. THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC and the *Year Book of Photography*, by their respective Editors.
3. A fine carbon print, tastefully mounted, being a photographic group of the members of the Society attending the annual excursion at Dirleton, by Mr. M'Ghie, of Glasgow.
4. A number of Messrs. Cussons' *Pocket Almanacs*, for distribution.

Mr. S. Tamkin read a paper on *Dry Plates and their Development.* [See page 31.] It was illustrated by a number of negatives and prints, and advocated, under certain conditions, the use of alkaline pyro. development, without restraining bromide, thus supporting Mr. M'Kean's contention that the latter is not necessary, but tending to show that the addition of bicarbonate to the ammonia was needless.

Mr. J. M'KEAN, on being called upon to reply to Mr. Tamkin and thus continue the discussion deferred from last month, said:—"I regret that Mr. Tamkin has not given us a practical demonstration of his method of using my developer alongside his own, as there would thus have been a better opportunity of judging of the merits or demerits of either. I am somewhat surprised that so simple a formula should have failed in the hands of such an expert as Mr. Tamkin, though, on close inspection, I think he has succeeded better than he imagines; for, on examining the negatives furnished to illustrate the paper just read, those restrained by bromide are more brilliant than those developed by bicarbonate of soda as a restrainer—in other words, the lights are more dense, and the shadows consequently more clear. Now this is the very point at which I claim to have made an improvement. No one will deny the danger of overdoing the high lights when using bromide as a restrainer, unless the quantity of pyro. be very nicely adjusted. Watch the progress of the two developers while instituting a comparison. The high lights of the negative developed with the use of bromide seem to penetrate the whole thickness of the film before justice is

done to the detail in the shadows (this, at least, has been my experience); but with the bicarbonate developer density and detail come together, consequently a softer and more harmonius picture is the result. Unless for copying line engravings, or anything requiring great density and clear shadows, I do not think it probable I shall ever again have recourse to bromide in the developer. Speaking of the 'feeling of uncertainty which naturally takes hold of one before applying the developer,' Mr. Tamkin says no uncertainty need exist; and in this I agree with him, when, as in his case, commercial plates are purchased by the gross direct from the maker, though amateurs and others who procure them by the dozen will agree with me that there is too often cause for reflection both before and after development. Mr. Tamkin finds two grains of pyro. instead of three sufficient to develope his plates. I use a three-grain solution, but in practice I develope two plates with the same. Had he used a three-grain solution, as advised, I believe his opinion of the bicarbonate would have been more favourable, and he would at the same time have saved the price of the pyro. by discarding the bromide. As to keeping notes of the various exposures and other details to guide in the development: I find one or two drops of the bicarbonate and ammonia in the pyro. solution will tell more in a second than could be written down in a minute, and this just at the moment when the information is most needed and serviceable.

Mr. J. M. Turnbull said he had not had sufficient experience to express a weighty opinion on the bicarbonate developer, but with the plates he had used he had found that, though they were not subjected to a prolonged action of the developer, yet green fog was prominently manifested; but with the ordinary developer restrained with bromide these plates were quite free from that defect.

Mr. A. Ayton remarked that since Mr. M'Kean published his formula he had been using it constantly, and found that it reduced his exposures about one-third, which was a very decided advantage, the negatives containing more half-tone than by the use of bromide, particularly if the exposure be slightly under. It, however, requires stronger pyro. to obtain sufficient vigour.

In answer to Mr. M'Kean's query as to how he would remember the exposures given on a busy day if the development were deferred,

Mr. Tamkin replied that it was his practice to time all exposures to suit one mode of developing; but when (as occasionally will happen) this rule had to be departed from, and the plates put aside for a time, he had a very simple way of refreshing his memory, if necessary. The plates, when taken out of the slides, are placed one above another, with a piece of paper between, in one of the ordinary pasteboard boxes a size larger than they are sent out in. If all the exposures have been according to rule no notes are required; but if an exception has been made a small reference to it is made in pencil upon the paper lying upon the plate, even one sign sometimes being quite sufficient to remind one of all the circumstances necessary to remember. He (Mr. Tamkin) being asked a number of questions in reference to the pictures taken by gaslight, elicited, among other, the following information:—The interior where he is seen sitting was exposed in all about forty minutes. He sat thirty-one minutes, and then left his seat, removing the white objects, and allowing the exposure to proceed for a short time. In the fully-exposed interiors the same plan was adopted. About three-quarters of an hour's exposure was given, the supper table was then cleared, other prominent white articles removed or obscured, and the exposure continued for three-quarters of an hour longer. There were here three gas-burners lighted, and a total exposure of thirty minutes, according to his calculation, would have been sufficient had an unrestrained developer been used. The moonlight view taken by Mr. Moffat was done with Dallmeyer's rectilinear.

The Secretary stated he had received a note from Mr. M'Laren, of Larbert, who could not be present, intimating that in his experience the bicarbonate developer was not suitable for Wratten's plates. He said:—"I followed the instructions with as much care as if the fate of Ireland depended on it; then, knowing that the correct exposure waa about twelve seconds, I exposed three pairs of plates—Nos. 1 and 1A for five seconds; Nos. 2 and 2A for eight seconds; Nos. 3 and 3A for twelve seconds. Nos. 1, 2, and 3 I developed with the bicarbonate, and the result was in each case more or less a failure. No. 3 was best, but was poor, wanting in crispness. Each gave signs of under-exposure, and I forced them until they began to veil. No. 1 was badly fogged. I then developed Nos. 1A, 2A, and 3A with my ordinary ammonia and bromide solution, and the result was in each case greatly superior to its neighbour. This developer will most probably succeed with plates which will stand a large dose of ammonia. I cannot complain of 'weak half-tones and exaggerated high lights.' If I get a negative of that description it is my own fault. I remedy it by giving a longer exposure, and using the pyro. in moderation."

In reply to remarks made and questions asked by members present,

Mr. Tamkin said that the negatives taken to test the relative properties of Mr. M'Kean's and Wratten's developers were exposed in a bad light. The experiments were made with every desire to give the former all fairness; and with this end in view Mr. Frank Moffat was asked to develope the one plate, while he (Mr. Tamkin) did the other, so that their peculiar characteristics might be observed side by side. He called attention to the curious fact that, while the fuller-exposed plate developed much more rapidly with M'Kean's than with Wratten's, the reverse was the case when the exposure was reduced. In regard to using an unrestrained developer: he only recommended its use where ordinary means were likely to fail, but thought that at such times to use ammonia alone (with pyro.) was preferable to using a substitute for bromide, as when extreme rapidity was desired the absence of the restrainer allowed them to give the shortest exposure.

Mr. W. T. Bashford said that he supposed the diversity of opinion probably arose from the dissimilar qualities of plates by different makers. He had found with the plates he was using that the simple bicarbonate developer recommended by Mr. M'Kean failed to produce a sufficiently plucky negative. There was a slight veiling of the shadows without a corresponding increase in the high lights to ensure brilliant prints; but by adding a small quantity of ordinary bromide and ammonia, stock solution (Swan's formula), that defect was remedied, and the exposure shortened. The image with bicarbonate was on the surface of the film, and was much more transparent prior to fixing—more resembling in translucency a plate developed with sulpho-pyrogallol. He was much struck with the gas and moonlight photographs exhibited by Mr. Tamkin, the former fully proving that with some most sensitive plates the presence of bromide in the developer was not necessary, thus placing a wonderful power in the hands of the skilful photographer, enabling him to secure negatives under conditions by many deemed impossible.

The Chairman, in proposing a vote of thanks to Mr. Tamkin, said that he felt indebted to him, to Mr. M'Kean, and others who had taken part in the discussion; and he was glad to see in the photographic press that the subject of developers was still brought into prominence, as he felt that any progress yet to be made was most desirable, consequently most likely to be in that direction, and any contributions by thoughtful, painstaking experimenters were valuable as aids to progress.

The motion was carried unanimously.

A hearty vote of thanks to the donors of the various presentations was accorded, also to Mr. W. Dougall for having so kindly and fully undertaken the duties of interim-secretary recently.

The proceedings then terminated with thanks to the Chairman for presiding.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The fourth regular meeting of this Society took place in Lamb's Hotel, on Thursday evening, the 11th instant,—Mr. W. D. Valentine, Vice-President, in the chair, office-bearers and members, with visitors, assembling in good strength.

The proceedings were opened by the Hon. Secretary reading a letter of apology from the President, Mr. J. C. Cox, for unavoidable absence.

The Chairman congratulated the members on their assembling in 1883.

The minutes of the previous meeting having been read by the Secretary, Mr. C. Johnson, and confirmed, the following gentlemen were admitted members of the Association, namely, Mr. W. M. Martin and Mr. Charles Kerr. Several gentlemen were then proposed for election at next meeting.

The question-box, having been opened by the Chairman, was found to contain three problems, which afforded a wide field for scientific inquiry and research in photography. Mr. Valentine, Bailie Ogilvie, Dr. Tulloch, and Messrs. John Robertson, Geddes, Roger, Ferrier, Ireland, &c., contributed to the solution of some rather abstract questions.

Mr. J. Y. M'Lellan, of Glasgow, afterwards exhibited and explained his patent "eclipse" lamp. Several plates were exposed, and the thanks of the Association, on the motion of the Chairman, were awarded to the exhibitor.

The Hon. Secretary announced the receipt of The British Journal Photographic Almanac, with its valuable budget of information, and a vote of thanks was passed to the Editor for his courtesy.

Mr. W. D. Valentine exhibited some artistic gems taken during the recent snow storms. The effects were pronounced to be excellent.

A vote of thanks to the Chairman closed the proceedings.

A packet from Mr. M. Jackson, Perth, and also one from Messrs. Cussons and Co., Liverpool, arrived too late for the meeting, but are hereby acknowledged with thanks.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The usual monthly meeting of this Society was held in the Royal College of Science, Stephen's-green E., on Friday, the 12th inst.,—Mr. Thomas A. Bewley in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. C. F. Allen and G. N. Jacob were elected members of the Society.

Mr. A. Conan read a very interesting and exhaustive communication on *Halation*, illustrated by experiments, including those of Captain Abney, showing the halation on a large gelatine plate, with the aid of the optical lantern. There was a well-sustained debate on this paper.

Mr. J. V. Robinson exhibited and explained the *modus operandi* of the "crystoleum" process, and exhibited a number of pictures, which were much admired. He also showed a new optical lantern, using the four-wick lamp instead of the three-wick, and a new tripod-stand made of American walnut.

Dr. Scott exhibited a new camera with the plate-carrier so constructed as to open inside the camera.

The next meeting will be held on Friday, the 9th prox.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Society was held on Tuesday, the 9th inst., in the College of Physical Science,—Mr. J. P. Gibson in the chair. The minutes of the last ordinary meeting and the special meeting were read and confirmed. Messrs. H. Piper and W. D. Welford were unanimously elected members.

This being the meeting for the election of officers of the Association scrutineers to examine the voting papers were appointed, viz., Messrs. Thos. M. Laws, Lyddell Sawyer, and W. Ridley.

The Secretary read the

SECOND ANNUAL REPORT.

Gentlemen,—Your Council have pleasure in offering to you the second annual report. During the past year the Association has suffered a severe loss through the death of one of the Vice-Presidents, the late Prof. Freire-

Marreco, who was most highly esteemed by the Council and members of the Association, alike for the value of his assistance and advice, the sterling interest which he took in the Association, and the kindness he extended to all those with whom he came in contact.

The ordinary monthly meetings have been very well attended, but your Council much regret that the outdoor meetings were again unsuccessful in point of numbers. Two practical demonstrations have been given and two lantern exhibitions held, each of which proved successful.

Although the Council regret that so many of the members failed to contribute to the competitive exhibition held recently, yet it far exceeded the expectation of the promoters. The local press, as well as the photographic journals, spoke in terms of great praise of the quality of the work shown, and much disappointment was expressed by the public that the exhibition was not made more widely known, and of a somewhat more permanent character. Since the formation of the Association in January, 1881, eleven members have resigned. There are now seventy-nine members on the books.

The best thanks of the Association are due to the council of the College of Physical Science for placing their rooms at our service; also to Messrs. W. Green, W. Armstrong, Jun., E. Dodds, J. Hedley Robinson, Dr. Williamson, and the Rev. T. F. Hardwich for the contribution of papers; as well as to Professor Merschel, Mr. Way, and Mr. P. M. Laws, for their valuable assistance in selecting the pictures at the exhibition.

Your Council again express the hope that a liberal supply of papers will be forthcoming at the ensuing meetings, and rely upon your generous support.

J. B. Payne, *Hon. Sec.*

An interesting discussion took place on the report, in the course of which Mr. J. B. Payne gave some details of the rise of the Association and the success which had attended its promotion, far exceeding, as it did, the expectations of those who had undertaken the formation of the Society.

The outdoor meetings had been a failure, probably owing to the weather; but it seemed to be the opinion of members present that in future other days than bank holidays be selected. With regard to the exhibition it was suggested that medals or certificates should be awarded the successful exhibitors; that, to ensure a larger number of competing members, those who sent pictures receive two presentation prints instead of one; also, that the exhibition be kept open for a few days, and that the opening ceremony should take the form of a *soirée* or *conversazione*, for which invitations might be sent out.

On the proposition of the Chairman the report was adopted.

Mr. P. M. Laws, the Treasurer, then read the financial statement.

General Statement of Receipts and Expenditure, 1882.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance from last year	10	2	8	By Expenses at Annual Meeting, Piano, Refreshments, and Advertisements......	4	17	0
,, Subscriptions from last year	2	12	6	,, Do. at Monthly Meetings..	5	16	10
,, ,, for 1882	32	11	0	,, Stationery	10	16	1
,, Visitors' Tickets for Annual Meeting	1	5	6	,, Postages	3	5	9
,, Ten Copies *View on Tees* ..	2	10	0	,, Album	0	6	0
				,, Professor Marreco's Portrait	4	14	6
				,, Balance in Bank.. 18 18 0			
				,, ,, in hand.. 0 7 6			
					19	5	6
	£49	1	8		£49	1	8

Examined and found correct,
EDWIN DODDS.

9th January, 1883.

Mr. J. Downey characterised the statement as satisfactory, and moved its adoption, which was carried.

The scrutineers reported the following result of the voting for election of officers:—*President:* Colonel Sheppee.—*Vice-Presidents:* Professor Herschel and Mr. A. L. Steavenson.—*Treasurer:* Mr. P. M. Laws.—*Council:* Professor Bedson, Dr. Berwick, Messrs. E. Dodds. J. Downey, J. P. Gibson, H. Mendelssohn, J. B. Payne, J. Hedley Robinson, J. W. Robinson, and E. Sawyer.

Mr. Payne stated that the two gentlemen who were nominated at the last meeting for the office of secretary declined to stand, and in this difficulty he proposed Mr. J. Pike (whose consent he had obtained], which was seconded by Mr. P. M. Laws, and carried.

Much regret was expressed on all sides that Mr. Payne's services could not be retained in that capacity.

Mr. Payne proposed, and Mr. Dodds seconded, the appointment of Mr. Redhead as auditor, which was agreed to.

The meeting was then adjourned.

Correspondence.

ON GREEN FOG.

To the Editors.

Gentlemen,—Were one to take a retrospect and scan the photographic journals for the past year or two, the attention could not but be arrested by the great diversity of opinion regarding green fog. The iodides, the bromides, borax, sulphite of soda, high temperature, &c., &c., *ad infinitum*, are all in turn said to generate the "monster."

It is not without some diffidence I venture to point out what I consider the immediate cause or causes of its formation in a gelatino-bromide emulsion. From experiment, and taking the case occasionally *ad avizandum*, as the lawyers have it, I came to the conclusion some time ago that when solvents of silver bromide are employed *in strong solution or in a concentrated state*—note the words—in the manufacture of gelatine emulsion more or less of a compound is formed, according to the strength of the solvent, which on reduction appears as green fog. The principal solvents of silver bromide employed are ammonia, certain acids, and the bromides of potassium and ammonium. The bromides, one or the other, are indispensable; the acid is used to ward off chemical fog,* and the ammonia to confer sensitiveness.

To elucidate the subject: when I make an emulsion I use neither acid nor ammonia in any part of the process, but an excess of bromide to act the part of restrainer—neutral, if possible, and the silver in like condition. I may here state that I am seldom troubled with chemical fog. Now, if the bromide solution, with the added gelatine, be of considerable strength, as it is in many formulæ, and I add the silver drop by drop to secure fineness of division, more or less of green fog is the inevitable result. On the other hand, if I use a dilute or weak solution of bromide, and pour *all at once* the silver nitrate into it, green fog is absent.

From this I deduce that the bromide in the first case, when concentrated, dissolves, accelerated by heat, a portion or modicum of the newly-formed silver bromide, which combines with the gelatine and produces the injurious compound that shows itself on reduction as green fog.

It need hardly be pointed out that ammonia and certain acids play, if in strong solution, a similar part. The bromide and silver solutions should either be divided and added alternately or mixed simultaneously, or as above. Of course, if the usual method of compounding an emulsion be reversed, and if the bromide solution *contain an iodide*, and it is then added, drop by drop or in a thin stream, to the silver, the same law holds good if the latter be concentrated. Anyone who has worked the negative bath knows that much.

In my opinion, a great deal of injury is often done to a properly-made and good emulsion by afterwards adding in bulk a strongly-acid gelatine; and if ammonia be employed in its manufacture half of the work is probably undone. Again: if one use cheap French gelatine in warm and Nelson's No. 1 in cold weather the calculations are sure to be upset, as the latter is always either neutral or slightly alkaline, while the former I have found invariably strongly acid.

Given a negative thoroughly washed and free from hypo.; successful intensification depends considerably on the employment of weak solutions of silver, iron, and acid.—I am, yours, &c.,

A. Donald.

Dundee, January 12, 1883.

To the Editors.

Gentlemen,—I do not wish to dispute or support the correctness of any remarks which have been made by anterior correspondents on the subject of green fog; but permit me to give a few facts which are the result of my own practical experience.

I presume that no one will gainsay that the "emerald" evil is more obnoxious to the eye than it is detrimental to the utility of the negative in which it makes its appearance. Some of the most beautiful prints I have ever seen have emanated from negatives sorely troubled with the green sickness; and, from their sterling merits as photographs, one would be almost inclined to proclaim it as a virtue and not a vice.

In the first place, I can only say, with regard to iodide connected with a gelatine plate, that its chief advantages and beauties are conspicuous by its absence. Is it not a fact that it prolongs emulsification and necessitates a longer period of washing? Here in the first stages it proves tardy. Just as true is it that its presence also lengthens the time necessary for development, and retards fixation in addition. Now if, as Mr. C. Ray Woods says, the longer the time occupied in development the greater the risk of green fog appearing, how can he in the same breath advocate the introduction of iodine in any form?

It is very true that a short exposure to light will replace green with grey fog; but where does the advantage of this operation come in? Mixing, I am quite sure, has nothing to do with either forming, accelerating, or avoiding the demon, for I have proved that long since. Mix how you may, you will find the same appearance if you will go on long enough with development or *over-development.* By "mixing" I mean the order of that operation. I do not mean the mode by which the fineness of grain is formed; for I know that the coarser the grain of an emulsion the less liable a plate is to green fog, and the finer the grain just the reverse.

Has anyone ever taken the trouble to work a plain gelatine plate for some time in a developer and note its colour on immersion? Is it to be wondered at that, after adding to gelatine two salts, discolouration of gelatine takes place if submersion be continued for any length of time? It is the *gelatine* which is the victim of this pest, and *not* the haloid salts which it contains, some samples, of course, being more liable to it than others.

That salicylic acid has a deterrent power I totally deny; for the worst form of green fog I ever witnessed made its appearance in a batch of emulsion in which it had been employed.

Mr. W. K. Burton made a most erroneous statement when he said that ten per cent. of alcohol should be used; for with that amount a

* Or is contained in the gelatine added in bulk.

perfect plate, even if everything else were correct, could never be made. Air-bubbles and imperviousness of film, necessitating inordinate immersion, would be the inevitable result; and the only advantage at all would be the extreme facility with which plates could be coated in its presence.

Alcohol and gelatine have no business with each other. When we know that if sufficient alcohol be introduced into gelatine in solution total precipitation of the latter is produced, it is sufficient to prove that the less we have to do with it the better; and, though it is useful in extracting water from pellicle, yet, for my own part, I would prefer to dispense with it even then. I do not say that up to two and a-half per cent does any harm, but beyond that I do not think it wise to go. I cannot find any further advantage than that it causes the emulsion to flow with greater ease than when it is absent; but an introduction of one and a-half per cent. is amply sufficient to produce this effect.

There are many people who fancy that they are able to excel, in any particular pursuit which they may follow, all others similarly engaged; and, as there is a great deal in fancy, I do not write for the edification of these *savants*. To those, however, who have yet to learn I trust these few remarks may be found acceptable. They are the result of my own practical experience, which has enabled me to produce a plate better than which I have yet to see.—I am, yours, &c., SHAMROCK.

January 13, 1883.

SAVING ACCIDENTALLY-EXPOSED PLATES.

To the EDITORS.

GENTLEMEN,—I met with an amusing case of ignorance the other day. Some whole plates were sent with strict injunctions to be carefully handled. The consequence was that the parcel was dropped in the street, the messenger being somewhat frightened, and, doubtful if any were broken, carefully *opened* the box in broad daylight, and finished his journey in high glee that none were broken. I did not expose these plates, but although others may occasionally kill plates by such accidental exposure to light, perhaps all may not know that they may be resuscitated by bichromate of potash.

Take a four-per-cent solution of this, and immerse the plates for twelve hours—more or less does no harm—(and from this point the usual precautions against actinic light must be observed); then place them in running water for eighteen to twenty-four hours, the longer the better, as the slightest trace of bichromate left in the film keeps that part insensitive according to the amount left.

The plates after this treatment will be found to be slow comparatively, though with the plates I use, Edwards' (to whom I am indebted for much help), they still remain almost as quick as the general run of commercial plates.

The game is not worth the candle where only a few are spoilt, but "patience overcometh difficulties," and patience, as a rule, brings lots of accidents, especially in the line of exposing a plate twice and leaving its neighbour unexposed, which mistake is not found out until development commences. J. H. T. ELLERBECK.

Liverpool, January 13, 1883.

SAVING SILVER WASTES.

To the EDITORS.

GENTLEMEN,—I hardly know how to approach the subject of Mr. Kirkby's letter in the Journal in reference to my contribution to the ALMANAC. He evidently seems to look for a reply of some kind at my hands, and I should be very sorry to appear discourteous by remaining silent.

My difficulty lies in the fact that Mr. Kirkby has himself supplied the only answer I should feel myself justified in giving under the circumstances made known by him—that being, evidently, under the influence of a "staggerer," he was tempted to pen lines which, if not condemning my process, threw grave doubts on its practicability and usefulness, and this without giving it a personal trial.

With all respect to Mr. Kirkby's feeling of fairness, I would still say that if this practice were universally adopted—to "judge first and try afterwards"—you would have nothing "new" in the ALMANAC; for anything and everything might be with equal fairness condemned if such matters did not happen to be contracted to the narrow groove of everyday routine, or have been heard of before. However, not wishing a very useful "wrinkle" to be lost to those "who are willing to put it on its merits," I may say that I have used it for upwards of two years, and have never had a single stained negative or *transparency*. The latter I name with emphasis, as being a crucial test for this evil. These I have executed up to 15 × 12 with a success leaving nothing to be desired.

I not only claim for my method a "saving of silver waste" but also the *best plan of fixing*—not only in the *modus operandi* in connection with the apparatus, but also a *safer and more perfect fixation*—for the simple reason that the silver being precipitated in the hypo. solution as it comes off the plate allows of the *hypo. being kept free from it*, to the great advantage of the plate; for, on the other hand, if a number of negatives be fixed in the ordinary way the hypo. soon becomes saturated with silver, and imperfect fixation is the result.

Now for another "staggerer." Has Mr. Kirkby ever tried to develope with pyro. a plate in a zinc tray? I adopt this plan invariably for the test plates when on a tour. The trays I use are not over a quarter of an inch deep, and so are light and portable, and are not in any way painted or coated.

Mr. Kirkby says that he has for some time used an earthenware jar in which some pieces of zinc are placed to precipitate the silver waste. For over eight years I have reversed this operation. I have poured the hypo. into a zinc jar (if we may so term it), as offering the largest possible amount of surface for contact, and consequent speedy precipitation.—I am, yours, &c., W. CLEMENT WILLIAMS.

Halifax, January 13, 1883.

A PROFESSIONAL ON AMATEURS.

To the EDITORS.

GENTLEMEN,—I cannot agree with you in considering the anonymous post-card of your correspondent amusing. It is too bigoted and narrow-minded to be so; and, as an amateur contributing my mite to your ALMANAC, I feel that it deserves to be treated with contempt, but not the contempt of silence.

If, as the writer of the post-card considers, amateurs are to be excluded from the photographic journals simply because they are not professional phorographers, many eminently useful men would be shut out, and the remedy must be found in establishing a new medium of intercommuication for this now large and ever-increasing contingent.

He overlooks the fact that amateurs largely contribute to the advance of photography—not so much by their productions as by their purchases. The number of photographic material warehouses now open and offering their wares to amateurs testify to the growing influence which this fascinating art has for amateurs. Take one simple item: where does a considerable portion of the gelatine plates go if not to these workers? The more money these workers throw into the photographic trade the more impetus and the more encouragement will be given to manufacturers to improve and cheapen their goods, to the manifest benefit of all.

I will not occupy your valuable space further than by this protest against what may be only unfounded trade jealousy.—I am, yours, &c.,

January 15, 1883. AN AMATEUR.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITORS.

GENTLEMEN,—May I ask the favour of insertion of this letter in your next issue?

Our annual meeting will be held at 181, Aldersgate-street, on Wednesday next, the 24th inst., the chair to be taken at eight p.m., by W. S. Bird, Esq.

The past year has seen some progress in the Association, and to ensure perfect success I earnestly ask the assistance of all in carrying out the objects of the Association, which are—"To assist members, their wives, and children when in distress through sickness, death, or want of employment, by means of immediate grants of money, to grant annual pensions to aged members, and to aid the unemployed in obtaining situations."

All members that can do so are earnestly requested to attend, and non-members are most cordially invited to the meeting,—I am, yours, &c., H. HARLAND, *Sec.*

January 17, 1883.

LARGE PRINTS IN PLATINOTYPE.

To the EDITORS.

GENTLEMEN,—I have been trying lately to print and develope some large prints in platinum, 20 × 16. The difficulty has been to get up heat on such a large surface. I overcame this by boiling the solution of oxalate of potash in a pan over the gas or fire, and then pouring it into a flat dish made hot by hot water beforehand. By this means the temperature is only reduced by the necessary amount, and good prints result.

For these large prints the thick rough is the best, and offers great facilities for the introduction of matter not in the original negative, black chalk being exactly the same colour.—I am, yours, &c.,

Liverpool, January, 13, 1883. J. H. T. ELLERBECK.

EXCHANGE COLUMN.

What offers in exchange for Seavey's boat, new, cost 45s., Marion's swing, cost 25s.?—Address, HELSBY, photographer, Denbigh, N. Wales.

Wanted, balustrade and plain background in exchange for boy's twenty six-inch wheel tricycle, cost £3 12s. 6d.—Address, J. COLLIS, Chard.

I will exchange a hot rolling-press or other articles for a 7 × 5 wide-angle lens by Ross or Dallmeyer.—Address, VINCENT HATCH, Huddersfield.

Wanted, a half-plate bellows-body camera, in exchange for a gem camera and twelve splendid lenses, in good condition.—Address, R. MCGILVRAY, 345, New City-road, Glasgow.

I will exchange a whole-plate portrait lens, by Shepherd, old, but good, useful instrument, for a folding bellows-body camera, whole-plate or 8 × 5, double backs preferred.—Address, PHOTO., 69, Holmesdale-road, Reigate.

I will exchange a lockstitch treadle sewing machine for either of the following:—5 × 4 or 6 × 5 doublet, or ditto portable symmetrical half-plate, Kinnear, or other folding camera.—Address, F. TYRIE, 40, Keeton's-road, Jamaica-road, London, S.E.

I will exchange a *carte* rolling-press, with nickel silvered steel plate, good as new, for a plain, dark-tinted background and side slip, or anything useful in photography in good condition.—Address, JOHN BOWMAN, photographer, 35, Hilda-street, West Hartlepool.

I will exchange a tripod, with mahogany thirteen-inch triangle, suitable for 12 × 10 camera and upwards, for a lighter portable one suitable for half- and whole-plate cameras, or a view lens with large aperture, eight to twelve inch focus.—Address, S. S. CREWDSON, Ulverston.

Wanted, portable half-plate dark tent for wet or dry plates, also Dallmeyer's or Ross's rapid rectilinear cabinet lens, in exchange for splendid pistols, by W. Richards, in mahogany case, and breech-loading walking-stick air-gun.—Address, FRAS. FREEMAN, Lewes Cottage, Hanwell, W.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

William Child, 14, Wellington-street, Leeds.—*Two Photographs of the Ruins of Newland Mill, Bradford, Yorkshire.*

William Gillard, The Studio, Clarence-street, Gloucester.—*Photograph of Miss Emily Spiller in Character of "Robinson Crusoe."*

J. SARSFIELD.—The common oxalic acid at about one shilling per pound will answer perfectly.

JNO. CLAPPERTON.—We did not preserve our correspondent's address, so we are sorry we cannot put you in communication with him.

J. MACK.—You will find an article by the late Mr. H. Cooper on photographing on textile fabrics in our ALMANAC for 1878, page 188.

G. H.—It is most probable you have been misinformed; at anyrate, we are in a position to have heard of the matter if the report were correct.

LITHO.—You will find photolithography treated upon at length in Mr. Bolas's series of articles on photo-mechanical printing in our volumes for 1878-79.

JAMES CRIGHTON.—The Sciopticon Co., Colebrooke-row, N., will, no doubt, be able to supply the slides you require. If they cannot we do not know where you will be able to procure them.

E. SHORT.—If you copy your friend's copyright pictures without permission you will certainly infringe the Copyright Act, and render yourself liable to the penalties for so doing. Surely your friend will grant you permission.

A. E. R.—Make the tray of well-seasoned pine, and then saturate it with solid paraffine. Of course this will not answer for hot solutions, as they would melt the paraffine. For hot solutions you cannot do better than employ earthenware.

E. L. HOPKINS.—There is no successful method of arresting the fading of a photograph when once it has set in. The best thing you can now do is to protect it as much as possible from the action of the atmosphere and keep it in a dry place.

FERRO-PRUSSIATE.—Try developing the plates with the ferrous oxalate; this will probably give you clearer shadows. You may use tin dishes for the developing solution; but, of course, they will not answer for sensitising silver paper. To obtain the full advantage in drying gelatine plates with alcohol the plates should be soaked in two or three changes of the spirit.

E. GILBERT.—A reddish-brown is the colour that is always produced by that treatment. Try the effect of using ammonia in place of the hyposulphite of soda. Of course, at this season, when the light has very little actinic power, the printing will proceed but slowly. Try another sample of paper, and employ the toning bath recommended by the maker of the paper. He will supply you with a formula.

COLLODION.—By "prints by development" is meant prints that are made on paper prepared with iodide or bromide of silver, and the image developed with gallic or pyrogallic acid. Albumenised paper cannot be employed for the purpose, as there is a difficulty with it of obtaining the whites with sufficient purity. The necessary exposure in this process is very brief indeed, but the tones are rarely pleasing for small pictures.

ERRATUM.—A typographical error crept into Professor Stebbing's letter in our last issue. A description is given of a new instantaneous shutter said to be invented by Mr. G. Hare, whereas the name of the inventor should be, as on the diagram, M. "Hase." Our compositor, being more familiar with the English name, took the liberty of making a "correction," and the next step was to further improve matters by the addition of the initial.

FERROTYPE.—1. The canvas you mention will answer the purpose; but do not select one in which the colour is very glaring, or it may dazzle the eyes of the sitter.—2. Better take a fresh picture than waste time in trying to "vamp up" an over-exposed one.—3. A dark grey is as good a colour as you can employ. Ordinary paint of the oil shops is meant.—4. Any tent manufacturer who supplies flags will furnish you with the American ensign.

C. B.—1. If the pyrogallic change as rapidly as you say, when it is closely corked up, you have evidently got a very inferior sample.—2. One drachm of a sixty-grain solution to each ounce of developer.

X. X.—The want of rapidity arises from the comparatively low temperature at which the emulsion is mixed. The solution should be as near the boiling point as possible before mixing. The slowness of development is due entirely to the gelatine, which is too hard for employment alone. Mix with it some of a softer kind. The spots also belong entirely to the gelatine; they are one form of the defect known as "pits," and, so far as we are aware, can only be avoided by changing the gelatine.

J. KINSLEY.—We shall try your "cane" arrangement, but fear the delivery will be too slow. There is no necessity to waste half-an-hour over the operation of mixing, nor is there any need to break the point off the glass tube the first time it is used. We have in use at the present time a tube that has fulfilled its purpose for more than two years, and which still retains its point. It is, perhaps, desirable to use a *little* care—so little, however, that it was not considered worth mentioning to ordinary readers.

T. LEWIS.—1. A "twenty-grain solution" of gelatine means—wherever grains and ounces are used—twenty grains to each ounce of solvent.—2. The colour test is not a reliable one to go upon; for whereas, *cæteris paribus*, a "blue" emulsion will be quicker than a "ruby" one, it is quite within the bounds of possibility that a ruby emulsion may be many times quicker than a blue one. Much, if not everything, depends upon the conditions of mixing.—3. Good methylated alcohol is all that is needed.

W. PAGE asks—"Are the figures in the table on page 251 of the ALMANAC supposed to be equivalents to the 'x' of Mr. Branfill's formulæ on page 255? I have been very much puzzled, for some of the figures correspond and some do not. For instance: in line No. 9 the numbers are all right, and in line No. 2 they are all wrong. If the figures in the table are not supposed to be equivalents of Mr. Branfill's 'x'—that is, to $\frac{f^2 \text{ or } p^2}{16\,a^2}$, please give the formula for finding them in Mr. Branfill's notation."——The figures in the table on page 251 are based upon the standard of the Photographic Society of Great Britain; that is to say, the "unit" is a lens with the working aperture $\frac{f}{4}$, which is identical with Mr. Branfill's x, line No. 9—that is, the "one-inch" diaphragm—and is, as our correspondent says, perfectly correct. If he will obtain the exact measurement of the stop represented by line No. 2 possibly he will find those figures also accurate. We, unfortunately, have not time, just before going to press, to go through the measurements and calculations.

RECEIVED.—*A Manual of Photographic Chemistry.* By T. F. Hardwich. Ninth edition. Edited by J. Traill Taylor.

IN TYPE.—Communications from Captain Abney; C. I. Burton; Edward Dunmore; "Free Lance;" George Smith, in addition to other articles previously acknowledged.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For two Weeks ending January 17, 1882.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Jan.	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remar k
4	30.08	E	45	42	—	47	41	Overcast.
5	30·23	W	45	45	—	50	39	Overcast.
6	30·38	NW	41	39	—	47	36	Cloudy.
8	30·28	SE	41	34	—	43	31	Foggy.
9	29·82	E	36	35	—	41	32	Overcast.
10	29.61	SE	37	40	—	43	32	Overcast.
11	29·58	SE	42	41	—	44	37	Overcast.
12	29·59	SE	40	39	—	44	36	Overcast.
13	29·27	SSE	41	41	—	46	37	Raining.
15	29·34	W	43	42	—	49	37	Raining.
16	29·65	NW	39	38	—	46	35	Raining.
16	30.18	W	44	43	—	49	33	Cloudy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1186. Vol. XXX.—JANUARY 26, 1883.

A MODIFIED METHOD OF EMULSIFYING WITH AMMONIA.

More than ten years ago (vol. xix., p. 420), in September, 1872, a novel method of sensitising emulsions was proposed in an editorial article in our columns, based upon the employment of carbonate of silver instead of the nitrate, but differing in very important details from Dr. van Monckhoven's and other similar processes. The plan proposed was to add to the ordinary bromised collodion a proper quantity of precipitated and washed carbonate of silver, together with a sufficiency of nitric acid to render the whole slightly acid. By double decomposition of the bromides of cadmium and ammonium and the carbonate of silver, silver bromide and cadmium and ammonium carbonates would be formed, and these latter would be subsequently converted into nitrates by the nitric acid, with evolution of carbonic acid. At this stage the emulsion would be in exactly the same condition as one made in the ordinary manner, the advantage it was hoped to gain from the roundabout mode of procedure being greater fineness of division of the silver bromide.

Upon practical trial, however, this process failed to work from various causes. The expected increase of fineness was conspicuously absent, while the alternate action of alkali and acid upon the collodion itself so thoroughly disintegrated the latter that the films were quite useless, and so the matter fell into oblivion for some years.

But we have now to deal with a different substance to collodion, and our ideas on the subject of fineness of division have become considerably modified in the course of the ten years that have elapsed; consequently, the method which proved unsuccessful with collodion may possibly prove useful in connection with gelatine. As a matter of fact, several difficulties which prevailed in the former case disappear entirely when gelatine is used, and it is a very easy matter to make a good emulsion in this manner; but the question remains yet to be settled by extended trial as to whether any permanent advantage is to be derived from the innovation. The following brief statement of conditions may be set down as a preliminary:—

We weigh out suitable quantities of silver nitrate and of bromide of ammonium. The silver nitrate is precipitated in the form of carbonate by means of carbonate of soda, and, after washing to free it from the nitrate of soda is incorporated with a solution of gelatine of proper strength. Two or three minutes in the hot water boiler will reduce the carbonate of silver to a very fine state of division, when the bromide of ammonium is added in crystals, and the emulsion stirred or shaken until complete solution and decomposition have taken place. When this is complete the emulsion contains bromide of silver *plus* carbonate of ammonia; but the latter salt—the normal carbonate—is an extremely unstable one, rapidly giving off ammonia and becoming converted into the bicarbonate, even at ordinary temperatures, and more rapidly still at the temperature of emulsification. This fact is plainly demonstrated by the smell of the emulsion directly the bromide of ammonium is added.

Here then, we have, in addition to the formation of the silver bromide, a quantity of free ammonia liberated to help in giving sensitiveness; besides which the physical characters of the carbonates of ammonia are not such as to raise any fear that they will spoil the dried film by crystallisation, so that the process may probably be utilised as one which dispenses with washing the emulsion. Such being the theoretical consideration of the case, we will proceed to describe the results of some experiments.

Eighty grains of silver nitrate were dissolved and converted into carbonate. For this purpose it is far better to employ pure *carbonate* of soda rather than the bicarbonate, as the effervescence caused by the evolution of the extra atom of carbonic acid of the latter renders the precipitate more difficult to wash and collect. If the anhydrous sodium carbonate ($Na_2\ CO_3$) be employed—and it be *really* anhydrous—twenty-five grains should suffice for the above quantity of silver; but it is better to err on the side of too much than too little. In precipitating and washing bear in mind that carbonate of silver is *very slightly* soluble in water; therefore let each change of water be as small in volume as convenient, and drain it off as closely as possible from the precipitate—two or three changes being sufficient.

Having drained off the last washing water we added to the carbonate sixty-five grains of Heinrich's gelatine, previously soaked, and, immersing the flask in the hot water, proceeded to dissolve it, at the same time thoroughly mixing it with the precipitated silver salt. When dissolved the bulk of the emulsion was made up to four ounces, and the water in the boiler having been raised to the point of ebullition, the flask was immersed for three or four minutes to partly emulsify the carbonate. The boiler was then transferred to the dark room and the gas turned out; forty-eight grains of ammonium bromide were then added to the emulsion, and the flask kept in agitation for five minutes to ensure solution and perfect mixture. A powerful smell of ammonia was at once given off, which became stronger as a larger proportion of the salts entered into combination. At this stage a small quantity of the emulsion was poured on to a piece of glass for examination and was found to be a rich ruby brown, though rather thin from the imperfect combination of the salts. The flask was now returned to the hot water boiler, the temperature of the water being 185° Fahr., and here it was allowed to remain until cold, samples being poured on to glass at intervals to show the change of colour. The maximum, as regards richness, was reached after five minutes' cooking, and the change then proceeded through the various shades of orange, yellow, green, steel blue, and full blue, just as in an ordinary boiled emulsion. The odour of ammonia was still as powerful as ever.

The emulsion was again warmed to coating temperature, and a few plates coated; these dried in about fourteen hours without heat and in a room not particularly dry. The surfaces presented a smooth, matt appearance, without the least suspicion of marking either in the shape of drying marks or granularity; the plates were, in fact, as perfect mechanically as any we ever saw. We may mention a peculiarity noticeable in the series of trial samples poured off at different stages of cooking. The image of a gas flame reflected from the surface of the dried emulsion acquired a deeper ruby tint in proportion to the length of emulsification—in other words, the

order of change is exactly the reverse of that which occurs in the case of transmitted light.

The plates were found to give 14 or 15 on the sensitometer, but the development was extremely slow and the image comparatively feeble. On this point we have to repeat the trial, as we have hitherto used only an ordinary developer of ammonia and pyro. with bromide. As we pointed out in a recent article on the use of bicarbonate of soda in the developer, the caustic ammonia added to the developer would most probably be converted into carbonate by the bicarbonate *in the film*, and so we were really using a very feebly-alkaline solution. The image after fixing was singularly clear, with not a vestige of green or other fog, and but little pyro. stain considering the extremely prolonged development.

From the above it will be seen that so far we have proved nothing except that the process is feasible. As regards sensitiveness, it must be remembered that the emulsion we have described was submitted to little more than half-an-hour's cooking at a rapidly-descending temperature. If, by increasing the length of time to a not too great extent, full sensitiveness can be gained without any counterbalancing evils the process will, no doubt, be a practical one, and will prove a convenient means of dispensing with washing the emulsion.

One point of weakness it is but right we should mention, namely, that the presence of free ammonia does not argue in favour of the uniformity in sensitiveness of an emulsion if kept for any length of time; still this and many other details require careful investigation, and we hope to be able to report favourably upon one or two variations very shortly.

GELATINE OR CARBON FOR TRANSPARENCIES.

In a leading article last week we incidentally alluded to two papers on the subject of enlarging, the writers of which—Mr. William Brooks and Mr. W. Clement Williams—advocated different methods for making the transparencies. While the former gentleman prefers the gelatino-bromide process, the latter gives a decided preference to the carbon; and as we have, of late, heard various opinions expressed by experienced photographers as to the merits of the two processes for the purpose, we now propose to make some remarks in respect to the practical part of the subject.

There is no question that some of the finest enlarged negatives that have ever been made were from carbon transparencies; but this cannot be taken as a proof that equally good results could not have been produced from those as by any other process, provided the transparency was as good as the particular process employed for making it was capable of yielding. Most of us know that by far the major proportion of professional enlargers employ carbon transparencies; but is not the general excellence of their work due more to the experience gained by continual practice than to the transparency itself? Supposing an equal amount of skill had been brought to bear on good transparencies by any other process, could not equally fine results have been obtained by the same operator? We have in our mind just now some excellent enlargements, twenty-four by eighteen inches, produced by Mr. Brooks some few years back, and alluded to by that gentleman in his recent paper. At that period he employed transparencies by the collodio-bromide process (as were also the enlarged negatives), and certainly they were amongst the finest enlargements we have ever seen by any process.

There is no gainsaying that the carbon process is admirably adapted for the purpose; but it has its weak points, like every other process, one of which is particularly felt at the present time, when so many thin negatives are being constantly produced, owing to the difficulty that exists in obtaining sufficient vigour in carbon transparencies from such negatives. In a leading article in our volume for 1881 [page 355] we, in allusion to this subject, pointed out that with the ordinary tissue used for the purpose, when a specially-thin negative had to be printed from, sufficient density could not be obtained, and, if the attempt were made to increase it by any of the well-known methods of intensification, a difficulty would be encountered, owing to the exceedingly small proportion of gelatine present to be acted upon by the intensifying agent. With a view to overcoming this difficulty we advocated the employment of a tissue containing less pigment, so that the image would be built up, as it were, of a greater proportion of gelatine and thus be the more easily intensified, seeing that in this process it is the gelatine itself and not the colouring matter forming the image which is acted upon. Since that time we know that many photographers have profited by our suggestion.

Another inconvenience in the carbon process for transparencies at this season is the long exposure frequently necessary to obtain them fully printed, sometimes as much as a couple of days being required. Furthermore, the employment of this process entails much inconvenience on those who do not utilise carbon printing in the usual course of business, as it necessitates a departure from the ordinary routine and the use of special appliances to produce a picture—perhaps only occasionally. For this reason few photographers who send their work to professional enlargers make their own transparencies, preferring rather to forward the original negative. This, again, often causes considerable inconvenience, as the negative may be, and frequently is, required at home for printing purposes; and there is also the risk, as many are aware, of its being injured in transit.

Now, if transparencies on gelatine plates will answer the purpose as well as those in carbon, all these inconveniences may be avoided. In the case of an excessively thin negative a fairly dense transparency may easily be obtained, which, if not considered dense enough in the first instance, may easily be intensified with mercury afterwards—permanency being a matter of no importance in this instance. Instead of requiring (perhaps) a whole day, or more, to print, a few seconds' exposure to the light of a gas flame or a paraffine lamp is sufficient. No second lot of chemicals, appliances, or exceptional experience is required, as dry plates are always at hand, as well as the requisite knowledge and materials for working them.

All risk of the original negative—which in every instance when an enlargement is required becomes valuable—being broken in transit is avoided; and if by chance a transparency should be broken in transit another can be easily made. Lastly, the original negative will always be available for the execution of any orders for prints, which frequently accompany a commission for an enlargement.

Anent this subject: a provincial friend (who issues a considerable number of enlargements during the year and sends them out to be made) in conversation recently told us that for some few years past he had never sent his original negatives away, owing to the attendant risk, and the inconvenience of parting with a negative at a time when it is usually required for printing purposes. Formerly he made carbon transparencies, but now he makes them on dry plates; and he told us that he secures better results from the latter than from the former, adding that he did not attribute the superiority in results so much to the process itself as to the fact of his operator being more *au fait* with dry plates than with carbon. He remarked that his experience with the latter was chiefly limited to making a transparency or two as required.

Of late we have learned that many professional photographers, who do not make their own enlargements, adopt the practice of sending dry-plate transparencies instead of the original negative; and we imagine they are satisfied with the results obtained, otherwise they would not follow the practice.

As a suggestion to those who may be inclined to make their own transparencies on dry plates, we would say that they should not be made too dense—an error often committed—or the shadows will come too heavy in the enlargement. Neither should they be at all veiled in the lights, otherwise a brilliant negative will not be obtained. By "veiling" we do not mean that the transparency should not be fully exposed and full of detail in the lights, but that it must be free from pyro. stain or fog. If by chance any do exist it should be removed with either of the clearing agents, or a fresh one made; for, be it remembered, a slight veiling which would make no practical difference to a negative for ordinary printing, will considerably mar the brilliancy of an enlargement if it existed in the transparency.

We have a strong impression that the gelatino-chloride process is one that is better suited to the production of transparencies for enlarging from than the ordinary dry plates, on account of the greater transparency that is obtained in the lights, and the variety of results that may be produced when it is employed.

PHOTOGRAPHING MACHINERY.

Looking through a photographer's album some little time ago, we were very much impressed by a number of beautiful photographs of machinery—all wet-plate work—which, though they evidently included representations of structures of all proportions, from the mammoth to the pigmy in size, were uniformly good, clean, brilliant, and delicate yet forcible, with every detail fully rendered, and, in fact, showing such portion of the machinery in a manner infinitely superior to what could be done in any engraving, however well executed. Here was, if not nature, at any rate art in its most natural phase, represented with perfect verisimilitude.

The effect was the more striking from its contrast with some other photographs of a similar class of work, which, though evidently done by a practical hand, were very far from answering the purpose that the better ones subserved. When a manufacturer has a piece of machinery photographed it is usually done for ulterior purposes—either to show the capabilities of his establishment or to enable him to obtain further orders for similar or a like type of goods; and as many of our readers are doubtless called upon at one time or another to execute such work, a few hints on the subject may be both useful and acceptable.

No apparatus is required beyond that needed for ordinary outdoor requirements; but a most essential point is that the camera should be supplied with a double swing-back, to the usefulness of which we shall presently allude.

We have just said that the person who commissions the photographer in such cases usually does so for his own ends. One of our contributors once described how an inventor was so bent upon securing a view of an engine of his invention that he ordered a portion of a wall of a building to be pulled down to enable a photograph to be taken; on similar grounds it will not be, as a rule, a difficult matter to have carried out the one most important requirement of all to secure a good result, and that is the special painting of the machine. A piece of machinery—be it locomotive, stationary engine, or any kind whatever—is, when ready to leave the manufacturer's hands or fitted up at its final destination, in the very worst possible state for being photographed. The glossy paint (usually of the most non-actinic colour) will not give a smooth effect, and if the machine be one embracing raw castings the effect will be very objectionable. Therefore, the photographer's first thought must be to have it specially painted; and for the reason we have noted this will, as a rule, not be difficult if it be pointed out that to obtain the best results no other mode is available. The paint to employ should be a simple mixture of black and white to about what would be called a "pale slate colour;" and, further, it must not be ordinary oil colour, but something of the kind called "flatting" by the painters. Ordinary white lead darkened with black and made up with turpentine with the smallest quantity of oil or japanner's gold size may be used as flatting. It is to be understood that the more matt or dead the paint dries the better will it hide any inequality in the surface of any large mass.

In cases where a machine is already *in situ*, and perhaps in work, it may be impossible to do this; but a temporary paint may be made by mixing whiting and lampblack with beer, adding a little crude ox-gall to make it "lie." This paint can afterwards be easily mopped off.

With regard to focussing the image: the operator will frequently find the greatest difficulty in getting a proper standpoint; either there is scarcely sufficient space to retire far enough from the object, or it is too high or too low. He will, therefore, need a good assortment of lenses of various foci to meet the former conditions, and to be expert in the use of the swing-back to get rid of the difficulties involved in the latter. An engine or other piece of machinery with columns or any parallel vertical lines must not be represented with converging perpendiculars, or the photograph would be rejected incontinently; hence a lens embracing a wide angle will often be needed, with also the utmost facilities for raising or lowering the camera front. It will be remembered that the rule for using the swing-back to avoid converging perpendiculars is to keep the focussing-screen always vertical whatever the slant of the camera.

The side swing will be found most useful (as indeed will, also, where permissible, the upright swing) for assisting to bring portions of a machine into focus which, with the close quarters frequently necessary, would be difficult to focus without the use of a very small stop. We need not say that for this work, where every detail is required to be of the sharpest, the smaller the stop the better, though in practice it will be found that the conditions of light will often be such that a very small stop cannot be used. The photographer must then average his conditions in the best manner he can.

A slight scrutiny will generally enable the photographer to notice any important part that receives less light than another. The use of a reflector made of white paper (there is usually plenty of paper, and of drawing-boards to fasten it to, in machine works) will greatly improve definition there, and sometimes a sheet may be placed behind any aperture to show its outline if the background should be dark.

In focussing, many important points may be quite invisible on the screen. To see them it will only be necessary to attach a piece of white paper. We saw a photograph once where a pocket handkerchief had been used, and the operator forgot to remove it! *Verbum sap.* Some photographers even employ a lighted taper or candle.

Finally: we would most particularly advise that, whenever it is possible, a standpoint should be avoided—when photographing in the interior of a works—that would give a window as a background. With dry plates halation would be a certain result, and whenever such conditions cannot be escaped from, the plate must be backed in the most efficient manner.

Our friends in South Africa seem to have had a far better chance of recording photographically the recent comet than we in these northern climes enjoyed. From a letter in our correspondence column it will be seen that Mr. E. H. Allis, of Cape Town, has succeeded in securing a number of pictures of the visitor, and which are before us as we write. These consist of six, three of which were taken respectively on the 19th, 20th, and 21st October—the remaining ones, after an interval of about three weeks, on November 7th, 13th, and 14th. The difference in the shape, but more especially in the direction of the comet's course, is very distinctly shown in the two lots; while—whether from the greater clearness of the November sky or from the mere fact of the exposures having been longer we cannot say—the later pictures show a very far larger number of stars than the earlier ones. The exposures ranged according to the particulars appended to each picture from thirty to 140 minutes, the shorter times—thirty, forty, and sixty minutes—having been given to the October pictures. The different rendering of the stars in the October and November series is most noticeable; for, whereas in the former they are represented as perfectly circular in form and of large size—several approaching the dimensions of a small pin's head—in the latter they are small in size and of an elongated or oviform shape, as if from stoppage or irregular motion of the equatorial. The series will prove a most interesting one for astronomers, and we trust Mr. Allis will have them published here. We have also seen a picture of the comet taken by Mr. G. T. Fernyhough, on October 5th, at Pietermaritzburg, on one of Wratten and Wainwright's plates, the exposure being about seven minutes. This picture shows the comet most distinctly and sharply—though no mention is made of the use of an equatorial—but the stars are conspicuous by their absence.

In connection with the pictures mentioned in Mr. S. Tamkin's paper, published in our last issue, it is well to remark that the employment of ammonia and pyro. alone for extremely rapid work was, in the early days of the gelatino-bromide process, the rule

rather than the exception. We believe that most, if not all, of Mr. Chas. Bennett's marvellous pictures by gaslight, and similar subjects, were developed in this manner, and we have frequently seen that gentleman develope without the aid of ammonia. Mr. Tamkin's results are certainly very interesting. The photograph of a girl blowing the fire, taken with an exposure of seven and a-half minutes by the light of an ordinary gas burner, is a wonderful example of the rapidity of modern plates; and the same may be said of Mr. F. Moffat's moonlight picture, which, though the exposure is not mentioned, exhibits detail in every portion.

MM. Adolphe Braun et Cie., whose photographs of pictures, engravings, &c., have obtained a world-wide reputation, are engaged in reproducing a selection of the choicest of the works of art in the Hermitage at St. Petersburg, and have just issued the first instalment of the series, which will include four hundred and thirty-two examples—nearly one-fourth of the whole collection.

The photographing of microscopic objects is becoming decidedly popular, and, owing to the increased facilities offered by the rapidity and the convenience of gelatine plates, it will doubtless before long be a common thing for microscopists to add still further to the pleasure of their hobby by undertaking such work. The incandescence form of lamp has been adopted in a variety of ways for illuminating small spaces difficult of access—not the least interesting of which, for example, has been the lighting up of the interior of the mouth, &c., to obtain photographs of the vocal organs; and at the winter *conversazione* of the Microscopical Society Mr. C. H. Stearn exhibited a device consisting of two small Swan lamps—one above and one below the stage—for illuminating objects, opaque or transparent. Messrs. Mawson and Swan have now perfected an arrangement for photographing by the aid of this light, and have also made a miniature accumulator weighing not more than five pounds to supply it with electricity. The accumulator, if kept working the whole of the time, is capable of acting for two hours, though, of course, if the current be only turned on when needed it would last much longer. We apprehend that (for a while at least) the lamp itself will be the most useful portion of the instrument, as an accumulator presupposes convenience for getting it charged when required—an improbable contingency, at the present time at anyrate, in most neighbourhoods.

Professor Newcomb, at the last meeting of the Royal Astronomical Society, alluded to a fact not well known with regard to the accounts of the Venus transit expeditions. He said :—"The rule imposed by your own Government and ours on the members of the different expeditions prohibits them from publishing their observations in advance," so that he was prevented from making any formal communication as to the results obtained. An immense amount of money and time has been expended upon these expeditions, and we have before pointed out that some mathematicians and astromomers of the highest skill have stated that other and more exact methods are available for attaining the same end—the estimation of the sun's distance from the earth. Professor Newcomb is among the dissentients to Venus transit expeditions, and at the same meeting he expressed his views in the following words:—"I think that there are other much more accurate methods of determining the parallax."

The question of the relative power of the sun and other light-giving bodies has lately been the subject of discussion, and a recently-formed estimate of that power has already been withdrawn and another substituted in its place. Professor Thompson, in a lecture before the Glasgow Philosophical Society, says :—"We cannot, therefore, be very far wrong in estimating the light of full moon as about one eventy-thousandth of the sunlight anywhere upon earth."

The question as to who first employed the electric light in the production of photographs would seem lately to have been solved. At a meeting of the Russian Physical Society last month M. Lermantoff presented a proof of a picture taken by M. Lewitski in the year 1856. When the Czar Alexander II. was crowned in Moscow a battery of eight hundred elements had been constructed to show the electric light, and was taken the next year to St. Petersburg. Professor Lenz demonstrated its action to a distinguished circle, consisting of members of the Imperial family and generals of the army, and during this lecture a photograph of the lecturer was obtained by M. Lewitski.

The value of the magic lantern for educational purposes is fully acknowledged, and numberless are the directions in which its powers are utilised. Messrs. York and Son, who have done as much as, if not more than, anyone to foster education by means of their series of slides, are about to issue an entirely new series under the supervision of Dr. Andrew Wilson and Mr. Lant Carpenter. The new slides are to include subjects comprehended under the somewhat wide title of "biology;" and in the first instance it is intended that they should comprise some of the lower forms of plant and animal life and the elementary facts of animal and vegetable physiology. It is believed that volunteers will come forward to give suggestions as to sources of illustration, &c., and the fact of the slides being in course of progress is published with the idea that hints and suggestions may be sent to either of the above-named gentlemen, whose addresses are, respectively, 36, Craven-park, Hailesden, London, N.W., and 110, Gilmour-place, Edinburgh. Those who have used or are intending to use the microscope in the production of photographs will doubtless obtain negatives that would be of considerable service for this purpose.

PRECIPITATION METHODS AND GREEN FOG.—ALCOHOL IN EMULSIONS.

In the paper which I recently read before the Photographic Society of Great Britain, on *A Precipitation Method*, I claimed for it that green fog was unlikely to make its appearance in plates prepared by it, the reason being that the gelatine which had been treated either with heat or ammonia, and which I believe to be at least *one* of the causes of green fog, is eliminated.

I notice that in your last issue "Argus" takes exception to this, and, arguing from analogy, comes to the conclusion that the gelatine mentioned is probably not a cause of green fog. I wish to show, first, that his analogy is incorrect; and, second, that the gelatine modified by heat—or more especially by ammonia—is *a* cause of green fog, if not the only cause.

The analogy which "Argus" takes is Professor Stebbing's process. Now, surely there is the greatest difference possible between this and the one which I described. In Stebbing's process bromide of silver is precipitated; it is then re-emulsified in gelatine in presence of a small quantity of soluble bromide, and, *after* that, if sensitiveness be wanted, the emulsion is either heated or treated with ammonia—that is to say, the gelatine is modified either by heat or by ammonia, and certainly is *not* eliminated afterwards. Not only is the modified gelatine not eliminated, but if ammonia be added this has to remain in the emulsion until such time as plates are coated, when it will escape by evaporation or volatilisation. In the other method, the sensitising process, whether it be boiling or treatment with ammonia or both, is performed in the usual way, and *after that* the gelatine is eliminated, when the silver bromide may be re-emulsified with any gelatine, no further sensitising process being gone through.

To show that green fog is produced in emulsion by the gelatine which has been modified by ammonia and boiling, the following experiment will suffice:—Prepare an emulsion as recommended in the paper referred to, stopping short after digestion for a few hours with ammonia; that is, briefly prepare an emulsion by any boiling-method formula which gives a large excess of bromide. Boil for an hour or two, allow to cool to 100° or 110° Fahr., add about three per cent. of strong ammonia, and digest for two or three hours. Now divide the emulsion into two portions. In the one case add gelatine as usual and wash; in the other leave the emulsion to precipitate in the manner described. Plates coated with the two emulsions will be of very different quality. The one treated in the usual manner, and which contains the decomposed or, at least, modified gelatine, will probably show marked green fog with ordinary treatment; certainly it will show it if forcing be resorted to in development. The other will not show green fog by any treatment that a negative is likely to get. It is quite true that if no

ammonia be used, but only boiling be resorted to, there is likely to be less green fog in the first case, or, in fact, probably none; but even here there will be found a difference between the two. The precipitated bromide will give a plate which will stand more forcing than that which has not been precipitated.

I have, as I say, claimed for my method that green fog will not show itself in plates prepared by its means. In saying this I merely mean that with any treatment which a plate is likely to receive during development, including a reasonable amount of forcing, the defect will not make its appearance. Captain Abney states that he is prepared to produce green fog in any gelatine plate, and I suppose he is correct; but this must certainly be by resorting to treatment which even an under-exposed plate does not usually receive.

When first experimenting on the precipitation method I chanced to make an emulsion which was not rapid, but which would stand the most extraordinary forcing without the appearance of chemical or green fog. I found that the plates prepared with it could be developed with a pyro. developer containing one grain of bromide of ammonium and fifty minims of ·880 ammonia to each ounce, and that even after prolonged action of this concentrated developer no green fog made its appearance. Such a plate I consider might fairly be said to be absolutely free from the defect, even if there be some extraordinary and unusual treatment which will bring it about.

When I say that green fog will not make its appearance in an emulsion prepared by mixing precipitated sensitive bromide of silver with gelatine, I do not mean to say that it is impossible by after treatment of the emulsion to produce green fog. On the contrary, I know that it is easy. A dirty vessel used to store the emulsion in or dirty glass will assuredly give rise to it; but the most likely cause is to be found in the rendering of the emulsion alkaline. It will be noticed that in the instructions I gave for working the precipitation method, I pointed out that a very slight degree of alkalinity of emulsion is advisable to allow ripening to take place to any considerable extent. I laid stress on the fact, however, that the alkalinity must be the slightest possible; in fact, that if it were possible to hit upon absolute neutrality this would be the correct state. As it is not possible, however, it is necessary to resort to *slight* alkalinity. Ammonia is the most convenient alkali to use, and if the amount of ammonia beyond what is wanted to neutralise the acidity of the gelatine be not more than two or three minims to the pint of emulsion, there is no danger of fog; but, in my experience, a quantity of ten to twenty minims of ammonia added to any emulsion which has been freed of all soluble bromide and is to be kept for any considerable time will infallibly result in green fog.

Another defect likely to arise from too great alkalinity of an emulsion is the superficial chemical fog which I described some time ago. I have to thank Dr. A. Conan Doyle for pointing out that this fog is really caused by alkalinity of an emulsion which has a predisposition to the defect. I now always neutralise—or, rather, render again acid—the emulsion with which I am just about to coat plates.

Dr. Stolze's communication, extracted from the *Wochenblatt*, is naturally of great interest to me. I quite recognise the advantage gained by a precipitation process in making it possible to eliminate the coarser bromide particles, which give rise to chemical fog if heat or ammonia have been too freely applied during preparation; in fact, I begin to see that it is one of the *principal* advantages of precipitation.

I notice that an anonymous correspondent makes a violent attack on me for recommending an addition of ten per cent. of alcohol to an emulsion. He must have kept his eyes very closely shut if he imagine that I am the first to recommend so large a quantity of alcohol for the purpose mentioned. Captain Abney has always advocated twelve per cent. of absolute alcohol. As a matter of fact I use methylated spirits, so that I probably add only about eight per cent. of alcohol; that is to say, the finished emulsion will contain about seven and a-quarter per cent. of alcohol.

"Shamrock's" statement that "alcohol and gelatine have no business with each other," because "if sufficient alcohol be introduced into gelatine in solution total precipitation of the latter is produced," is a most absurd *non sequitur*. He might as well say—"Sufficient ammonia in the developer will fog any plate; therefore no ammonia has any business in the developer."

I certainly did not pitch upon the particular amount of alcohol which I recommend without careful experiment. I tried various quantities of methylated spirit in emulsions, and found that no air-bubbles or imperviousness of film or defect of any kind took place till an addition of twenty-five per cent. was made to the emulsion; that is to say, until it contained about sixteen per cent. of alcohol.

It is curious that, although a sufficient amount of alcohol causes gelatine to set in a stiff mass, any quantity short of the amount capable of doing this causes the very opposite effect. A gelatine solution containing twenty minims to the ounce of a mixture of three parts of water and one of alcohol takes much longer to set than if the alcohol be replaced by water, and it does not eventually set so stiff.

W. K. Burton.

BROMO-IODIDE IN EMULSIONS.

In the report of Mr. Farmer's lecture there is an erroneous statement to which I should wish to call attention. Under the heading "History of Photography" I read:—"1880. Abney pointed out the advantage derived from employing a small quantity of silver iodide with bromide."

I think you will readily admit the importance of accuracy, both as to author and date of improvements, recorded in an authoritative statement such as the above. Permit me, therefore, to refer you and your readers to two communications of mine on this subject which appeared respectively in The British Journal Photographic Almanac and the *Year Book* for 1878. In the former I said:—

"Having been impressed, during my practice with bromo-gelatine emulsions, with the existence of certain defects not formerly experienced in working with bromo-iodide, I asked myself whether we have not, without due consideration, rejected the use of iodide, and drawn hasty conclusions to its prejudice not altogether borne out by the result of experiment and practice. Under this impression, I thought it worth while to put to the test whether iodide, combined with bromide, in the gelatine processes would remedy some of the defects of the simple bromide. These, in accordance with my experience, may be stated to be:—First, a tendency to fog, or veil, if the particular preparation, the exposure, and the mode of development are not in harmony. Second, the defect of blurring, or halation, which such plates have. Third, a buried condition of image, making it difficult to judge of the progress of development. Last, but not least, a difficulty or uncertainty as to intensification. Experimenting with this end in view I was not surprised to find that a small proportion of iodide did much to remedy all these defects, and, in addition, seemed to allow of greater latitude in exposure; that is to say, either over- or under-exposed plates are more amenable to correction in development *with* iodide than *without*. One thing, however, I was quite unprepared for, viz., that the same bromide preparation is *more sensitive* when iodide is added than in its simple state."

The original experiments to which my communications had reference were made during the year 1877—three years before the date claimed for the suggestion on behalf of Captain Abney.

It seems somewhat unaccountable that my recommendation, duly recorded at the time in the annual publications, should be overlooked, and the discovery attributed to another experimentalist at such a much later date. The value of iodide with bromide being now recognised, it is as well that this chronological error should be corrected.

G. S. Penny.

PHOTOMICROGRAPHY.

[A communication to the Quekett Microscopical Club.]

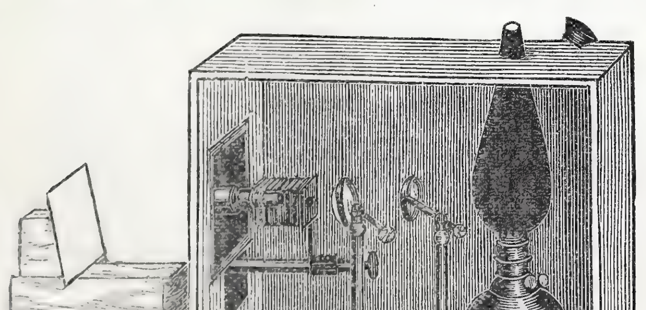
This being one of a series of demonstrations and not a lecture, it is not my desire to occupy your valuable time and attention by making more than a few preliminary remarks necessary to your fully understanding those essential details in the art of photomicrography which may serve to start you fairly in this very interesting occupation for winter evenings. I would in the first place remind you that I do not stand here as an oracle on the subject, but simply come before you at the wish of the higher powers of the Club to do what I have so often done before, and that is to stop a gap which might have been filled by others more efficient but, at the same time, more modest. It is a very true saying "that if the blind lead the blind, shall they not both fall into the ditch?" Now, it is far from my intention to land you with myself in this ignominious dilemma. I shall only show you the method I have employed for my own recreation; and if any of you like to follow my steps you may be able to introduce many improvements, and serve to advance the art, which has many fascinating charms about it for the enlightened worker.

It has been often asked by numbers of those fossilised individuals who may be found in great abundance—"What is the good of making photographs of microscopical objects? It has been tried over and over again and found no good; it can't be done." To such I would reply:—If you found yourself knee-deep in one of those floating bogs which the sportsman and traveller may often unwittingly step upon in Ireland and elsewhere, would you attempt to run and get out of it as quickly as you could, or would you stand

still to sink for ever in it because hundreds of others had tried to run but had generally sunk to be seen no more? I reckon that you would "make tracks" to get out as well as you could; and this illustration may be used as an argument in advocating the further study of this art. It is not because our predecessors have been, as it were, floundering about in the practice of photomicrography that we are to rest content; but I deny entirely the assumption that they did nothing worthy of our admiration, or sufficient to encourage us in our endeavours after perfection. I grant that the art is surrounded by many and great difficulties, and only the application of close study and the concourse of many minds can tend to its advancement; but while it is neglected or limited to a few practitioners its advance must be slow.

I am glad to see by the photographic journals that many in the provinces and abroad are awakening to the interest attached to this process, and much good will result. I must, however, proceed to the subject of this evening's demonstration. The method most generally practised and recommended is that the microscope being placed in a horizontal position, its tube should be attached by a blackened tube or a cone to the front of a photographic camera, the lens of which has been removed. Now, I find these difficulties arise. It is not everyone who has got a camera, and they may not feel disposed to go to the expense of procuring one, while all the members of this Club possess microscopical objectives; but, further, if they have a camera, it is not an easy matter to see the fine details of a subject through the ordinary ground focussing glass. Again: unless the camera and microscope are securely fastened down to a base-board there is a tendency to unsteadiness which is irritating in the extreme; and, furthermore, this usual plan does not offer any advantages over that I wish to introduce to your notice this evening. In the apparatus before you, and which I have found so convenient, it is not necessary to have either a camera or a microscope, and is so simple that it can be adopted by the youngest member of the Club; but, even with this, difficulties will arise which are altogether apart from the apparatus. For instance: objects differ in their capability of transmitting the actinic rays; they may be too opaque or brown, or they may be stained blue or red. All these conditions vary the time of exposure, only experience teaching the requisite time to imprint the image in the sensitive film just sufficiently without under- or over-exposure; this must be left to the cultivated judgment of the operator. Great assistance will be derived by the beginner sticking to one objective till he can produce a good result on every occasion, when a fresh one may be tried, the time of exposure being greatly varied by the magnifying power employed, the lower powers admitting of a shorter exposure as more light passes through them. The principles upon which this beautiful art is founded may be read in any of the many manuals on photography, and which are published at a cheap rate; therefore, leaving these, I will pass on to the practice. If any one need to learn about the various apparatus employed for photomicrography, full particulars will be found in Beale's *How to Work with the Microscope*, and in Cutter's *Microscopical Technology*, both of which works are in our library.

In the first place, I claim for my plan its great simplicity, being, as you see, nothing more than a lidless box placed on its side. At the left end it has a square hole; but any aperture will do. A brass plate, having an adapter in it, slides in and out on runners for more



easily changing the powers when it is desired to do so. Another long aperture is made at the top side, covered by a blackened chimney to carry off the heat from the duplex paraffine lamp inside. Another aperture at the bottom of the right side serves to admit the air to the lamp when the front of the box is covered up by the black focussing-cloth; within the box, and attached to the left side, is a carrier working on a long and fine screw, which serves to adjust the object to the correct focus. Two condensing lenses—one to render the rays of the lamp parallel, and the other to condense them on the object—complete the arrangement as far as the box is concerned. The light passing from these through the objective emerges as a cone, and on the principle of a magic lantern projects the image on a screen to the left of the operator.

The screen consists of a heavy piece of wood having a groove formed in it, and carrying another block upon which the screen is held. The screen which receives the image may be made of an oblong piece of glass either four and a-quarter inches by three and a-quarter inches, called by photographers a quarter-plate, or by a plate 5×4, according to the amplification you intend to employ or the nature of the object may indicate, or, if lantern slides are desired, on a square three and a-quarter inches. These ought to have a piece of smooth writing paper gummed on that surface presented to the image. The image is then thrown on to one of these, and, the hand placed under the focussing-cloth, the carrier is to be moved by means of the screw adjustment till the image of the object is sharply defined on the screen.

In many writings on this subject it is stated that the actinic and visual foci of microscopical objectives are not coincident. All I can say is that, with a one-third of an inch, which I shall employ this evening, and with Zeiss's D, no alteration is needed from the visual focus. The screen may now be removed and its place occupied by a dry gelatine plate, and the exposure accurately timed according to the nature of the object; but only experiments can determine this. Care must be taken before making the exposure that the light through the objective be cut off till the plate is in position, when it may be allowed to fall on the plate for the requisite time, and then cut off again before removing the plate to the developing dish; this is done, as must be evident to you all, to avoid blurring the image. I need not say that the only outside light must be a non-actinic red light, and no ray of white light must be allowed to reach the plate, or it will be "fogged"—that is, when it is developed it will be veiled by a misty deposit in the film; therefore no actinic light is admissible till the plate is fixed.

The developer I use is the ferrous oxalate, made by a saturated solution of protosulphate of iron being added to a saturated solution of neutral oxalate of potash in the proportion of one part of the iron to the three parts of the oxalate; these are best when freshly mixed. If the plate has been rightly exposed the image begins to make its appearance in about forty seconds, and grows under the action of the developer till it is full of detail. When the image shows faintly through the film on looking at the back of the plate I stop the development, and wash the plate by a good rinsing in rain or distilled water, and then place it in the fixing bath, which consists of a solution of four ounces of hyposulphite of soda dissolved in a pint of water; this extracts all the silver which has not been acted upon by the light. The plate must now have a great deal of washing to rid it of the hyposulphite of soda; this is thoroughly done by placing it in running water under a tap for half-an-hour. If the film contain a trace of hyposulphite it causes the image to fade out after a time.

Some plates have a tendency to frill; that is, the edges of the gelatine film, while wet, have a tendency to separate from the glass and to curl up. To prevent this the plate may be soaked for about five minutes in a saturated solution of alum, and then again well washed and stood up on a sheet of blotting-paper to dry spontaneously.

Now I have thought it well, before commencing the demonstration to give you these details, that you may, bearing them in mind, follow the practical part with a clearer understanding of what I am doing and why I do it, and at the same time the box and its brass contents have been getting warm—a not unimportant item in the proceedings; for if you begin your operations before this takes place your glasses will become dewed with the moisture condensed on them, your brass will be in a process of expansion from the heat, your image will accordingly be wanting in definition, and your plate assuredly spoiled. I will now proceed to photograph the blow-fly's tongue. T. C. WHITE.

ON DEFINITION IN PICTORIAL PHOTOGRAPHY.

THERE seems to be considerable divergence of opinion upon the subject of *proper* definition, whatever that may be, in photographic pictures—some advocating absolute sharpness, and others limiting the area of definition to certain portions of the subject, as the best means possessed by photographers of imparting artistic feeling to

their work. Pictorial photography, by-the-bye, must not be understood to include copies of works of art, machinery, and suchlike, which necessitate sharp and equal definition throughout. There is much to be said in support of the out-of-focus theory, and able performers like the late Mrs. Cameron, have done much to popularise this method of working. As a matter of course this plan is generally supported by artists of the brush and palette, and very natural it is, too, that they should, being forced by the shortcomings of their own art to adopt this means in order to carry out their ideas.

One or more chief points of interest have to be created, and the most expeditious and satisfactory method of attaining that end is by making the less important portions of their designs act as a foil to those parts they wish to emphasise. Necessity, therefore, in the first instance, and expediency in the second, has caused this method to be almost universally followed by painters. The term "suggestiveness" is in this case a very appropriate term as applied to those portions of a painting possessing the leading lines only, or indications of them, without much detail, but sufficient, however, to guide the ideas of the spectator into the channels desired by the artist, as leading up to and explaining the sentiment and intention of his labours. The familiar smear, with a few dots and dashes, are indications of the distant village; a few dabs of the brush, the distant forest. Then we come to the middle distance: a few characteristic touches, a little more detail, and trees, water, rocks, and boulders grow upon the canvas. The nearer the foreground is approached forms and details are gradually elaborated, until at the feet of the spectator, so to say, every object is as carefully drawn and realistic as possible.

In figure pieces the principal actors in the scene are most carefully worked; the subsidiary ones and surroundings generally less so with regard to detail, such being left to the imagination. The more clever the artist is in suggestive treatment—the more completely he can tell his tale in the fewest words—so much more interest and variety will his works possess. The fact of certain portions being left to the imagination gives an opportunity to the observer of translating them more or less according to his own feelings; the touch here and there keeping fancy within due bounds, and, on the whole, subservient to the wishes of the designer.

There are, however, no rules without exceptions; and sometimes we find groups and interiors full of detail throughout, the drawing and composition of the piece centering the attention upon the part desired. The old Dutch painters were especially careful in detail. Their composition effected all that was desired to isolate or emphasise without sacrificing atmosphere by the elaboration, proper definition of the different planes being obtained by a careful regard to the colours used rather than by superior definition of one part with regard to another. It is the very nature of painting, even when most highly finished, to be suggestive and crude in comparison with a photograph. Yet it may be said with truth that a clever painting, however minutiæ may be disregarded, will convey a more realistic idea of most subjects than a photograph. No matter how excellent the photograph may be itself, it would never be mistaken for the original if that consisted of forms brightly coloured or represented objects on different planes.

There is no disputing but that the texture and absolute realism of a photograph would be infinitely superior to any painting; but the impression conveyed would be less striking in all except special instances, *e.g.*, black lace laid on white paper, or any object in monochrome of a similar character. But with figures, groups, or landscapes, photography, with all its accuracy, is far inferior to painting as a means of conveying truthful impressions. Each art has, however, its own special advantages; and I do not think rules accepted as applicable to painting should be the rules by which photographs are judged quite so much as they are.

How best to produce artistic work is the gist of the argument, and, should the picture be sharp or out of focus, to produce artistic effects. In painting, indistinctness or want of detail is, as I have already said, a necessity; but, in photographing microscopic detail, it is part and parcel of the process, and is the one particular advantage it possesses over any hand work—an invaluable and undisputed quality which alone makes it more and more indispensable in the various arts and sciences to which it is so useful a handmaiden. Yet advocates of the out-of-focus theory are, by throwing away this advantage, doing little else but levelling down photography to the shortcomings of the brush and palette; for in this respect photography is infinitely superior to any other process, and all attempts to impair its value are to be deprecated. That clever but erratic fuzzinesses are lauded to the echo for their artistic suggestiveness, and set up as models for imitation, I cannot help thinking is a mistake. Softness, delicacy, and atmosphere, *with definition*, are quite as easy to attain with as without it; and aërial perspective in photography ought not to consist of an indistinct blur, but of beautiful and refined gradations of tint, while, if correctly rendered, the utmost sharpness and definition will not in any way interfere with it, but, contrariwise, add to its beauty.

The comparatively easy manner of rendering atmospheric effects by indistinctness is, as far as I can see, its only recommendation, and this a very questionable one; for it is producing the effect of atmosphere in a slovenly and illegitimate manner. The old idea of comparing the photographic lens to the human eye contains sufficient truth to be somewhat misleading; and the argument that, because the eye can only define a very limited portion of the landscape at one time, photographers will be conforming to natural laws by only making a portion of their pictures clear and distinct, is a fundamental error. It does not follow that because our eyes are incapable of seeing objects on many planes equally distinct at the same time (and to compensate for this have the power of unconsciously and instantaneously altering their foci whenever there is the slightest necessity for it) that our lenses, which possess a power denied to eyesight—that of practically seeing all planes with the same distinctness at the same time—should be robbed of this equivalent for adaptation of focus, and be constructed to imitate the shortcomings of eyesight.

I am satisfied that sharpness—microscopic definition, if you like—*so far as it is possessed by the object to be represented*, is at no time objectionable in our work, the effect of atmosphere being obtained by variations in the strength of image rather than by blurring of outline. A slight haze will have the effect of partially obliterating the objects to be depicted by the lens; and, if skilfully taken advantage of, will introduce that atmosphere and suggestiveness that are qualities of undoubted advantage in landscape work. The point is to endeavour to represent objects as seen in nature, and not to make an artificial atmosphere by mechanical means, when it may be had in a perfectly legitimate way, namely, by the exercise of artistic and manipulative skill, and by the selection of our subjects when they present the most favourable aspect.

EDWARD DUNMORE.

LANTERNS AND SLIDES.

No. II.

I MUST leave it to others more experienced than myself to discuss the relative advantages of the numerous silver-printing processes applicable to transparencies on glass for the lantern. All of them with proper care are capable of giving perfect pictures—even gelatine dry plates. Any one who saw the transparency exhibited at the exhibition of the Photographic Society of Great Britain by Mr. W. K. Burton—a gelatine dry plate developed by Mr. A. Cowan's citric and pyrogallic acids-method—must have been struck by the remarkable purity of the high lights as well as the perfect range of half-tones, far exceeding anything I have myself obtained with any commercial dry plates. What has been done once can be done again. Many others have produced excellent results with gelatine, some of which I have seen on the screen. I only particularly mention the one of Mr. Burton's because it was on exhibition and must have been seen by thousands, and is in itself proof positive that perfect results can be obtained by the gelatine dry process.

I am of opinion that the slower are far more suitable for transparencies than the "instantaneous" plates, for many reasons. In the first place: even with the slowest the exposure to an ordinary lamp or gas light is so short that it is none too easy to control the exact exposure—a difficulty considerably increased by greater sensitiveness of the plate. Secondly: as the slightest trace of fog is fatal to the brilliancy of the picture, it is evident that the more sensitive the plate the more liable it must be to injury from each and every one of the different causes which tend to produce fog. Thirdly: because I am convinced that many of the commercial plates have been, and perhaps still may be, endowed with a false degree of sensitiveness, due to "auxiliary lighting" during the process of manufacture.

In the making of gelatine transparencies it will be found absolutely essential to mask the edges of the negative with black paper—preferably a mask cut out out of a piece the full size of the pressure-frame. This will have the double advantage of producing a clear margin round the transparency, invaluable both as a guide during development and as a test for perfect transparency of the whites, and also of preventing stray light from passing through the edges of the plates. It is astonishing how far light will travel through the edges, as may be seen by putting a pile of negatives together, or plain glass with opaque paper between each, near a window.

Any accidental striæ or bubbles in the glass would be quite sufficient to make a portion of this light strike upwards, and so mark the print.

Whatever other process may be finally adopted for producing lantern transparencies, no one employing gelatine dry plates should hesitate to use every endeavour to produce the best possible results with them as positives. The experience thus gained must prove extremely useful in the development and exposure of gelatine negatives. The same conditions of purity of the whites and transparency of the half-tones are equally important in negatives if perfection be aimed at; and, although it is quite true that satisfactory pictures can be obtained on albumenised paper, by dodging the printing, from very imperfect negatives, it is only at an expense of time, trouble, and waste that would be repaid tenfold by greater attention to the negative once for all. This perfection of the negative is of still greater importance if any of the modifications of the carbon process should be employed for printing the transparencies.

The carbon process is in poor favour—most undeservedly; for it is the most charming and fascinating of all when its difficulties are once mastered. Its difficulties, however, are many, and are principally dependent upon the many varieties and apparent vagaries of gelatine. Not only do the hard and soft varieties materially change the working, but many gelatines which are excellent in other respects—whether it is that they have been clarified by alum, as rumour says, in process of manufacture or from some other cause—have not the necessary solubility after sensitising with the bichromate. These properties of gelatine are far from being understood, consequently the commercial carbon tissue leaves much yet to be desired.

The preparation of the tissue in the small quantities required for lantern slides does not present any real difficulty to the amateur who will take the trouble to prepare it for himself. Nelson's amber gelatine is always reliable; but see that it is Nelson's, as there are other amber gelatines which, for other purposes, may be in every way equal, but which are not equally suitable for work with bichromate. I can speak with the greatest certainty as to Nelson's, having used it almost daily for fourteen years. Samples will vary greatly as to certain qualities, but they are invariably sufficiently soluble.

All that is necessary is to make a thick solution coloured to the required depth and tone; carefully filter and free from air-bubbles, and coat the paper evenly with it. For this purpose it is put in a suitable vessel kept warm by a water bath. Small pieces of paper may be coated by floating—still longer strips by rolling the paper up and, commencing with one end, dexterously drawing the paper over the surface. This plan requires some experience and a steady hand to coat the paper well without soiling the upper surface.

Another excellent plan is to take two pieces of paper and, holding them quite evenly by two corners, plunge the two edges together right to the bottom of the dish and then draw the sheets upwards. If carefully done, the two sheets of paper being held firmly and strained tightly, not a drop will get in between the sheets, but a nice, even coating be obtained on either side. The two sheets will dry together perfectly flat and are easily separated afterwards. While draining, the lower edge is used as a skimmer to draw any bubbles which may be formed by the operation to the margin of the dish.

Coating the paper by damping it and pouring the coloured gelatine on is another plan. If this be adopted the paper must be well wetted and squeegeed on to a piece of plate-glass placed on a levelling-stand. When the gelatine is poured on a number of minute bubbles will be sure to rise upon it from the interior of the paper. This must then be tipped off into another dish, and a second quantity of coloured gelatine poured on, which will be found quite free from bubbles. The first lot need not be wasted, as after remelting and filtering it will be as good as ever.

For colouring matter the liquid indian ink prepared by the artists' colourmen is perhaps the best commercial article, with the addition of red and blue to tone desired. One point, however, to which I would more particularly call attention, because I believe it has never yet been published, is the extraordinary effect which the amount of colouring matter has upon the sensitiveness of the tissue. The more colour the more sensitive. The exact relation of sensitiveness to depth of colour has not, as far as I am aware, been ever approximately estimated; but I can assert it to be a most positive fact that, if two tissues be made of exactly the same gelatine and sensitised with the same proportion of bichromate—the one being only lightly coloured and the other very deeply—the deep one will be fully exposed in a fraction of the time which would be required for the lighter tissue.

At first sight this might be attributed to the greater depth to which the light would have to penetrate in the lighter film in order to produce the necessary insolubility; but further reflection will prove that this is not the case. Exposure is continued—not until the darker parts have the required depth, but until the high lights are just touched. It is, therefore, the exterior surface only which has to be rendered insoluble in the high lights which is in question; and this effect is obtained, as I have said, in a much shorter time in proportion as the colour is deeper. Most of the carbon transparencies which I have seen put upon the screen have been wanting in vigour. This arises simply from the tissue not having been suited to the negative—that is, the tissue has not been deep enough in colour, or, what is quite as likely, the negative has been foggy or wanting in pluck.

In a previous paper I have insisted on a bit of clear glass in the shadows as one of the essentials of a good negative. If the carbon process is to be used for producing the transparencies the bit of clear glass will be found of great service in giving depth and vigour to the picture. The details in the shadows, which would be quite lost by bronzing in a print on albumenised paper, will be clearly brought out in carbon. With a great many existing negatives, where the required contrast is wanting, vigour can still be obtained in three different ways:—First, by printing in a stronger light; second, by reducing the proportion of bichromate with proportionately longer exposure; and, third, if these two expedients still fail, by using a tissue of deeper colour. On the other hand, should the negative be too hard, choose a tissue lighter in colour, increase the quantity of bichromate, and print in a weaker light. It will be noticed that the strength of light in which the negative should be exposed is exactly the opposite to the conditions which must be observed in ordinary silver printing.

All these details may seem very elaborate, but they are no more complicated than the attention necessary to be paid to lighting, exposure, and development, as well as to the bath and sensitiser, by any other process, if the same result is to be attained, namely, a set of equally-brilliant positives from an unequal series of negatives.

George Smith.

ACTINIC RAYS.

II.—Competition in Photography.

On the occasion of Jones first commencing his "opposition shop" just a few doors below us, how naturally we felt the inclination to make nocturnal rambles up the back lane and drop lighted "lucifers" in the driest corner of the wooden structure which was raising its head proudly and defiantly in the rear of Jones's premises! We regard him as an interloper—half consider him a purloiner of what is rightfully our own; and, while these impulses prevail, reason must in vain endeavour to make it apparent that our rival's presence should eventuate in our individual good. Yet this is really the more accurate view to take of the matter; and in our calmer moments we must be easily reminded that competitive emulation and honest rivalry are the progenitors of progress. The desire to exceed the efforts of another rushes us into the successful execution of projects which only a short time before we should have deemed it madness to attempt; for we all borrow ideas from our contemporaries to produce original results. This may be paradoxical, but originality is only the re-arrangement of known matter.

"The mind is but a barren soil—a soil which is soon exhausted, and will produce no crop, or only one, unless it be continually fertilised and enriched with foreign matter." So says Sir Joshua Reynolds, and this admixture is much more congenial to the soil of our minds when it is sprinkled with a consciousness that otherwise our crops will be valueless compared with those of our more provident neighbours.

Nothing is more conclusive of the direct effects of this emulation than the fact that the photographers in some vicinities, as a body, produce superior work to those in other localities; while, again, one style of portraiture will frequently predominate in a certain neighbourhood, pointing out conclusively, to my mind, that the work of one man—perhaps unconsciously—influences that of his opponent. It also seems to prove that there is an elastic-like power in the quality of our endeavours, responsive to the pull of emergency. Perhaps it is natural to conclude that if our immediate contemporaries were to evacuate our locality we should be enriched to some extent by their departure; but this reasoning is as short-sighted as it is far spread.

A porter having a load of goods to convey to some destination where it is beyond his single strength to bear it will naturally look out an assistant, and in an ordinary way share with him the financial proceeds; and this is the true aspect in which to view our case. We are really assistants to one another—all pushing our truck-load of photography to its destination of public approval. If the number of persons in a place intent on having their countenances perpetuated by photographic aid were the same, whether one or more artists practised

there, then matters might be different. Instead of this, however, being the case, we have to arouse a demand for our work by interesting the public in this direction; and how can one man hope to accomplish so much, especially when it is remembered that our profession is far from being a necessity of life? To me it palpably proves the requirement of united efforts, and I do not think that the matter can be too strongly recognised. Why there are cases every day of persons being induced to be photographed through some attraction exhibited in a particular place, and yet going to another studio and requesting to be delineated in a similar manner; so much do we depend upon each other.

See the non-success of isolation as demonstrated by those patent processes which come periodically before our community. The royalties are purchased by divers of our more speculative fraternity, generally with the specially-advantageous proviso that they are to have the sole benefits to be derived within a certain radius. And what are the invariable results? We may with certainty estimate that, after the usually heavy pecuniary disembursement, the purchasers will do their utmost to recuperate themselves for their outlay. Possibly, too, the innovation is really good, yet still the effect is failure, and the cause of the effect is placarded manifestly in its face. It explains directly the futility of our striving to stem the current of natural conservatism unaided.

We may drag our exclusive novelty against the tide for a while; but without fraternal aid it is only a question of time till we find our wearied grasp fail us and behold our isolated "hobby" engulphed in the irresistible rushing waters of universal opinion.

Of course, the same rules which regulate the success of a new patent process must operate directly in all branches of our everyday productions. It is only by such matters being adopted jointly, and a spirit of competition being aroused in us, that the whole merits of the case are likely to come to light and to be passed into general favour.

Let me endeavour to show another proof of the great benefits of legitimate rivalry. Truly, one who essays to make the "black art" quite subservient to his will cannot be said to but dream of life on a bed of down. The countless worries consequent on following a calling affected by every vicissitude of the fickle weather; the continued forcing of an outward affability in the studio; the chemical uncertainties, the fumes, and general close confinement—all tend to create an ideal fairydom of those distant scenes—

> "Where daisies pied and violets blue,
> And 'lady smocks' of silver white,
> And cuckoo buds of yellow hue
> Do paint the meadows with delight."

I believe that every poor, struggling, over-worked photographer nurtures a dim, shadowy hope that there is a future when the pressure of business will be lightened, allowing him to find time for "ruralising," and depicting with his camera some of Dame Nature's "beauty spots" which abound within easy distances of every locality in our island home. But ask him why he does not embrace this desirable and health-giving occupation as a branch of his regular business, and he will shake his head, declaring meanwhile that it does not pay. Does not pay! See the innumerable English houses where the walls are "decked" with those vile German-Jewish "engravings," invariably caricaturing the most beautiful of our scriptural subjects, and suffocating what crude ideas of taste might primarily have an existence in the untutored mind.

> "Breathes there a man with soul so dead
> Who never to himself hath said,
> 'This is my own, my native land?'"

Love for their country is strong in the hearts of all Englishmen, and think you not that they would soon become desirous of having its favoured scenes on their walls in place of those bastard monstrosities so frequently abiding there? There is a great mistake somewhere. Ask the energetic firms of Wilson or Valentine, who have become world-known, principally through their competition one with another, if landscape photography does not pay.

Picture subjects await, and purchasers are to be found if their interest be aroused; but sufficient recognition is not accorded to this branch, simply because its workers are too few for the task. Their puny efforts are like using a penknife to hew down an oak.

What does my argument betoken? If it convey the lesson I humbly intend that it should, it calls us to remember that we are brothers while we are rivals; to remember that honourable competition is at all times the keystone which unbars the channels of universal recognition, and makes it "fall, like the gentle dew," replete in individual benefits.

LYDDELL SAWYER.

CARBON PRINTING.*

THE next experiment tried was printing the picture on the back of the gelatine, through the paper, which was waxed, to render it transparent; but that did not succeed, owing to the grain of the paper, which could not be entirely got rid of; and they were also wanting in sharpness, owing to the thickness of the paper being between the negative and the gelatine.

Mr. Swan at last entirely removed that difficulty by transferring the picture to a second paper, and then washing away the superfluous gelatine

* Concluded from pag 34.

from the back. There are two modifications of this process, called the "single and double transfer processes." When these processes were first brought out the double transfer, in the form of chromotypes or Lambertypes, was the great favourite; but now comparatively little is done that way, and it is almost solely the single transfer process that is worked commercially. I will therefore describe that first.

The transfer paper is prepared by coating a hard-sized paper with a solution prepared by dissolving one ounce of gelatine in one pound of water. When the gelatine is thoroughly dissolved five and a-half drachms of an aqueous solution of chrome alum, prepared by dissolving one ounce of chrome alum in twenty ounces of water, is added, drop by drop, whilst it is being continuously stirred round. It is then filtered through fine muslin, and must be used while warm, as it will not redissolve if it be once allowed to set. It is then brushed over the paper with a broad camel's-hair brush. Another very good method of preparing single transfer paper is by coating the paper with an aqueous solution of shellac, obtained by boiling three parts of white shellac and one part of borax in thirty parts of water; or, if an unbleached shellac of red-brown colour be used it imparts a very pleasant rose tint to the paper. This shellac transfer paper possesses one great advantage over gelatine transfer, inasmuch as it keeps good for any length of time; while the gelatine transfer paper, contrary to what is generally supposed, only keeps at its best about a fortnight. The double transfer paper is prepared in exactly the same manner as the first single transfer paper described, only there is less chrome alum added. The proportions are:—One ounce of gelatine, six ounces of water, and two and a-half drachms of alum solution.

A piece of single transfer paper is now cut a little larger than the tissue to be developed, and both it and the tissue are placed in cold water till the tissue has become soft—generally about half-a-minute; they are then taken out, and placed face to face on a flat piece of glass, or zinc, or slate, and a squeegee is passed over them gently at first, and then more strongly, to bring the two surfaces into intimate contact in every part. This, and all subsequent operations, may be carried on in an ordinary lighted room, as the tissue loses its sensitiveness whenever it is wet. From the same cause the printing action (which, as I said, continues after the tissue has been removed from the frame) is stopped, so that, if any prints which have been fully printed cannot be developed at once, it is better to squeegee them, when they will keep for a couple of days or so. The development is effected by soaking the tissue and transfer, which are now in close contact, in water from 100° to 120° Fahr. In a short time the coloured gelatine will be seen oozing out from the edges of the tissue; it must then be taken hold of and drawn carefully under water, leaving on the transfer paper a dark, soluble, slimy mass, under which lies the insoluble picture. This is allowed to soak in the water for a few minutes, and then the superfluous mass of gelatine and colour is removed by splashing the water over it. If the print, when partly developed, show signs of being light, the water must be cooled down; or, if it be still too dark when all the superfluous matter has been washed away, it can be lightened by prolonged soaking in water about 150° or 160° Fahr. If it be very obstinate, a little carbonate of soda or ammonia will reduce it to a proper depth, unless it has had about double the exposure which was necessary. When the print has been thoroughly developed, allowing for a slight increase of depth after drying, it is removed into clean cold water, and allowed to stand for five minutes at least, to remove as much of the bichromate as possible. It is then placed in a bath of alum composed of one pint of alum in fifty pints of water, and allowed to remain about ten minutes; then well washed in clear water, and hung up to dry. Photographs which are intended as illustrations for books, or, indeed, any photographs which have to be mounted on paper, can be developed on the paper direct, and thus get rid of the otherwise inevitable cockling. The only precaution required to be taken is to have a square safe-edge on the negative. This is most easily done by pasting strips of black or yellow paper round the negative.

Carbon prints on opal glass are done by the single transfer process. No preparation of the glass is required; it is merely washed, and the tissue squeegeed on it as on paper. The greatest objection to the single transfer process is that a reversed negative is required, whereas double transfer prints can be done from an ordinary negative. To my mind this is the only advantage which it has over the single transfer process. The double transfer process is as follows:—Having got our print as for single transfer, it is developed on either white, smooth glass, or, if a matt surface be required, on finely-ground zinc. The glass is prepared, after being thoroughly cleaned, by first rubbing the plate well with powdered French chalk, after which all the loose powder is dusted off. It is then coated with plain enamel collodion. As soon as this has set (say in two minutes) it is placed in a dish containing pure water, not too cold, till all the greasiness has disappeared. The plate can now either be used in its wet state or can be dried, and damped again when required for use. To prepare a zinc plate, or ground glass—which answers the same purpose, but which has not such a fine grain—they must be rubbed with a solution of one part each of wax and colophony or pure resin in fifty parts of turpentine or benzine. The mixture is rubbed on with an old linen or flannel cloth, which acts best after it has been repeatedly used, as too new a cloth takes too much wax off the plate again, in which case the print sticks or gets a grey tone from the zinc. Having the plate prepared the printed tissue is squeegeed on it, and it is developed the same as a single transfer print. More care must, however, be taken in the

development, as the collodion film is easily broken and the print easily scratched. It is then washed, fixed in alum, and allowed to dry. Any retouching which the print requires must be done at this stage, either with oil-colours and brush or dry powder colour and a leather stump.

The picture is now ready to be transferred from the glass or zinc plate to paper. For this purpose the double transfer paper I have already described is used. A piece is cut rather smaller in size than the plate on which the print is lying, and is softened in water from 100° to 110° Fahr. As soon as the gelatine feels softened the paper is placed in cold water, and kept there until wanted for use. The plate containing the print is now dipped for an instant into cold water; the softened transfer paper (gelatine side downwards) over the print. A sheet of india-rubber cloth is then laid over the transfer paper, and the surface of the latter is brought into close contact with the print by means of a firm pressure in all directions from the squeegee. This is then allowed to dry perfectly, when the print can easily be stripped from the plate. The only other subject which I intend to speak a word about is the production of transparencies either for enlarging or making reversed negatives from, or for the magic lantern.

In the preparation of the tissue more care must be taken, especially in the grinding of the colour, which must also be filtered through cotton-wool. The proportion of colour to the gelatine is also different—about seven instead of three and a-half per cent. It is sensitised and printed in the same way as an ordinary print. A transparency for the lantern is printed about the same depth as an ordinary print; but a transparency for making negatives from requires almost double as much printing. After the tissue is printed it must be coated with thin enamel collodion, about half the ordinary thickness, and allowed not only to set, but to dry.

The glass plate is prepared by coating it wet with a solution of gelatine, the same as is used for single transfer paper, or by coating it dry with a very thin solution of gelatine in acetic acid and alcohol, about half-an-ounce of gelatine to ten ounces of solution. The last is much better, as the coating of gelatine is extremely fine and thin. The tissue is then squeegeed and developed in the ordinary manner. The negative from which a lantern transparency is printed should be rather dense or hard, in order to give a brilliant effect on the screen; but if the transparency, after development, prove too thin or weak, it can be intensified in quite a number of ways. I think the best way to intensify lantern transparencies is by flowing ordinary writing ink over them. The ink stains all the gelatine, and of course the deep parts which have most gelatine get stained in a proportionate degree to the thin parts. Transparencies for making negatives from are intensified by a solution of permanganate, which acts in the same way as the ink, but which has not such a pleasant colour for the lantern. In making transparencies for multiplying or making reversed negatives from, any saving, double printing, or other dodging can be done, so that when it comes to printing off copies there is nothing to do but fire away. The printing-in of clouds, for instance, when a large number of prints are wanted could not be done any other way.

It is rather difficult to print in clouds or backgrounds, as you cannot see the picture. It is done in this way:—When the landscape is printed the frame is opened, taking care not to move the tissue on the negative; it is then turned up and powered French chalk painted on the negative. The tissue is then pressed on the negative, and a copy of the outline is obtained. The cloud is then allowed to print in slightly over the edge of the landscape. J. C. Annan.

ON THINGS IN GENERAL.

When a new process, a new arrangement of processes, or a modification of a process—one has to be careful nowadays how one expresses oneself—is published in the journals, it is generally treated in one or other of these ways—firstly, every one condemns it; secondly, every one praises it; or, thirdly, a few praise it, and the remainder cry it down. Now, if the subject were one I was totally ignorant of, my experience would lead me to form the worst opinion of the second class, a very good opinion of the first, and the best opinion of the third, and especially so when it was said to be deficient in originality or novelty. And under this third class no one will deny that Mr. W. K. Burton's emulsion process comes, so that, notwithstanding the condemnation it has had in some quarters, I feel confident that those who have recognised its value will be a continually-increasing majority. On page 731 of this Journal (December 22, 1882), in the course of an article by that gentleman, I read these words—"This, of course, proves my theory incorrect." I involuntarily called out—"Bravo! Burton!" (I hope he will pardon the familiarity.) Of the hundreds, perhaps thousands, whose compositions appear in the columns of photographic literature, I wonder how many would have the courage to confess thus openly an error of judgment. All honour, therefore, for such outspokenness.

I read not long ago an account of the pleasurable feelings produced in the bosom of an amateur at the open way in which difficulties were smoothed and information given by experienced photographers to beginners in the art, and, to their praise it must be said, that many experienced men, amateur and professional, are very kind in this manner, though there are conspicuous examples to the contrary, as also there are of gross abuse of such confidence; but I should like to know if this gentleman ever came across a professional photographer who did not know all about everything, or one who, told the newest of new things, or the latest thing in "wrinkles," had not been perfectly familiar with it for a long time, far less whether he ever came across one who confessed an error.

By-the-bye, speaking of errors, I should like to know whether, when a writer has once pitchforked a heap of symbols on to paper, he considers his work done and is above any labour of correcting them if error appear. It is all very well for the scientific reader who can detect such an error at a glance, but when the symbols themselves are for mere elementary calculations they presuppose a non-scientific reader. Looking the other day over Mr. E. Howard Farmer's interesting papers, I took the trouble to examine one of the equations (it was on page 719). Here it is:—

$$Ag\,(NO_3) + 3\,Cl = Ag\,Cl + 2\,H\,Cl\,O + NO_2$$

Then, in page 733—

$$2\,Ag\,Cl + 2\,Na_2\,(S_2\,O_3) = Ag_2\,(S_2\,O_3).\,2\,Na_2\,(S_2\,O_3) + 2\,Na\,Cl,$$

and in the next line the equation was satisfied with entirely different values. I next opened my Journal at Captain Abney's lectures, and then I saw (page 750)—

$$2\,Ag_2\,Br + 2\,K\,Br + H_2\,O + O = Ag\,Br + 2\,K\,H\,O,$$

and the same formula was given exactly as hero written in another report of the same lecture. A few lines further I read—

$$61 + 6\,RHO = 5\,KI + KIO_2 + 3\,H_2\,O,$$

which absurdity, with the exception of one of the errors, I also note in another account of the lecture. Now I contend that if these symbols are supposed to be of any use beyond ornamental embellishments of the text, or as literary fireworks, those learners for whom they are intended ought to be better treated than to be supplied with this kind of pabulum. I repeat: the formulæ are scarcely intended to teach learned men and such errors as these (and undoubtedly others, if looked for) repel or deter the beginner.

Among new apparatus I noticed that Captain Pizzighelli had invented an outdoor arrangement got up as a wheelbarrow. In the early days of photography, when so many amateurs took up the art, all sorts of vagaries were indulged in by its votaries, and for a gentleman to be "photographing" was sufficient excuse for behaviour or *impedimenta* of the most *outré* description; but we are "too proper" now. I must confess that I myself should not like to meet any of my acquaintances while trundling a wheelbarrow, although I might be "on pleasure bent" and conveying camera and photographic goods alone. In the distant past I have a most lively recollection of an ingenious friend who stowed his camera in, and made a dark tent of, a *perambulator*. I never could bring myself to accompany him in one of his expeditions: yet he rather enjoyed his perambulations!

But there are photographers *and* photographers. How many, for example, so clever as Signor Pricam, described by Mr. W. J. Stillman, who never takes a second negative of a sitter on the chance of one being spoiled, and who is so certain of his light and his power of estimating it that he never developes to see if he have a successful negative while the sitter is in the studio! Light is undoubtedly less varying in the southern parts of the continent than it is here; but these are feats of no mean order, if good work be aimed at.

An example of another class of photographer was mentioned at the last meeting of the Photographic Society of Great Britain. Mr. Peek is reported to have said that a "certain eminent photographer was in the habit of asking his intended sitters to breakfast with him, so that he might study their expressions." This is *something* of a photographer! Does he study the faces individually or collectively? and when he arrives at the studio has he his cook at hand to bring in and place on a sideboard those dishes whose appearance or arrival brought the glow of pleasure into the countenance of the guest? or does he keep concentrated essences in bottles, and, uncorking them just before exposure, let a whiff reach his sitter's nostrils and secure a picture ere its beatific effect is gone? I feel quite curious on these points, and if meanwhile I obtain a solution of my questions my readers shall have the benefit in my next.

Free Lance.

NOTES ON PHOTOGRAPHY.

Lecture VIII.—The Gelatine Process (Continued).

Preparation of Bromo-Iodide Emulsion and Plates.*

Weigh out on clean pieces of paper the following materials:—

1. Potassium iodide	5	grains.
2. Potassium bromide	135	"
3. Nelson's No. 1 photo. gelatine	30	"
4. Silver nitrate	175	"
5. Autotype gelatine	180	"
or { Nelson's No. 1 photo. gelatine	120	"
{ Heinrich's gelatine	60	"

The potassium iodide and bromide should be pure samples, and the silver nitrate recrystallised. Dissolve No. 1 in one drachm of water in a small test tube, and No. 2 in one ounce and a-half of water in a beaker

* Photography with Emulsions (Capt. Abney).

capable of holding about twenty ounces. No. 3 is first rinsed with water and then placed in the bromide (No. 2) solution to swell. Place No. 4 in Captain Abney's spray apparatus, and dissolve in one ounce and a-half of distilled water. No. 5, after being rinsed, is allowed to swell in two ounces of water. No. 3 having soaked in the bromide solution for about ten minutes, plunge the beaker into hot water so as to dissolve the gelatine, and add one drop of strong hydrochloric acid; then take it and the silver solution in the spray apparatus into the dark room, and heat both in the water bath to a temperature that can just be borne by the hand without inconvenience (about 150° Fahr.). Now, holding the beaker in the right hand and swirling its contents round, or stirring well with a glass rod, blow in the contents of the spray apparatus until about half is added, then add drop by drop the iodide (No. 1) solution, and proceed again with the silver solution. When all is added rinse out the spray apparatus with a little distilled water, and also add; finally transfer to a twenty-ounce flask or bottle, and give a *thorough shaking* for two minutes. The emulsion should now be carefully examined to see if the mixing operation has been successful; for this purpose a little of it is poured on a glass plate and examined by a candle or gas flame. By transmitted light in thin films it should appear an orange, and in thicker films a beautiful ruby red, colour. If it be so, the beaker in which the mixing took place should next be taken out into the light and examinod, when it will at once be seen whether the whole of the silver bromide is in the orange condition. If the drainings round the sides are uniformly of this colour the mixing has been perfectly successful; if, on the other hand, some parts are perceptibly coarser or grit is visible it has only been partially successful, and the emulsion will suffer in quality. Finally, should the colour transmitted be grey or blue the boiling should be omitted, as it will not increase the sensitiveness and may produce fog. An emulsion which is blue after mixing is many times more sensitive than one which is red, but not so sensitive or of such good quality as that obtained by boiling the red emulsion.

Supposing the mixing to have been successful, the next operation is to place the flask or bottle containing the emulsion in a saucepan containing water, and heating until the water boils. After the water has been brought to the boiling point the emulsion is kept at this temperature for forty-five minutes, being shaken occasionally at intervals for half-a-minute or so. The boiling should take place without the cork being left in the vessel to allow of egress of steam, or a cork with a slot in it should be used. After boiling, a little of the emulsion should again be put on a glass plate and examined by transmitted light. It should appear of a grey or violet tint; if not, *the boiling should continue until this is the case.*

The flask is now withdrawn from the saucepan and cooled by immersion in water to between 70° and 80° Fahr. The gelatine (No. 5), which has meanwhile been melted in the two ounces of water and also cooled to between 70° and 80° Fahr., is now added and thoroughly incorporated by shaking with the emulsified bromide, and the emulsion is poured out into a flat porcelain dish and allowed to set. When thoroughly set (the test being that it should not tear with a moderate pressure of the finger) the emulsion is scraped off the dish with a strip of clean glass and placed in a piece of coarse canvas (having a mesh, if possible, not less than one-eighth of an inch), which has been previously boiled in hot water to get rid of any grease or dirt. The emulsion is twisted up into a ball in this, immersed in water in a basin, and by a gentle pressure squeezed through the meshes into the external water, when most of the soluble salts are at once extracted. The threads of emulsion are then again placed in the canvas, and, after being well doused with water from a tap or jug, again squeezed through the meshes into fresh water. After another sluicing it is left at the bottom of the basin and the water changed two or three times, when the emulsion may be considered as washed. When this is the case the threads of emulsion are placed on the canvas stretched across a basin and allowed to drain for about two hours; it is then transferred to a clean jar or jam pot and placed in hot water to redissolve. A temperature of 120° Fahr. or more may be given it with advantage. It should be noted, before redissolving, that the emulsion is firm and free from sloppiness. If it be not so two ounces of alcohol should be poured through, which will take up the excess of water. Half-a-grain of chrome alum dissolved in a drachm of water is then stirred in, and if alcohol have not been employed in the washing four drachms are then added in the same way. The emulsion should now measure about six and a-half ounces and is ready for filtering. This is done through a piece of wet chamois leather or swansdown calico, which has previously been well boiled and washed. The leather or calico is placed loosely in a funnel and the liquid emulsion poured on it, and as it filters through is collected in a glass flask.

To prepare the glass plates, immerse them in nitric acid and water (one to ten), then wash and rub them over with a ten-per-cent. solution of soda containing a little methylated spirit (this is conveniently done with a piece of chamois leather tied over a bung); wash again under the tap, rinse in distilled water, and stack up on clean blotting-paper to dry. In the operation of coating a large slab of plate glass or flat slate is required. This should be levelled by means of three small wood wedges and a spirit level on a bench or table close to where the plates are going to be coated. The plates being ready immersed the flask containing the filtered emulsion in water heated to 120° Fahr., and, taking a plate on a pneumatic holder, pour on a pool of the emulsion (considerably more than is required to coat the plate), tilt the plate quickly all round so that the emulsion covers the whole of it, and return the excess emulsion to the jar; finally give the plate a final tilt in the opposite direction to that in which the emulsion was poured off, and place on the level slab to set. Another way equally efficient is to place the plate on a small levelled block of wood, pour on sufficient emulsion, and spread with a glass rod; finally tilt the plate to render the emulsion uniform and transfer to the slab. As soon as the plates are set, which should be in a few minutes, place them in the drying cupboard and dry in a minimum time of about six hours; or place them in methylated alcohol free from resin for ten minutes, and stack up on blotting-paper, when they should dry in about an hour.

Precautions in Hot Weather.—After mixing the gelatine (No. 5) with the boiled emulsion the whole is poured into a jam pot, which is immediately placed in iced water for the emulsion to set. When set it is washed in the same way, but the water employed should have some lumps of ice floating in it. The draining should only take about half-an-hour and the emulsion ought then to be melted, a few drops of carbolic acid (or other antiseptic) added, and again placed in iced water; when set it is covered with alcohol and allowed to ripen for a day. When coating plates the slab should be previously cooled by being covered with small lumps of ice for half-an-hour. If the emulsion appear too thin before coating, twenty grains of hard gelatine should be melted in one and a-half drachm of water and added to it immediately before filtering,

An Alternative Method of Washing.—Cool the mixed gelatine and boiled emulsion to as low a temperature as convenient without its setting, and pour into a large beaker or jar. Take a glass rod, and, stirring the emulsion round with it, pour in methylated spirit until the liquid is seen to become clear, when most of the emulsion will be found adhering as a clot to the rod. Pour off the clear liquid containing the soluble salts, and add a little fresh alcohol. This removes the last traces of water and hardens the clot, which is broken up into small pieces and allowed to swell in clean water. This is changed a few times, and the emulsion finally melted as in the other method.

Rationale of the Process.—The object of emulsifying in a small quantity of the gelatine is to save as much as possible from the decomposing effects of boiling. It also shortens the time necessary to produce the granular bromide. The addition of the drop of hydrochloric acid serves two purposes: it aids materially in the production of a fine precipitate, and by rendering the emulsion acid prevents or destroys fog. Heating the solution, the use of the spray apparatus, and the agitation of the liquid are all for the purpose of securing a fine precipitate. On the silver nitrate coming in contact with the potassium bromide the following chemical change takes place:—

$$Ag\,NO_3 + K\,Br = Ag\,Br + K\,NO_3$$

The reason for adding the potassium iodide after some of the silver nitrate is added is that, if silver nitrate be added to potassium iodide, the silver iodide produced has a great tendency to form in a coarse condition. When, however, the emulsion contains some silver bromide and the potassium iodide is then added (no free silver nitrate being present), the more powerful base, potassium, combines with the more powerful halogen, bromine, and leaves the weaker base, silver, to combine with the weaker halogen. Thus—

$$K\,I + Ag\,Br = K\,Br + Ag\,I,$$

and in this case the particles of silver iodide formed are of the same size as the previous particles of silver bromide. For the same reason, whatever excess there remains of the soluble haloid salts will contain no iodide, but will be all bromide. On calculating it out in this case we find that there is an excess of sixteen grains of potassium bromide when the silver has all been added, and it is this excess of potassium bromide which performs the important operation of converting the orange bromide to the granular bromide. Boiling the emulsion has the effect of very much hastening this operation, but the same change takes place in a much longer time in the cold. The washing is for the obvious purpose of removing the soluble nitrate and now worse than useless excess bromide. The addition of the chromo alum hardens the gelatine and prevents frilling, and the alcohol facilities coating the plates uniformly. E. H. Farmer.

FOREIGN NOTES AND NEWS.

Dr. Stürenburg's Method of Preparing Canvas for Photographing upon.—Photographic Society of Berlin.—A New Automatic Printing-Frame.—Melting Point and Capacity of Conducting Electricity of Chloride, Bromide, and Iodide of Silver.

Dr. Stürenburg, in the *Deutsche Photographen Zeitung*, gives the following as his method of photographing upon linen, &c., as a foundation for painting upon:—Take the whites of several eggs and add one gramme of chloride of ammonium to each egg; then beat these together to a froth *without* the addition of water, and let the mixture settle, and store in bottles. To use it coat the linen or canvas with a thin film of it by means of a paint brush, and then equalise the surface. In order to make the albumen less brittle a little glycerine may be added when preparing the linen. The linen or canvas is then dried and sensitised upon a 1:8 silver bath. The prepared surface is rapidly dried beside a stove, and then immediately printed upon. The linen must not be allowed to stand when in this condition, because it would then easily become brown.

When the linen is stretched a board is placed under it, and the negative is laid upon the prepared surface. The whole is then carried out into the daylight and *printed very dark*. The negative should not be too soft, but very clear and powerful. After printing, the whole is slightly toned and then fixed in a 1:5 solution of hyposulphite of soda and water. After being well washed the picture is coated with a moderately-strong solution of bromide of potassium, and then, after being pretty well washed, is perfectly dried. The foregoing is useful for painting upon in water-colours. When strongly-sized drawing-paper is used as the foundation instead of linen the albumenous coat may be dispensed with and water substituted, when it is better to float the paper upon the latter than to put on the coat with a brush.

The Photographie Society of Berlin, of which Dr. Stolze is president, lately celebrated the twentieth anniversary of its foundation by a banquet.

The *Correspondenz* describes a mechanical continuous printing-frame which has recently been patented in Austria and Germany by Herren Tronel and Koch. When once a strip of sensitive tissue has been placed in this printing-frame it goes on printing upon it the whole day without its being necessary to take it into the dark room, and it is also unnecessary either to reverse or open it until the whole of the prepared paper contained in it has been exposed under the same negative. In this way a great number of prints can be obtained with a single frame in the course of a day. When printing in the sunlight a yellow glass may be kept over the negative in order to prevent the paper from being tarnished while the rollers are being revolved.

It is only when another negative has to be placed in the frame that it is requisite to take it into the dark room. A photometer is used for printing by, and it may either be let into the frame itself or used separately. The inventor says when the light is favourable a hundred or even more impressions may be got in one day in a single frame, in which the negatives can neither become dusty nor be injured in any way, while the prints will be unusually uniform. The frame may be used for both silver and carbon printing. The frame consists of a flat box, divided into three compartments. The compartments situated at either side of the box are intended to hold the sensitive paper, for which purpose they each contain a winder or roller. Under the opening in the centre of the printing-frame the negative is pushed, and is held in its place against the side partitions by four india-rubber plates which press upon its edges. The sensitive paper passes over the partitions and between the strips of india-rubber, and is pressed upon the negative by a catch lever and a spring by means of a cushion consisting of a board with a layer of felt.

The operation of working is as follows:—A number of pieces of sensitive paper are cut in strips of the requisite breadth, and joined end to end; then at the proper height for the picture both ends are fixed to the rollers and carefully rolled up upon one of them. The negative to be printed from them is laid in the frame, the rollers placed in position, and the partitions slipped into their grooves. The space at the edge of the negative covered by the india-rubber strip is sufficient to allow the paper to move freely when the roller at the top of the negative is revolved. The cushion is then put in place and held there by the spring. The lid is now closed and presses lightly upon the upright partitions. The box is then reversed and exposed to the light along with a photometer. Tho proper exposure having been attained the projecting lever is set free, so that the cushion sinks down into the space between the lever and the lid, and the paper is moved along towards the top by means of the roller, until the print disappears under the mask over the negative. The lever is again raised and another exposure is made. Further details are promised soon.

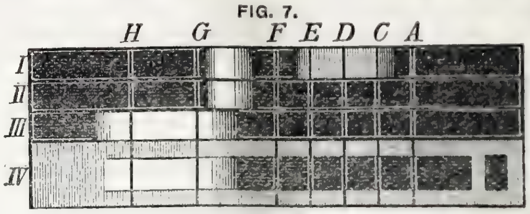
The *Annalen der Physiku-der Chemie* says:—"According to Kohlrausch, the melting-point of chloride of silver lies above 485° C. (according to Rodwell near 451° C.); that of iodide of silver at 540° C. (according to Rodwell near 527° C.); but the mixture of equal *equivalents* of chloride and iodide of silver melts, however, at 260° C. Chloride, bromide, and iodide of silver conduct electricity very well above the melting-point. The chloride then conducts best, the iodide worst, while the bromide occupies the middle position. The resistance of chloride and bromide of silver increases very much on solidifying (by which it is converted from the amorphous to the crystalline modification), and on being cooled down rises from 20° C. to more than a million times its first value. Iodide of silver, on the other hand, absolutely does not change its power of resistance on solifying (540° C.), but first shows a rapid increase only at the temperature of 145° C., at which it passes from the amorphous into the crystalline condition."

RECENT ADVANCES IN PHOTOGRAPHY.*

Lecture IV.

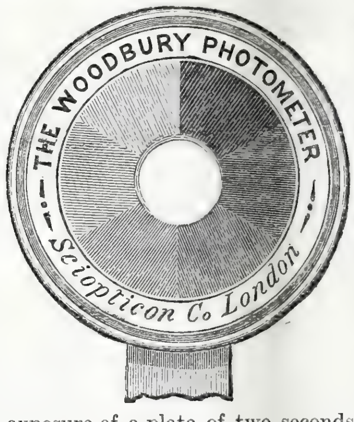
This leads me on to the measurement of the intensity of light, for if we want to know anything about our plates, we must know what brightness of light we have. I again have to allude to Mr. Warnerke; he is a most facile inventor, and the photographic world is largely indebted to him for many ingenious contrivances. He has introduced an actinometer which is dependent on phosphorescence for its value. I have here a phosphorescent tablet which has been as little illuminated as possible. Now I will throw the spectrum upon it. [Shown.] This bright spectrum of phosphorescent light extends into the ultra-violet, but stops short at the place in the indigo where the phosphorescent light is emitted; that is to say, one spectrum ends where the other begins. Mr. Warnerke has shown us that by exposing such a phosphorescent tablet to the action of light, by an ingenious contrivance, such as you will see down stairs, he is able to tell the photographic value of the particular light. This is a most valuable discovery, because phosphorescence is induced by very nearly the same rays as those which affect bromide of silver. If I allow the spectrum to play upon a fully-excited phosphorescent tablet we get another action. You will see that the phosphorescent light is diminished where the red and green have acted. These rays extinguish phosphorescence to a very large extent. With reference to this there is a curious fact that below the red, as we know, there are rays which exist, and which, to a certain extent, "desensitise" the phosphorescence film, and we have a darkening going on in that region. I have shown you this experiment to demonstrate how you can desensitise the phosphorescent plate, viz., by allowing white light to pass through red or green glass, since they permit the passage of those particular rays which act as extinguishing rays. There is another very simple way, which I recommend to amateurs, of telling the amount of exposure to give to your plates, and that is by Mr. Woodbury's photometer, which is the simplest thing in the world. Here we have a piece of bromide paper exposed to light for a minute, then read off against one of these tinted circles, according as to whichever tint it agrees with; you know what is the intensity of the light, and, therefore, what to give to a plate. A simple rule to remember is this, that if you use a bromide plate, only use a bromide paper for securing this tint; if you are using a chloride plate use a chloride paper. Recent researches of mine have shown that the darkening intensity and the developing intensity go hand in hand; therefore, it will be found that when you have the number which gives the right tint you may always be sure of getting the right exposure. If a tint require two minutes to obtain, which corresponds with an exposure of a plate of two seconds, and you get that tint, and give two seconds, you will not be wrong. If it require half-a-minute to obtain it give the plate half-a-second's exposure and you will be right. This is as useful an apparatus as you can have for the field. I do not know about the studio, but in the field some such device as this is almost a necessity.

FIG. 7.



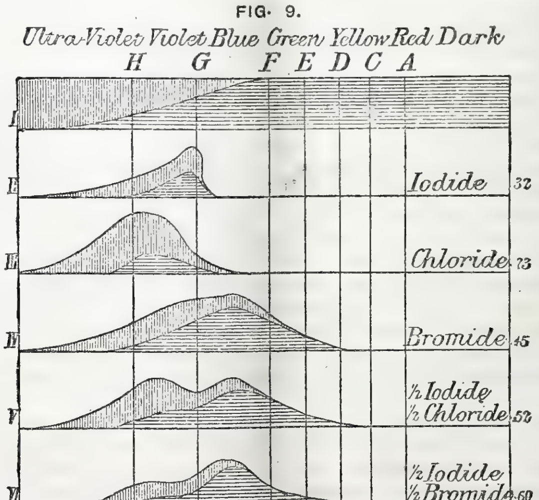
I. Visual spectrum of phosphorescent light.
II. Photographic spectrum of ditto.
III. Rays exciting phosphoresence.
IV. Rays which extinguish phosphorescence.

FIG. 8.



I want to show you the theoretical as well as the practical necessity of using a photometer or actinometer of some description. Here we have these little mountains which signify the intensity of different parts of the spectrum. There are some bright days in summer, the light of which, when spread out in a spectrum, let us represent by a rectangle (I); that is to say, they are all of equal intensity. I do not say they are, but you can represent them as such. There are other days in autumn or winter in which the ultra-violets will very much decrease. If you judge the exposure by the eye you may be entirely wrong, and if you are using an iodide plate you may only give one-third of the exposure you ought to give; for chloride only one-fourth; for bromide about one-half. If you are using one-half iodide and one-half bromide you would give only two-thirds of what you ought to give, so that the eye is no exact judge of the exposure you ought to give; it depends on the amount of

FIG. 9.



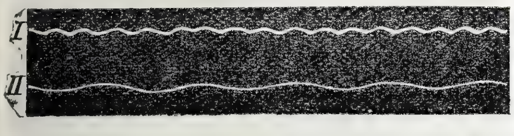
The horizontal hatching represents the effect where the ultra violet light is deficient. The standard light is represented by the whole of the shaded figures

* Concluded from page 12.

rays which exist in the ultra-violet, and that can only be told by a photometer of some description.

The next thing I propose to show you is with regard to drop shutters. I could talk to you for a whole evening on drop shutters, and even then I should not have finished, for there is a great deal in the philosophy of a drop shutter of which people have not dreamed. I am sure if I were to enter into the philosophy of the thing, I should carry you beyond any endurable limits of time. I therefore propose to show you one very easy plan of knowing what your drop shutter can do for you. We often hear said, "Oh, I exposed that plate with a drop shutter," and if the exclaimer is asked what length of exposure that was, he will probably confess that he does not know, or will say anything from one-fifth to one-fiftieth of a second. Now, that is a very untidy way of photographing. It is decidedly misleading to say one-fifth of a second when it may be one-twentieth. I will show you a way in which you can tell whether it is one-twentieth or one-fifth of a second of exposure you may have given with a drop shutter. I have here a monster lens, with which, had I time, I was going to show you some tricks. It is not very valuable—I think it cost 6s. In front of this gigantic lens I have a gigantic drop shutter, and attached to the sides of that drop shutter there is a tuning-fork which cost 1s. I claim no monopoly. You take a common iron clamp, and attach it to the side of the shutter. Then you blacken a piece of albumenised paper by the side, and make the tuning-fork vibrate. As the shutter drops it traces its own vibrations, and tells you how many it has performed during the fall of the shutter. You may know that an E tuning-fork vibrates so many times per second, and by simple measurement you can tell at what speed your shutter is going at any part of its path. I dare say we shall be able to see that the tuning-fork leaves its mark on the smoked glass, which I have substituted for the albumenised paper above described. Here is another trace (II) made when gravity was aided by an elastic band. [The shutter fell, and the diagram was shown on the screen.]

FIG 10.



I find my time is more than up; but before I close I should like to show you one or two curiosities as regards the scientific application of photography, and these are some composite photographs kindly lent to me by Mr. Galton, showing you what aid photography can give to anthropology. Here is a typical family composite portrait, composed of a mother and two daughters, all three faces being blended together. We thus get a likeness of the female branch of the family; then we have the father and mother, two sisters, and two brothers, giving the typical family group. Here we have another image, which is a typical group of engineer officers, and I am glad to see that they are so good looking. Here is one more, which is a typical group of sappers. I wish I had more time to go into the subject.

I cannot touch on printing processes at this late period of the evening, and, therefore, I must ask your permission to close. I feel that what I have done has been very imperfect, but I have done it to the best of my ability, so far as time would permit. I may have done things I ought not to have done, but I have certainly left undone a great many things which I ought to have done; but I hope for all my shortcomings you will excuse me. That this course of lectures has caused a certain amount of interest is evinced by the continued large audiences I have seen before me, and I hope some abler lecturer at some future time will be able to complete what I feel I have only commenced to do, viz., give a *résumé* of recent advances in photography. W. DE W. ABNEY, R.E., F.R.S.

THE LATE MR. THOMAS RODGER, PHOTOGRAPHER.

A CORRESPONDENT sends the following obituary notice of a well-known and able photographic artist:—In the death of this esteemed gentleman St. Andrews has lost a citizen of whom she might well feel proud, and a bright star has set in the photographic firmament. Gifted with very refined tastes and high intellectual powers, the deceased was from early boyhood a great admirer of all that was grand, noble, and beautiful, both in nature and art; while his naturally cheerful, contented, and happy disposition rendered him a universal favourite with a very large circle of acquaintances. Unselfish in the highest degree, nothing gave him more happiness than in planning how to make others happy, and he excelled in delighting his private friends with scientific exhibitions of various kinds. A thorough student and deep thinker, he ever kept himself abreast of the times in scientific knowledge.

Early associated with the late Sir H. L. Playfair and Dr. Adamson—themselves no mean amateurs—Mr. Rodger, after a distinguished career in the chemistry classes of our ancient University, commenced professional life in the cottage at Lead Braes, known as "New York." Thence he removed to that house in North-street immediately east from the site of the old English chapel, and subsequently to the more central and extensive premises in St. Mary's-place, where he found freer scope for developing his artistic tastes. A born artist, and devoted to business, deceased soon gained for himself a name and fame which became known throughout every region of the globe.

A happy "knack" of grouping large parties, combined with a finish and richness of tone which distinguished his photographs from all others, brought him numerous subjects from all quarters; and his gentleness of dealing with each endeared him to all classes—from the prince to the peasant. With children he was particularly successful, and the many happy groups he has photographed will hand down his name to posterity as the kindly "gentleman who took their pictures." One of his most successful efforts, in our humble opinion, was the family group of the Rev. M. L. Anderson, minister of the Second Charge, which adorns the walls of the exquisitely-furnished studio he has left behind him. Those who enjoyed the privilege of his private friendship know well that a kinder heart never beat beneath a human bosom; in truth, he was what a very old friend has remarked to us—"the essence of kindness."

While not exempt from the cares and worries incidental to human life, he never failed to have, as Burns beautifully expresses it, "a correspondence fixed wi' Heaven," and that enabled him to bear up under the great shocks his extremely-sensitive feelings experienced in the deaths of Mrs. Rodger, two of his children, and his father, who for so long a period acted as his right-hand man. We are in a position to know that he felt their loss very keenly, and was never easy except when in company, to which he fled as a refuge from the pains of recollection. He is acknowledged on all hands to have been a man of very great benevolence, and his manners were as pleasing as his photographs were admirable. The year 1883 had not gone a week when he was called away, let us hope, "to the beginning of months in a brighter and happier world, where partings are unknown;" for at best

"There is no union here of hearts
That finds not here an end."

DUM SPIRO SPERO.

Our Editorial Table.

A MANUAL OF PHOTOGRAPHIC CHEMISTRY. By T. FREDERICK HARDWICH, M.A. Ninth Edition. Edited by J. TRAILL TAYLOR.
London: J. AND A. CHURCHILL.

IT is now many years since the last edition of this well-known and deservedly-popular work appeared, and many striking changes have occurred in photographic practice in the interim. "Hardwich" was at one time the recognised, if not the only, guide out of all the difficulties by which the photographer is beset, and the laborious research of its author on pyroxyline and collodion for photographic purposes have become classical, and are likely to remain unique for many years to come. Mr. Hardwich has, however, unfortunately for our art-science, separated himself from photography almost completely during some years past, his pastoral duties as well as his health compelling him to refrain from some of his old pursuits. Consequently this as well as the two previous editions of the *Manual* have been steered through the press by editors.

In commencing the task of editing the ninth edition, Mr. Taylor undertook no sinecure; for, independent of the vast strides that have been made in photo-chemistry in late years, it had been felt that much of the matter that had been excised from previous editions ought to be restored. In fact, that as the author himself could not take the helm, *his* original text should be adhered to as far as possible, modern advance being treated—as fully as circumstances would permit—in order to bring the work up to modern date. Obviously, to treat with as much amplitude as Mr. Hardwich did collodion, such subjects as carbon printing, collodion emulsion, gelatine emulsion, platinotype printing, to say nothing of innumerable other new processes or improvements which have appeared since his time, would require a volume (or volumes) quite independent of the old work. For which reason it has been judiciously decided to adhere as closely as possible to the old text. While keeping this intention in view there are some changes which it has been impossible to avoid, one of which is the alteration in the nomenclature and atomic weights of chemical compounds. While adopting throughout the new notation, the editor has thought fit to make a compromise in the matter of nomenclature for reasons which an extract from the Preface will explain:—"For while the chemist of the present day knows that—to adduce the case of a familiar body—the substance expressed by the formula $Na_2\ S_2\ O_3 \times 5\ Ag$ is *Thiosulphate of Soda*, there is scarcely one among thirty photographers or dealers in photographic chemicals who is aware that this is the modern term to express hyposulphite of soda. Hence a work intended to be of everyday use to photographers would have its value impaired by the exclusive use of terms as yet imperfectly understood."

Thus, while the new notation has been introduced throughout, and the *Outlines of General Chemistry* altered or rewritten in accordance where necessary, the old familiar terms are, in a great measure, retained. Passing on through the greater part of the volume, we find "Hardwich" untouched, except where, here and there, necessary to add or modify something. Some space is given to mechanical methods of printing—much, if not all, of which is new—and also to collodion emulsion. Gelatine emulsion has, it may be said, been completely created since the last edition appeared; hence this deparment is quite new, and, if brief, is thoroughly practical. Chapters on platinotype printing, micro-photography, optics, the stereoscope, and on chromotype and Lambertype (the latest phases of carbon printing), all brought up to date, complete a volume which we recommend our readers to peruse with a view of making themselves acquainted with its numerous good features.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 1	London and Provincial	Mason's Hall, Basinghall-st.
„ 1	South London	Society of Arts, John-st., Adelphi.
„ 1	Bolton	The Baths.
„ 1	Leeds	Mechanics' Institute.
„ 1	Glasgow	172, Buchanan-street.
„ 1	Dundee	Lamb's Hotel, Reform-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The monthly technical meeting was held on Monday last, the 22nd (instead of Tuesday, the day announced on the time-card issued by the Society),—Mr. John Spiller in the chair.

Mr. G. L. Addenbrooke opened a discussion as to the extent to which the proportion of pyrogallic acid might be varied in developing, and showed a series of plates in which this proportion had ranged from one to sixteen, the difference in the resulting negatives being less than might have been expected, exposures being made under a Warnerke sensitometer. In every case. however, there was a failure as regards the representation of minute differences of shading in the high lights.

Captain Abney attributed this to reversed action, it being quite possible for reversal to take place on the surface of the film simultaneously with direct action farther in. He (Captain Abney) evidently considers that much of the flatness complained of is in reality due to this kind of partially-balanced reversed action.

The need of a thick and photograghically-dense film was insisted on by Mr. L. Warnerke and Mr. A. L. Henderson, the latter gentleman pointing out that the best way to avoid flatness from over-development was to watch for the first appearance of the high lights at the back of the film, and then to fix the negative.

Mr. Henderson said he found, when a plate was developed by a series of fresh batches of oxalate developer, that reversed action was altogether prevented, or reduced to a minimum, his theory being that the reversal was in reality due to the action of the partially-exhausted developer.

An interesting discussion arose regarding this point, and several of those present promised to try Mr. Henderson's method of developing.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on the 18th instant, the chair was occupied by Mr. E. J. Golding.

A question from the box—"What causes grey fog?"—was read, but nothing very definite resulted from the short discussion which ensued.

Mr. A. Cowan showed a box for storing gelatine plates, the internal arrangements of which were similar to those before exhibited, but the lid was made so as to be thrown up by a spring, when the catches were released. These catches were similar to those used on travelling bags, and as the two had to be pressed simultaneously one with each hand to allow the box to be opened, there was very little danger of the box being unclosed by carelessness or idle curiosity. The shutting of the lid sufficed to lock the catches. Mr. Cowan also referred to some transparencies made upon chloride plates, which he said he had found to be about one-tenth as sensitive as bromide ones.

The Chairman asked whether anyone had observed any difference between the action of bromides of ammonium and potassium in the developer.

Mr. W. Coles replied that when using bromide of potassium he employed about one-fifth more than of ammonium. Results had been published some months since by an experimentalist, who found that when used in the proportion of their combining weights the results were similar.

Mr. Cowan said he had found that, although the equivalent of potassium bromide was higher than that of the ammonium salt, and that, therefore, it might be supposed more of it would be required, he yet obtained clearer pictures when using bromide of potassium than with an equal weight of ammonium bromide.

The Chairman remarked that his experience was similar to that of Mr. Cowan.

Mr. A. J. Brown said that potash had been recommended to be used instead of ammonia to develope with on the ground of its not bringing up green fog. He found, however, that with plates of a green-fog character potash produced a yellow fog worse than the green one.

Mr. A. L. Henderson inquired whether anyone had tried the addition of bromide of potassium to emulsion before coating.

Mr. J. Barker said that his previously-communicated experiments had shown that the presence of either soluble bromide, chloride, or iodide in emulsion would cause the image to disappear if development were deferred. Phosphate of soda had a similar effect to that of the haloids. He did not find that the emulsion was actually slowed by them.

Mr. W. M. Ashman doubted if the image ever entirely disappeared from this cause.

Mr. A. Mackie inquired whether, if exposed plates were treated with bromide of potassium and dried, the original image would be so completely obliterated that they might be used on a fresh subject.

Mr. A. J. Brown replied that it would, and he had used plates so resuscitated. He also found that the addition of bromide to fogged emulsion cleared it.

Mr. Henderson said that his experience was that the addition of bromide of potassium to a washed emulsion did slightly slow it, but did not cause the image to disappear, or even become weaker in any reasonable time if kept dry. He would prepare some plates with emulsion containing a quarter of a grain of the bromide to the ounce. These plates he would deposit with the Curator of the Association, who should expose them equally. One should be developed now and another in a year's time, and he believed that there would be no difference in the result.

With reference to a solution which Mr. Henderson had recently introduced for the preparation of emulsion, and which he called "leucine,"

The Secretary read from *Thudichum's Chemical Physiology* the method—a very lengthy, troublesome, and expensive process—of preparing that substance.

Mr. W. E. Debenham suggested that, in order to see how far the efficiency of Mr. Henderson's solution was due to any leucine it might contain, three emulsions should be made up—one with real leucine, one with metagelatine, and the third with a solution made as directed by Mr. Henderson, and the results compared to see whether the first or the second more resembled the third emulsion.

Mr. Mackie inquired what advantage Mr. Henderson's solution had over one of gum.

Mr. Henderson answered that the gum was never completely washed out of set emulsion, and, therefore, green fog resulted. This was not the case with leucine, which washed out better.

Mr. Ashman said that in his hands the use of gum for emulsifying had caused spots in the negative.

Mr. Coles had read that Mr. Mawdsley's experience was against gum.

Mr. Barker said that if gum arabic were used it should be first powdered and washed with alcohol to remove a certain amount of gum resin which might cause spots,

Mr. Coles said that gum arabic did not contain resin.

On the subject of fraudulent imitation of glycerine and the question as to whether it had found its way into the English market,

Mr. J. J. Smith said that he had seen crystals—apparently those of sulphate of magnesia—at the bottom of a glycerine cask.

Mr. Henderson inquired whether anyone had had any experience with Mr. McKean's developer, in which bicarbonate of soda was substituted for soluble bromide. Not having soda at hand he had used bicarbonate of potash and found that the negative, although sufficiently exposed for development with bromide in the usual way, came up under-exposed and with full density.

Mr. Coles had tried Mr. McKean's developer, but could not obtain much density, even with three or four grains of pyro. to the ounce, using for that quantity twenty minims of Mr. McKean's mixture. He had tried it on a plate which gave red fog with the ordinary developer and yellow fog with caustic potash, hoping to get clear shadows with the new developer, but found a yellow stain where the bare glass should have been. He found the time of development much prolonged.

Mr. Cowan found the result with Mr. McKean's mixture to be like that obtained with very little ammonia and no bromide—weak, and wanting in the vigour which the plate would give when developed in the ordinary way.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held in the lecture hall of the Mechanics' Institute, on Thursday evening, the 11th inst.,—Mr. J. W. Leigh, President, in the chair.

The minutes of the previous meeting were read and confirmed. Mr. D. Shoosmith was elected a member of the Society.

Mr. Kershaw showed a very good arrangement for changing plates in the field, which consisted of a single dark slide with some light-tight material fastened on securely at the back, forming a kind of bag, with sleeve holes on each side, through which the box of plates is put; the slide is opened, downwards, the exposed plate removed, and a new one put in its place. The simplicity of the arrangement was much admired.

The remainder of the evening was devoted to a sale by auction of the property of the members; and, in response to the circular sent out by the Secretary, a great many availed themselves of the opportunity of disposing of what to themselves was only useless apparatus. Altogether, 120 lots were put up, including lenses, cameras, tripods, lanterns. and other articles too numerous to mention. Upwards of £50 in value were sold. Mr. Thomas Acton kindly gave his services as auctioneer. The experiment was pronounced a decided success.

The President, in a few appropriate remarks, proposed a vote of thanks to Mr. Acton for his kindness in coming at great personal inconvenience and so ably assisting at the sale, and to Mr. Kershaw for his contribution.

The meeting was adjourned to February 8th, when Mr. Johnson has kindly promised to read a paper on *Photomicrography.*

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

The annual dinner of this Association took place at the County Hotel, Newcastle, on Friday evening last, the 19th inst. About thirty members were present. In the absence of the President and the two Vice-Presidents Mr. J. P. Gibson (Hexham) took the chair, Mr. Mendelssohn occupying the vice-chair.

After an excellent dinner had been enjoyed, the toast list was proceeded with. Mr. Garland proposed the toast of the Newcastle-on-Tyne and Northern Counties Photographic Association in a capital speech, and Messrs. Mendelssohn and J. W. Robinson responded. The toast of the Officers and Council of the Association was proposed by Mr. A. G. Ross, and replied to by Messrs. Ed. Sawyer, P. M. Laws, and J. Pike. The name of Mr. J. W. Swan was received with enthusiasm, and his health drunk with musical honours; a like reception was accorded to that of Mr. J. B. Payne, whose absence through severe indisposition was much regretted.

The chair during the latter portion of the evening was taken by Mr. Garland, Mr. Gibson having to catch an early train. Recitations, songs, and instrumental music by Mr. Carver, Mr. Readhead, Mr. Piper, Mr. Ross, Mr. Nicholson, Mr. Bacon, and Mr. Calcott, occupied the evening; and owing, in great part, to these gentlemen, and the evident determination of all present to enjoy themselves, the dinner was a perfect success.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met on the 5th of December, 1882, the chair being taken, as usual, by Dr. Hornig. The minutes of the previous meeting having been approved, several new members were admitted.

Dr. Eder explained the principle of Warnerke's photometer, and exhibited a specimen one. He then introduced Mr. Plener, and demonstrated how that gentleman's separator should be used for the production of gelatino-bromide of silver emulsion.

The Chairman then laid the following works upon the table:—*Traité Elementaire du Microscope*, Eugène Trutat; *Handbuch der Chemigraphie*, W. Toifel; *Die Bearbeitung der Metalle auf Chemisch-Physikalischen Wege*, *Ledebur;* and Seelhorst's *Katechismus der Galvano-Plastik*—the last two of which he (the Chairman) said were patterns of what such books ought to be.

Three queries were found in the question-box, the first of which—Is a photographer bound to give up a negative to the sitter for a money consideration, if no bargain to that effect be made at the time of sitting, and, if so, who is to fix the price?—gave rise to a short discussion, but no definite conclusion was arrived at on the subject. The second inquiry was about the production of stereoscopic glass transparencies by Woodburytype. The third inquired whether there was any means of separating emulsion precipitated by alcohol, according to Mr. A. L. Henderson's method, before washing.

Captain Pizzighelli replied that he had, along with Baron Hübl, made a series of experiments with emulsion prepared according to Mr. Henderson's formula, and tested the plates by a Warnerke sensitometer, when they showed a sensitiveness of 21°. The viscousness of masses of gelatine precipitated by alcohol formed a drawback which they were endeavouring to overcome by further experiments.

The Chairman then read another question which had reached him by post, from a correspondent in South Germany. It ran:—1. I have for some time back been employing Dr. Lagrange's method of restoring exhausted developers by means of oxalic acid, bichromate of potassium, and pulverised iron; but I find the restored developer works harder than that freshly added (Dr. Eder's formula), and I would like to know whether that is the general experience, or whether it be probable that my chemicals—impure oxalic acid, for example—are to blame?—2. Then my developer is stored in what is called a Woulff's bottle, and is covered by a film one c.m. thick of vaseline oil. Some of this oil gets mixed with the oil, and causes spots on the developed negative. How can I remove the oil from the developer? Can anything be put into the filter to do so?

The Chairman remarked, with regard to the first branch of the inquiry, and Professor Eder confirmed his remark, that the hardness complained of was ascribable to the always increasing accumulation of bromide of potassium induced by repeated restoration. With regard to the second branch of the inquiry, he (the Chairman) advised the preparation of a new developer, and that shaking it should be avoided.

Professor Eder recommended the repeated filtration through a previously-moistened filter, and also the dipping of the plate in water before placing it in the developer, so that the oil might be repelled by the film of water.

The meeting was shortly afterwards adjourned.

Correspondence.

THE PHOTOGRAPHIC SOCIETY'S STANDARDS.

To the Editors.

Gentlemen,—Seeing Mr. Page's inquiries in your last issue, I have looked into the table of U. S. numbers, page 251 of the Almanac, and find that they correspond with my formula, $x = \frac{f^2}{16\,a^2}$, a few only being fractionally different. The last figure on line 17, however, is evidently a clerical error.

I notice that the diagragm is smaller than it should be, owing to shrinkage, and this has probably misled Mr. Page.

I assumed the diameter of No. 1 to be $\frac{1}{8}$ inch, each number increasing by $\frac{1}{16}$ inch up to No. 9, and by $\frac{1}{8}$ inch beyond that number.—I am, yours, &c., J. A. C. Branfill.

Chadwick-road, Peckham Rye, January 22, 1883.

PHOTOGRAPHS OF THE COMET.

To the Editors.

Gentlemen,—In your Journal of October 13th, 1882, lately received, I see you mention that no photographic record of the comet has been obtained, and I have not seen any notice of its having been accomplished since. It has been a very brilliant and interesting object here, which is, of course, in a much more favourable position for observation than the northern hemisphere, and I have secured fairly successful photographs.

Having obtained the co-operation of Dr. Gill (the Astronomer-Royal) we attached the camera, with portrait lens of about eleven inches equivalent focus, to the arm of a large equatorial, and gave exposures varying from thirty minutes to two hours, obtaining negatives which, in the longer exposures, show details that are almost absolutely invisible to the eye, and also the stars as low as the ninth magnitude. You will receive by same post some copies of these.

The negatives are taken on gelatino-bromide plates prepared by myself; and, indeed, I have used but few commercial plates since I have been out here, except for experiment or comparison.

I also enclose a couple of views, and should be glad of your opinion as to their merits or otherwise.—I am, yours, &c., Edward H. Allis.

Rose Bank, Cape Town, December 19, 1882.

THE BICARBONATE DEVELOPER.

To the Editors.

Gentlemen,—In the report of the proceedings of the Edinburgh Photographic Society, in the Journal of the 19th inst., I find a remark of Mr. J. M'Kean's, which must have escaped me at the meeting, or I would have replied to it, and, in justice to myself, have prevented such an erroneous idea getting into print as to my method of making comparative experiments.

The remark to which I allude is this:—"Had he (Mr. Tamkin) used a three-grain solution of pyro., as advised, I believe his opinion of the bicarbonate developer would have been more favourable." The negatives I showed as the result of my experiments were placed in card-board mounts, and I called attention to notes on the margin where it was distinctly stated that a three-grain solution of pyro. was used with the bicarbonate and the ammonia developers, and a two-grain solution with Wratten's.

Knowing so well before on how little the success or failure of a process sometimes depends, it is vexing to find myself represented as having attempted to give Mr. M'Kean's developer a fair trial without following his instructions.

I should feel obliged if you could find space to insert this explanation in your next issue.—I am, yours, &c., S. Tamkin.

Edinburgh, January 20, 1883.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

To the Editors.

Gentlemen,—An error has crept into your report of the meeting of the London and Provincial Photographic Association in the Journal of January 19th, and which I think it necessary to correct.

I am represented as having shown a photograph of a bust taken at one of Professor Tyndall's recent lectures. The photograph in question was not taken as stated, but was taken at the carbon works of Mr. Applegarth, Lambeth, and the electricity was generated by a new dynamo introduced by that firm, in anticipation of being requested by the Professor to do something of the kind at the Royal Institution. Professor Tyndall did me the honour of alluding to and exhibiting at his first juvenile lecture the "pinhole" portrait taken in the studio by —Yours, &c., A. L. Henderson.

49, *King William-street, January* 21, 1883.

AN AMATEUR ON PROFESSIONALS.

To the Editors.

Gentlemen,—As you have very generously permitted an opinion to appear in your Journal from the pen of a professional which is liable to a little criticism, may I ask you to give equal publicity to the opinion of an amateur, which, I hope, may be thoroughly understood?

I have frequently (while taking a short holiday) had opportunities of visiting the studios of professional photographers. On more than one occasion I have asked to be enlightened on some difficulty which puzzled me in my work as an amateur, and I must say I have *always* received the greatest possible courtesy and attention. Not a shade of jealousy have I ever experienced.

I think it only right to state this, as I have during the past week, in this fashionable town, had a special corroboration of this most pleasing fact, in the marked courtesy and consideration received at the hands of the eminent artist of this neighbourhood, Mr. Norman May.—I am, yours, &c. H. Victor Macdona.

Malvern, January 23, 1883.

EXCHANGE COLUMN.

Wanted, in exchange, magnesium enlarging apparatus. Good value given (see advertisements).—Address, B. Wyles and Co., Southport.

I will exchange a posing-chair, two backs, in fair condition, and 12 × 10 air-tight bath, in case, for anything useful in photography.—Address, E. Targett, 45, Catherine-street, Salisbury.

I will give in exchange a 10 × 8 portrait lens for a good studio table.—Address, George Read, photographer, Market-place, Preston.

In exchange, for anything useful in photography, one set new burnishers, seven-inch roller, in excellent order.—Address, Alex. Walker, photographer, Larbert.

Wanted, double dark slides for Lancaster's *Le Meritoire*, 4¼ × 3¼, in exchange for changing-box, 7¼ × 3¼.—Address, A. Chambers, Gordon-road, West Hill, Hastings.

Wanted to exchange a Ross's No. 5 portable symmetrical for a whole-plate rapid by same maker; the difference in price can be adjusted.—Address, C. Birch, 32, Newton-road, Bayswater.

I will exchange a rolling-press, 10 × 3⅞, also *Retouching*, by Burrows and Colton, and 10 × 12 glass bath, for lantern sllides or interior background.—Address, G. Mackie, 26, Crouch-street, Colchester.

I will exchange beautiful oil-painting, *Hawthorn*, by E. Cox, value £5, for a 8½ × 6½ P. A. C. S. A.'s true view lens, or similar lens by good maker — Address, R. K. Peacock, 150, Accrington-road, Burnley.

We will exchange an outdoor background, and another indoor and outdoor background, by Seavey, for solid accessories; photographs exchanged.—Address, Price and Galvin, photographers, 39, Babington-road, Derby.

I will exchange *Dictionary of Photographic Terms* for *Photographic Colouring*, by Wake, or will exchange *Robinson's Pictorial Effects*, or other scientific books, for a good book on transfer colouring.—Address, H. Gover, St. Luke-street, Hanley.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered—

Harry Wheeler, Vandyck Studio, Weymouth. —*Photograph of the "Skipper's Darling."*

Photographic Patents.—Owing to extreme pressure on our space we are compelled to leave an article in type over till next issue.

Hammerstein.—Any artists' colourman will supply the works you require. If he has not got them in stock he will procure them for you, supposing all to be in print at the present time.

Q. R. Y.—There is no work published specially devoted to the subject of enlarging. You will find full information in our back volumes, as well as in the Almanacs of previous years.

W. U.—It is not possible to mount two prints from the same negative so that they shall show in relief in the stereoscope. The stereoscopic effect is dependent upon the two pictures being taken from slightly different points of sight.

Steamtown.—We cannot answer your query as to how "the maker expends the extra sum to the advantage of the plates." Why not write direct to him for the desired information. The markings appear to be due to the plates being packed with paper between them.

Canvas.—You do not say by what process you wish to make the enlargements; hence it is impossible for us to tell you how the canvas or opal should be prepared to receive the picture. Different processes require the canvas and opal to be differently prepared.

Litho. Printer.—The cause of the film pulling up with the inking roller is that the substratum is not sufficiently hard. Probably it was not exposed long enough to the light before the second coating was applied. The gelatine you name is too soft a variety. Try a harder kind, such as Nelson's X opaque.

G. Humphreys.—You have not been misinformed. One equivalent of bromide of cadmium requires *two* equivalents of silver nitrate to convert all its bromine into silver bromide. In the same manner one equivalent of bichromate of potash will convert *four* equivalents of silver nitrate into chromate, liberating at the same time two equivalents of nitric acid.

Amateur (Seaforth, Ontario).—1. There is no work published on the subject, but we expect to have a series of articles on it shortly.—2. Dry plates giving very transparent shadows will answer the purpose; but gelatino-chloride plates will be better.—3. Three and a-quarter inches square is the standard size in England, and all lanterns are fitted to take slides of these dimensions.

J. E.—The spots on the prints appear to be very like those caused by the bronze powder used for the lettering of some mounts; but as your mounts are not printed in this material we can hardly surmise that this is the cause, unless, indeed, as is very probable, they may have been printed or dried in a room where others were so lettered, and so the particles flying about have contaminated your cards.

J. H. wishes to direct attention to the efficacy of glycerine for loosening stoppers in bottles when they become fixed. He says :—"A few drops allowed to remain in the neck of the bottle for a few hours will invariably remove it." This is an old "dodge," and in many cases answers well, but not in all. It is well worthy of a trial, when a stopper gets fixed, before resorting to more violent methods.

R. Brown.—It is very clear that you have not recovered as much silver from your washing waters as you should have done. As a rough guide to the quantity of salt to be added in practice we may state that one-third of the quantity of salt should be used as there is estimated to be nitrate of silver present in the washing water. The silver will subside more rapidly if the water be made slightly acid with hydrochloric acid.

R. H. Furman (Rochester, N. Y.).—We have had no further experience with the apparatus than that we published. English dry-plate makers do not *all* publish their methods of working, so that we cannot reply to your query. The inventor is at present on the continent, but if you send a letter here we will see that it is forwarded to him on his return. Also one addressed to the other gentleman named would be forwarded to him. We cannot give private addresses in this column.

J. A. Rivington.—See a communication from Mr. J. A. C. Branfill in the current number. The diagram shows the circles rather smaller than they should be, owing to a shrinkage of the paper in printing, &c.

Received.—W. J. Stillman; Herbert S. Starnes. Thanks. In our next.

South London Photographic Society.—At the next meeting of the above Society, to be held at the House of the Society of Arts, on Thursday next, the 1st February, Mr. W. Brooks will read a paper entitled *The South London Photographic Society's Popular Lantern Meeting, and its Lessons.*

Photographic Club.—Next Wednesday evening, the 31st inst., at the club rooms, Ashley's Hotel, Henrietta-street, W.C., being the last Wednesday in the month, will be a lantern night. Members are requested to bring slides. Visitors are invited to attend, and the Committee will have pleasure in exhibiting any slides they may bring. It has been decided to have a "lantern" night the last Wednesday in each month, to which visitors are invited to contribute.—E. Dunmore, *Hon. Secretary.*

A Memorial Photograph.—Messrs. W. Cobb and Son, of Woolwich, send us a photograph of the ceremony of unveiling the statue to the late Prince Imperial by the Prince of Wales on the 13th inst. The picture —which was, of course, taken "instantaneously"—represents his Royal Highness in the act of pulling the cord which is to uncover the statue, the latter being still wrapped in the white sheet which has hitherto hid it from public gaze. Despite the dulness of the light at the time the picture is well exposed, and the details and faces of the crowd are plainly distinguishable. The picture is tastefully vignetted, and, together with a few lines of dedicatory verse—the composition of Mr. W. Cobb—is mounted on a large "imperial" board, and forms a striking memento of the event. His Royal Highness the Prince of Wales and the ex-Empress Eugenie have graciously accepted copies of the print.

A Transatlantic New Year's Gathering.—From the *Tavares Herald* we learn that our old friend, Mr. J. Traill Taylor, has been paying a visit of a few weeks to the orange estate which he purchased some time since in Florida, on the banks of Lake Harris, and on which are "located" his sons, Mr. John Hay Taylor and Mr. Alfred Taylor. The former has recently taken to himself an English bride, and we wish them all happiness in their *united state.* In honour of the visit of Mr. Taylor *père* the notabilities of the neighbourhood were invited to meet the latter on the evening of New Year's Day. The evening was devoted to a variety of amusements, in which music and a "stereopticon lantern entertainment" were the principal features; and after supper a little "speechifying" was permitted, or, perhaps, was unavoidable. In responding to the toast of his own health, Mr. Traill Taylor, after alluding to several purely local topics, said that "if people in England and Scotland could be made to know the low prices at which homes might be obtained in this southern state it would prove a boon to them."

Liverpool Amateur Photographic Association.—We have to acknowledge the receipt of the annual report of this Society, and we believe we are not wrong in stating that long though the Society has been in existence this is the first printed report it has issued. Whatever the cause it need not be ascribed to lack of substantial matter to bring before its members; for the Society is a "live" one, and the account of what it has done in the past twelve months shows good, useful work, and proves that some, at least, of its members take an earnest interest in the art, and in the wellbeing of the Society. An interesting page is made by the account of the annual competitions for 1881 and 1882—a feature which must add to the attractions of any society. We take note that a great accession of members occurred last year—a fact significant of the increased hold that photography has again taken of the popular fancy, and fitting to be shown in the city where emulsion processes had their birth. The last, but by no means the least, important feature to be noticed is the fact that the cash balance is decidedly on the right side, and to an amount equal almost to one year's expenditure.

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THE BRITISH

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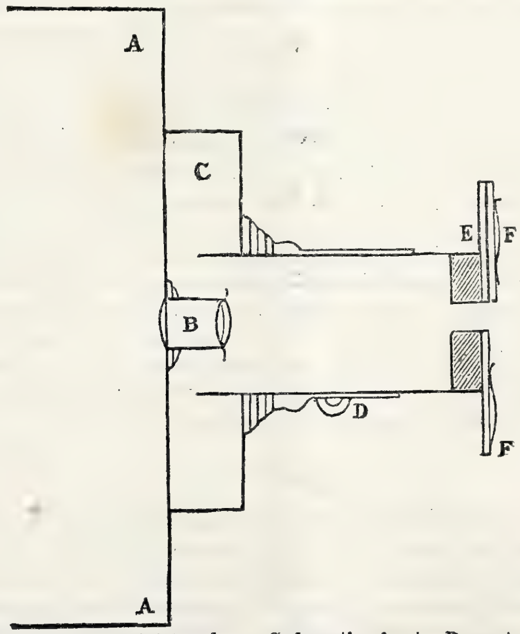
PHOTOMICROGRAPHY WITHOUT A MICROSCOPE OR MICROSCOPIC OBJECTIVE.

In our last issue we published a very able paper on *Photomicrography*, read before a recent meeting of the Quekett Microscopical Club, by Mr. T. Charters White, in which that gentleman described his method of working so that he dispenses entirely with the microscope itself, and uses only the object-glass and a few simple fittings. The camera is also dispensed with, and an arrangement substituted in its place very similar to that described by us in our last volume.

Knowing the great interest now taken in this branch of photography by amateurs generally, we propose to go a step further than Mr. White, and show how photographs of microscopic objects may be produced by those who are not the happy possessors either of a microscope or a microscopic objective, provided they have a good photographic lens of short focus. We have recently been trying a series of experiments in order to see how far the different forms of lenses employed in photography can be made available for the purpose, and we shall here give our readers the benefit of our experience in this direction.

In the first place we took a small Ross's "postage stamp lens" we possess, and fitted it on to the front of a copying camera capable of extending to twenty-eight or thirty inches. This lens we may, in passing, explain is nothing more or less than a portrait combination in miniature. It is something under three-quarters of an inch in diameter, and about one and three-quarters of an inch equivalent focus. To use it for our present purpose we, of course, required something to support the object to be photographed, at the same time permitting its being adjusted in any position, and also capable of being used as a rough means of focussing or regulating the size of the image; in fact, to take the place of the stage of a microscope had one been employed. This is how it was accomplished. On the front of the camera we fitted a shallow box after the manner of an "elongating cone," and on this was screwed the mount of a quarter-plate portrait combination from which the glasses had been removed. In the place occupied by the front lens was fitted a plug of wood, on which was glued a flat piece of mahogany three inches by four, and a-quarter of an inch or so thick. A hole, an inch in diameter, was then made with a centre bit through the two pieces of wood corresponding with the axis of the small lens. A couple of flat brass springs screwed on to the mahogany served to hold the microscopic slide in position. This completed the arrangement. By this simple contrivance, which any one can make for himself, we had the rack and pinion of the portrait lens to focus with, which gave us a range of about one and a-quarter inch—quite sufficient for all purposes with the lens we were using. The annexed diagram, showing the arrangement in section, will make it better understood.

The light was condensed upon the object by an ordinary bull's-eye condenser, the source being a single wick paraffine lamp. It may here be explained that in all cases where a photographic lens is employed, unless it be symmetrical in its construction, the posterior glass should be arranged next the object to be photographed. The class of objects we experimented with were familiar ones, such as the sting of a wasp, the tongue and the eye of a fly, tongue of drone fly, &c., and we found the definition given by this lens was as fine and crisp as anything that could be desired—quite equal in the centre to that given by a very good inch objective in our possession, while at the margin of the image it was far more perfect. This was scarcely to be wondered at when we consider that it was longer in focus, and that a photographic lens is corrected to give an image on a flat surface, and not on another lens. With regard to the size of the image obtained, we may as well mention here that with the camera we employed, when fully extended, the tongue of the blow-fly measured about two inches and a-quarter to two and a-half inches—a very suitable size for the magic lantern.



A A camera front. B miniature lens. C elongating front. D quarter-plate lens mount. E stage. F F springs to hold the object slide in position.

We next proceeded to test some other lenses for the purpose, having modified our fittings to suit them. One of a pair of single lenses of French make, three and a-quarter inches focus, which, when employed as a wide-angle landscape lens for stereoscopic pictures gave capital definition, was next tried; but it proved useless for our present purpose, as it would not produce a crisp and well-defined image, although stopped down equal to $\frac{f}{15}$. At this we were somewhat disappointed, considering the exceedingly sharp pictures we had taken with it.

The next lens we experimented with was a small portrait combination, about three and a-quarter inches equivalent focus, and an inch in diameter—a "locket lens" of French manufacture. This, when stopped down to half-an-inch, gave very fair definition indeed; but by no means so crisp as that by the Ross's lens with its full aperture.

We next took a double combination stereo. lens of English manufacture, of large aperture and about four and a-quarter inches equivalent focus, such as are made for "instantaneous" work. This

gave admirable definition on all portions of the image; but, owing to its length of focus, it was not suitable for such small objects as we had tested the other lenses upon, as the image was too diminutive unless the camera be inconveniently long. But for objects of larger size, however, it answered perfectly.

We had now exhausted our stock of short-focus lenses, but there is one other we should have liked to have tried for the benefit of our readers if we had had one, namely, the smallest size "portable symmetrical," which is about three inches equivalent focus; as we know these lenses are capable of yielding exceedingly-fine definition, they would doubtless be found very suitable for photomicrography.

In our experiments we employed a camera, as in this instance it was more convenient to do so; but it is manifest that by fitting the apparatus shown in the diagram inside a box, as in Mr. White's arrangement, it may be dispensed with—indeed, in actual practice, we ourselves never use one. Although, as our experiments prove, many photographic lenses of short focus may with advantage be employed for the delineation of microscopic objects, it must not be taken for granted that all can simply because they are of short focus; for it is clear that, unless they are capable of yielding the very finest possible definition, they are worthless for the purpose.

The lenses of our best English opticians, as a rule, fulfil this condition; hence they can generally be relied upon. The so-called "gem lenses" would be very suitable indeed, so far as focal length is concerned, although we have not tried them for the purpose; we imagine, however, from the price at which they are sold, they cannot be very perfectly-corrected instruments.

It must not be assumed that photographic lenses can ever be made to take the place of object-glasses of high powers for the delineation of very minute objects, as their defining power will not be sufficient; and, even if it were, the distance at which the prepared plate must be from the object would be so great as to render it impracticable. But, for the more popular familiar objects, such as *acari*, parasites, tissues, &c., or for such objects as low powers of an inch or lower, they, if good, will answer quite well, and possess some advantages over the microscopic objective. They have no chemical focus, which most object-glasses of low power have. They can easily be stopped down, so as to obtain depth of definition when the object is not a flat one, as in the case of photographing some of the larger objects. Indeed, for practical purposes a well-corrected photographic lens of short focus will be found more convenient to use, and will often give a better result photographically than many microscopic objectives of low power.

INSTANTANEOUS PHOTOGRAPHY.

The relations between the photographer and the public in some directions are beginning to assume a peculiar aspect, none the less so that many members of the public themselves either photograph or have brothers or sisters who do. The consequence is that some are disagreeably "knowing," or, through general ignorance, combined with that "little knowledge which is a dangerous thing," assume impossibilities, and are startled to be informed that those things they looked upon as of everyday occurrence are incapable of accomplishment.

We have all heard of the countryman who brought a lock of his wife's hair and wanted her "fottygrarf" done from it. Educated people, quite ignorant of the art, would laugh at the story, little thinking that they at times ask for work just as impossible. It is really amazing what extraordinary feats are considered (and by those who might be supposed to know better) possible to the photographer. We were recently assured by a professional photographer that one of his clients who had taken a daguerreotype from its case and polished it entirely out of existence, brought it to be "restored!" Numberless other cases equally absurd could be instanced.

But we are concerned now—not with a general but a particular phase of the relations of the photographer with his client. We would ask—Where is the professional photographer who is not familiar with the formula, "I wish to be taken by the instantaneous process," and who, if he attempt to explain what he can do, has not been blandly informed that Mr. So-and-So always takes his sitters by that process. The sitting thus begins with one of those difficulties on either side which usually ends in dissatisfaction.

Now, we need not at the present time recapitulate to our readers what has been done in the direction of rapid work; but there is no question that the term "instantaneous photograph" has been in use among photographers for more than one decade, long before quick gelatine plates had been invented. Further: the term has been objected to more than once on account of its misleading character; yet it still prevails among photographers, and now, with no knowledge of its actual meaning, it has got abroad among the public, who place upon it their own meaning.

For the most rapid work—such as Mr. Muybridge has accomplished with wet plates—there may be some disappointment in store when gelatine plates are tried, the conditions being most favourable for bringing out the highest qualities of the former and for disguising them in the latter. Still a far greater amount of rapidity than is there shown is, doubtless, possible.

Yet what does this and all the other really wonderful and beautiful work amount to? A photographer can tell readily enough that it means, under conditions chosen by the photographer (which always include that one of sufficient light), that certain subjects can be photographed in a very short space of time. It is almost a lifetime since a photograph was taken by the light from the discharge of a Leyden jar, and nothing more closely approaching instantaneity has, with all the aid of modern appliances, been yet done.

The term "instantaneous photograph" is almost stereotyped in the language; but it is incumbent upon every photographer to do all in his power to explain to his sitters what can and what cannot be done by legitimate photography. "Instantaneous" processes and apparatus are advertised far and near over the whole country; and, after all, it is small wonder the public are led astray, for it is as much by the photographers themselves as by their own imagination. Something, however, should be done, or annoyances will increase.

A most crass case occurred quite recently, which shows the full justice of our strictures. Our readers are aware that all prisoners of a certain category have to be photographed while in custody, the collection of their interesting faces being as useful as remarkable. According to a paragraph in another page of the current number, it was reported to the learned Recorder of Liverpool that a certain prisoner declined to be photographed. "Why cannot he be taken by the instantaneous process?" said the Recorder, with a satirical remark on the "liberal" Treasury. And a leading local paper had a long article on the subject, in the course of which it pointed out how it was sure the authorities had nothing to do but go to a well-known establishment and be supplied with the "instantaneous apparatus" for a few pounds.

Now, if one of our high legal functionaries and the editor of an established paper could hold such erroneous views of the power of photography, we are less inclined than ever to blame the general public for holding similar opinions. Yet, as we say, something must be done to prevent the "instantaneous process" from becoming a perfect bugbear.

Some photographers can cleverly shirk the matter, either colloquially or otherwise. We know of one gentleman who, by the aid of a Cadett shutter deftly used, feels quite at home in giving exposures of two, three, or even more seconds, while his sitters are quite unconscious of the fact that they are being taken at all, and greatly does their account of the operation redound to his credit; they are quite sure the instantaneous process was used.

Finally: we would say the question resolves itself into two positions—either the public must be educated into a true knowledge of the actual present capabilities of photography, or every means must be taken so to shorten the exposure as to make it less unlike the mental image which has such hold on their belief. To this end, though for many special cases there need not be anything to hinder the usual precautions to be taken to ensure the highest class of work—subdued light and the use of a stop and soforth—it will be needful to reject all slowing operations except those most essential to good work. Thus frequently a diaphragm is made use of, when not only would a picture not suffer by its disuse but would be positively improved; or,

again, a light is screened which, by counterbalancing with suitable reflections, might be retained with infinite advantage to the rapidity of exposure.

If on days with insufficient light—and they need not be frequent—instantaneous work were declined, an average exposure of from one to two seconds might almost uniformly be given without a head-rest being used, and, the sitting being made as little irksome as possible, might yet not inaptly be termed "instantaneous photography."

A modification of the well-known Liebig's condenser was described at the last meeting of the Chemical Society, and possesses sufficient points of interest to be noted in our columns, one advantage being that it occupies slightly less space than the usual form when set in action. The ordinary pointed delivery end of the condenser is plugged up, as it were, by pressing into it a small piece of tube, projecting inside and bending up a little, thus forming a sort of gutter in which the distillate forms before it can begin to drop into the receiver. This gutter, by means of a second piece of tube fitted with a stopper and let into it, allows any portion of condensed products to be kept from entering into the receiver till required, simply by taking out the stopper and allowing the condensed matter to run into a flask or other vessel.

We recently called attention to the imperfect closing qualities, as regards very volatile liquids, shown by the most perfectly-fitted glass stoppers. A capital method of closing bottles in lieu of employing a lost stopper, or, indeed, as an improved substitute for one, has lately been recommended. It consists simply in slipping over the mouth of the bottle one of the india-rubber finger-stalls so often recommended for photographic use to save the fingers from stains, but so very tiresome to take off and put on. For closing bottles and protecting their volatile contents from escape, however, they would answer admirably, so long as the contained liquid or its vapour was not capable of acting upon the caoutchouc.

Another instrument likely to be useful to photographers using gas apparatus is also described—a small instrument for measuring the pressure of gas. It is, in brief, a narrow U tube, widened out very considerably at each end, and filled with two liquids which will not mix, and are of nearly similar specific gravity, the point of junction of the liquids being arranged to be as near as possible at the middle of the U. When a small pressure is applied to either end it will naturally cause the liquid in the other end to rise to a certain height, which will, of course, always be the same, whatever the shape of the tube. But with two wide tubes connected by a narrow one the liquid in the narrow tube must move to a considerable extent, when but a slight rise takes place in the wide one (in the proportion, in fact, of the cross-sections of the two). In the instrument we describe this motion is rendered apparent by the shifting of the line of demarcation of the two liquids which thus forms an indicator of pressure.

The use of acetate of soda for filling foot warmers is continuously increasing, and in *La Nature* for January 13th M. Ancelin has a paper on his system. The method has been recommended for supplying a gentle heat to plate-drying closets and other apparatus where the ordinary temperature of the atmosphere is insufficient.

The great comet has now passed out of mortal ken, except when aided by the most powerful of telescopes; but on January 23rd the presence in the heavens of another was telegraphed from Mexico, as having been discovered at the Puebla Observatory.

Photographers and artists of the brush or chisel have many links to draw them together. Poor Rejlander was a painter of skill, as all know, and the success which by universal acclamation was given to M. Adam-Salomon's pictures was doubtless in some measure owing to his knowledge as a sculptor. The popular illustrators of Christmas and other books find a wealth of example in photographic studies of children. We do not know if Miss Kate Greenaway derives any help from such sources; but her brother, who is a skilful chemist, has the management of a large department for producing photographs by mechanical means, which is being installed at one of the great printing establishments of the day. Very shortly a number of electric lights will be in use there in connection with the special work.

The late Gustave Doré—who, if not a great painter, was, at any-rate, the most wonderful artist and draughtsman who ever lived—was much interested in photography, and once, when asked how he managed to remember and portray such a multiplicity of incidents, laughingly replied that he had "plenty of collodion in his eye!"

Military ballooning in connection with photographic operations has not received from the War Office authorities the amount of attention that it deserves—a state of affairs that too often follows meritorious invention in this country—and we hear very little of anything being done. We have recorded some French experiments in this direction, and German military men, we may be sure, will not neglect the subject. The officers of Engineers in Berlin are experimenting, and, it would appear, have obtained satisfactory results, in the face of the various motions of the balloon; quick (less than a second) electric exposures have enabled them to do this. We need scarcely inform our readers that the same thing has been done by English experimentalists, though we do not remember any records of the fact in connection with our military engineers.

ON THE KEEPING QUALITIES OF GELATINE PLATES.

For the past twelve months I have taken a great deal of trouble to get all the information possible on this subject, by inquiring of nearly all photographers I came in contact with as to the keeping qualities of gelatine plates.

At the beginning of last spring I had a conversation with a very eminent landscape photographer, who told me that during the previous summer he purchased some plates from a well-known maker, and he liked a certain batch so well that he reserved them for special occasions. For about a month they were in splendid condition, and he scarcely had a failure of any kind with the plates; but after that time he thought he noticed a slight falling off in their rapidity, and also in the quality of the negatives produced when compared with the first ones. He thought that, perhaps, his developing chemicals might not be quite of the same quality; so he purchased some new samples, but this did not alter the matter in the least. He then tested the plates in question against a new sample from the same maker. The newer ones were well up to their work both as regards rapidity and quality of the negative, and the only conclusion he came to was that the plates had materially changed from some cause or another.

I can cite a similar case. I purchased about a gross of plates to send abroad, and I tested several before despatching them. They developed easily, and gave a splendid image. They were exposed by an amateur, a friend of mine, and I undertook to develope them for him. From the notes he furnished to me I gathered that they were fully exposed. I did manage to develope the whole of them, but not to my satisfaction. The films appeared to have hardened to a very great extent; and not only had they hardened, but I could not develope a single plate clean. All had, more or less, a marbled kind of scumlike marking on them, while the test plates I had developed previous to sending them were thoroughly free from it and the plates perfect. I have great faith in the manufacturer of the plates in question, who charges a fair price for a good article.

I purchased several other samples from makers of good standing, tested one or two plates out of each sample, and found them correct. I put them on one side, tested them again after a month, but found them not quite so rapid, with a slight falling off in quality. Some weeks after I tested them again, and still found a falling off in every way. This was conclusive to me that plates did change. I must not omit to mention that among these were some of my own preparation, with the same failing.

I have not the least doubt that I shall bring down any number of anathemas on my head from those who indulge in vague pet theories and notions of their own, but about which I care nothing.

I think that instead of theory we had better look at the hard, unyielding facts. It may be in the remembrance of many that, when collodion emulsion first came up, it was said that when once made it would keep almost for ever; but those who had much to do with that process found out the mistake. It would keep a reasonable time, and there was an end of it. Gelatine emulsion plates are not so unchangeable as many are led to believe.

I know many amateurs who are in the habit of purchasing large quantities of plates (or making them) in the early spring—sufficient to last them through the year. Now I come in contact with many of these, and at the end of the season many complain that there is a falling off in the quality of their work. They always blame the light, but never think about the plates changing. I myself can take as good a negative in October as I can in May, but not with the same batch of plates as used in May.

To show further that there is a change going on in plates by keeping:—It is a well-known fact that some batches of plates blister when first made, and if these plates are put away in a dry place for a month or two the blistering is cured. This change has been attributed to the hardening of the gelatine. I have some plates now in my possession which I have had about four years, and when new they gave splendid results; but it is now impossible to get a presentable image on them. Try what system of development I may I obtain nothing but thin, grey images, with grey fog all over. I might give many similar illustrations, but I think the above will suffice.

I have made plates carefully by all kinds of formulæ to test the keeping qualities of the same, and I have been very particular about washing the emulsion, viz.:—

An emulsion containing bromide of silver (only).
" " bromo-iodide of silver.
" " bromo-chloro-iodide of silver.
" " bromo-chloride of silver.

I have here placed them according to the order of their keeping qualities, as I found them. The plain bromide plates I have developed, and have obtained first-class results after having been made six months, but have found them more easy to develope at two months. Bromo-iodide plates come next. From these I have had good result at four months; from a bromo-chloro-iodide plate not longer than three months; and from bromo-chloride plates not over two months.

The last sample named gave by far the best results when new, having more the colour of a good wet plate than by any other formula with which I am acquainted; but unexposed plates very soon deteriorate, especially if the weather be damp, such as we have had for the past few seasons.

In the course of the past year I read a paper at a meeting of the South London Photographic Society, and showed some negatives by the latter formula, and by all to whom I had shown them they were considered perfect. When new they develope very readily, with plenty of intensity, full of gradation, and sparkling high lights; but as age creeps on they are slow in developing, lacking intensity, and finally only very thin images and grey fog are the result. My system now is only to make sufficient to last me about two months, and if I have any over I prefer to use them for copying indoors, never running the risk of employing them in outdoor work. I seldom, therefore, have a failure. WILLIAM BROOKS.

ON LATITUDE IN EXPOSURE.

[A communication to the Photographic Society of Great Britain.]

THE subject I wish to introduce is an old and well-discussed one, certainly; but as the experiences put forward have been somewhat varied, and new experiences cannot have failed in throwing new light upon the question, I think there is little need for apology in once more introducing it and initiating a discussion.

It is not an unfrequent complaint, in reference to gelatine, that we have not sufficient latitude in exposure. We sometimes hear that we are not prepared to undertake the development of an over-exposed plate; sometimes the statement is made in reference to a plate that has had (say) six seconds' exposure that it has been spoilt, because it should only have had five. And, again, apparatus more or less complicated is introduced, to enable us to expose our plates with certainty within a period of time forming but a small fraction of the total exposure. Not only have we these questions to consider in reference to the subject of "latitude in exposure," but the still more important one of—"What is the best kind of plate?" In some kinds of scientific work, such as photographing the spectrum, the question is a comparatively easy one; for you have, after getting a plate sensitive to that part of the spectrum you require, only to find the right time of exposure by trial, and then keep on exposing your plates accordingly. In studio work, while the question becomes a little more complicated, there is still a certain amount of uniformity; but in landscape photography the question becomes more complex. Quantity and quality of light, nature of subject and colour, atmospheric effect, &c.—all these and more have to be considered. Arm yourselves with photometers as you will, it is simply a matter of impossibility to correctly time the exposure—to give it (say) the theoretically-exact quantity of light to produce the desired effect with a certain strength of developer. A certain amount of chance *must* enter into the question, and a plate capable of giving a very considerable latitude becomes a *sine quâ non*, more especially since it has usually to be developed away from the scene depicted. That there is much more latitude in exposure than is generally admitted I am convinced, and it is my invariable practice, with the few views I take, to be on the safe side, and give the subject quite half as much exposure again as it really seems to require, and develope slowly, with plenty of bromide in the developer. Here is a small negative I took in Egypt of the French astronomical party. I had only intended to give it two seconds, which I am convinced from results producd on other plates would have been ample; but one of the gentlemen having made a slight movement just as I was taking off the cap, I gave it ten seconds instead. The movement thus occupied but a very minute portion of the total exposure, and restraining with bromide (I used the iron developer) gave me a satisfactory result.

I have recently carried out a few experiments to ascertain to what extent a plate may be over-exposed and yet developed clearly. As a ready method of testing the latitude in exposure allowable in a gelatine plate, I exposed a bromo-iodide plate, beneath the negative I have just passed round, by the light afforded by an ordinary match, and developed with an iron developer prepared by dissolving ferrous oxalate in potassic oxalate. I then exposed another plate under the same negative to the light emitted by two inches of magnesium ribbon, held at a distance of six inches. The developer not being restrained sufficiently the result was fogged; but on a second trial, the developer being further restrained, a successful result was obtained. The developer consisted of one ounce of developer, *plus* nearly one ounce of a twenty-grain solution of potassic bromide. Similar experiments were tried with plates containing only bromide of silver, the same developers respectively being used. The bromide plate exposed to magnesium light developed more quickly than the bromo-iodide plate under the same circumstances, and there was a tendency to veil.

On comparison the bromo-iodide plate had much the best of it, so far as latitude was concerned, but not to the extent I expected. What I wish chiefly to draw attention to, however, is firstly, the great latitude available in both cases, and, secondly, the great restraining powers of alkaline bromides. You will also notice the difference in colour. The plates exposed by magnesium light, and very strongly restrained in development, look as if they had been developed with pyro. It occurs to me as not at all improbable that the presence of bromide in the alkaline developer may partially and in a small measure account for the difference in colour between a pyro.-developed plate and one developed with ferrous oxalate.

The transparency method, however, may be objected to; for it does not necessarily follow that similar results can be obtained in the camera when the subject consists of a landscape with its varied tints and shades. In the field one would not expect the same degree of latitude that is available in transparency-making, yet I do not think it will be difficult to show that even in the field there is far more latitude than is usually supposed, and that photographers do not fully recognise the great power at their disposal in the manipulation of the developer. To carry out a perfect series of tests in this matter requires, in the first place, the indispensable kind of day best suited for landscape photography; and, secondly, a day on which there is little variation in the quantity and quality of the light in order to render the exposures properly comparable. These conditions are not easily attainable in our climate, and especially at this time of the year; and though I have for some time past been desirous of carrying out such a series of experiments, the time and the opportunity have not occurred together. Owing to the precipitancy with which I have had to introduce this subject, I have carried out a few experiments on the only opportunity I had; but, though very imperfect in their nature, they may not be without some little value. A camera provided with a Dallmeyer's $6\frac{1}{2} \times 5$ rapid rectilinear was placed at the door of my operating-rooms, and brought to bear on a most unprepossessing subject—a row of houses. The light was certainly unvariable, or, at least, but little variable; but the atmosphere was hazy. The plates used

were rapid; but not wishing to have my exposures too long, and rather under-estimating the power of the light, I worked with the full aperture of the lens. Three bromide plates were exposed in succession for one, three, and nine seconds respectively, and then developed. The first was developed in ferrous oxalate (my favourite developer) unrestrained by bromide, and came up quickly and thin through over-exposure. The second was restrained with a few drops of bromide, and gave a similar result. The third was developed with a very considerable quantity of bromide in the developer, in order to obtain, if possible, a nearer approximation to the exposure, and gave a negative almost as good as might be expected, considering the day and the subject. I do not think I should be far out in saying that it had about twenty times the exposure necessary with a normal developer.

A little later on, five plates containing iodide as well as bromide were exposed for one, three, nine, twenty-seven, and eighty-one seconds respectively. The first, developed with the unrestrained iron developer, was over-exposed, but came up better than the corresponding bromide plate, though it possessed the same sensitiveness. I endeavoured to develope the four others to exactly match, if possible, the first one, and almost succeeded; but the amount of bromide required advanced in a greater ratio than the length of exposure. It only took, however, the same amount of bromide to restrain a bromo-iodide plate which had had twenty-seven seconds' exposure that was required for a pure bromide plate with nine seconds' exposure. A chloro-bromo-iodide plate was exposed for two seconds and another for two minutes, and the results on development showed that it is quite within the bounds of possibility to develope successfully two plates having such very different exposures. All these results, however, were very poor, but they showed what might be done on a suitable day; and at the earliest opportunity I purpose carrying out a more complete series of tests, and bringing them up at some future technical meeting. Of course a similar series of tests should be made with the alkaline developer. The alkaline developer is said by its advocates to be superior to the iron developer, so far as latitude is concerned. This may be true so far as under-exposure is concerned, but judging from the foregoing experiments I feel inclined to doubt it in reference to over-exposure. C. Ray Woods.

ON THE OXYMAGNESIUM LIGHT.

At the last meeting of the Liverpool Amateur Photographic Association I exhibited the oxymagnesium light. Its power and efficacy were immediately acknowledged by the members present. I showed that it could be generated by very simple means, and exhibited photographs taken therewith. The cleanliness, portability, and economy of this method of producing a light rivalling in brilliancy the electric light leaves nothing to be desired, and it is surprising that it has not been earlier brought forward.

A two-pint white glass stoppered bottle luted with paraffine suffices to carry anywhere sufficient oxygen wherewith to support the ignition of magnesium ribbon to such an extent as will allow four or five or more exposures to be made. The light yielded is so brilliant as to be dangerous to vision, unless the eyes of the operator are shielded with spectacles of dark green or red glass. Ten or twelve inches of the ribbon burned in oxygen gas affords an abundance of light for taking a photograph, and this quantity of ribbon may be ignited several times in a bottle of the size referred to without obvious diminution in brilliancy. This will be easily understood when we consider that two pints of oxygen are sufficient to oxidise about twelve feet of magnesium ribbon at three grains to the foot.

It might have been anticipated that so small a bottle would have been broken by the heat evolved during combustion, or that the bulk of the gas would be driven out by the expansion caused by the heat; but that this is not the case the success of the experiment proves. A piece of white paper gummed on one side of the bottle acts as a reflector, and the fumes of oxide of magnesium speedily generated serve to diffuse the light; but it may be found desirable to soften the intensity of the light by a translucent screen. A skewer passed through a piece of copper foil two inches square, secured by a cork, is a convenient means to introduce the magnesium ribbon after it has been coiled into a spiral, protects the hand, and prevents unnecessary escape of gas. I think this light will be found very useful by amateurs for evening portraiture on a small scale, and still more as a simple and portable arrangement for illuminating dark interiors.

The preparation of the oxygen is easy in the extreme. A shelf supported on a couple of bricks in the sink of the dark room, filled with water, forms a pneumatic trough. Unfortunately, the globular Florence oil flasks of our boyhood have gone out of use, but the flat-bottomed flask now employed will suffice to generate the gas if the flask be laid on its side, and if the heat be kept away from the bottom until the last portion of chlorate of potash (mixed with oxide of manganese) requires to be heated; a flexible india-rubber tube serves for the delivery of the gas, and the wash-bottle containing soda solution may be dispensed with, as the gas is to be contained in glass vessels. Several bottles may be filled at once; and if sufficient water be left in to cover the stopper when inverted, or if the bottle be kept inverted in a jar of water, the gas may be safely preserved any length of time. When required for transport the stopper and neck may be wiped dry, and melted paraffine from a candle run into the groove surrounding the stopper.

In using the light for portraiture, of course pains must be taken, by means of reflectors, to make the most of the light and to soften the deep shadows. By keeping the light generator near the camera and slightly behind it the lens will be shielded from its rays; and this is a suitable distance for the diffusion of the light.

Focussing can be done by gaslight or with the aid of a candle. The lens may be left uncovered, and the exposure made dependent on the length of ribbon burned, the ordinary artificial light of the room not having any appreciable effect on the plate during the short time which intervenes.

During the dark days of winter this oxymagnesium light may be found useful, even during the day, for portraiture in ordinary rooms, to illuminate the shaded side of the sitter. It might also be advantageous in photographing with the microscrope. Once more let me impress upon the would-be experimentalist the necessity for using dark spectacles, otherwise injury to the sight is inevitable.

These suggestions are not put forward with any intention of doing away with the necessity for larger and more elaborate arrangements on the part of the professional photographer, but simply to show amateurs occasionally requiring to photograph by artificial light how easily and by what simple means this may be effected.

Magnesium may be obtained in powder. This, mixed with chlorate of potash, gives a very brilliant light, and for some purposes may be found a convenient substitute for the arrangement with oxygen; but there is some amount of smoke or cloud which will be objectionable indoors. For those requiring an apparatus to be in frequent use, I cannot imagine anything more convenient than the "eclipse light" of Mr. McLellan. G. A. Kenyon, M.B.

EXPRESSION IN PORTRAITURE.

To the portrait photographer one of the greatest difficulties is to get a pleasing expression on the face of the sitter. To put the person in a chair, fix his head in a rest, point out a spot on a coloured wall for him to look at, and then tell him to look pleasant, will certainly not get over the difficulty.

The expression on a face is governed entirely by the inner working of the mind, and the will is powerless to alter that expression. For instance: in a case of guilt, when the will is exercising its greatest power, the expression on the face speaks the inner working of the mind. This proves to us that in portraiture this inner working of the mind must be in sympathy with the expression we wish to obtain. And now comes the question—How are we to obtain control over this unconscious power of the mind? Some time since, when watching two friends looking through a scrap-book of pictures, I noticed that the expression on their faces changed in sympathy with the subject of each picture looked at. If the subject were one that told of the bright and happy side of life, the expression on the faces was one that a portrait photographer would long to be able to reproduce; if the subject were a sad one, the expressions instantly changed in sympathy with it. I at once obtained a key to the difficulty, and in carrying it into practice I found it was, indeed, "a happy thought."

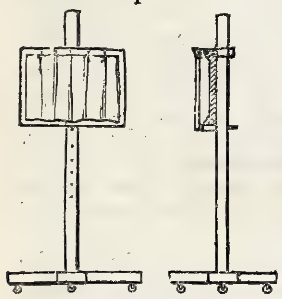
When photographing an old lady friend—of whom in previous negatives I could only obtain the painful fixed stare of expression we know of too well—by uncovering, the moment before exposing, a picture of a child playing hide and seek with its grandmother, I noticed that the expression on my sitter's face instantly and unconsciously changed to one of a look of sympathy with the subject of the picture. The fixed stare was instantly gone; and, in these days of rapid gelatine plates, of course I found little difficulty in securing the passing expression of a few seconds. Indeed, with the aid of a pneumatic shutter, and by carrying on a suitable conversation at the time, the sitter need not know that the exposure is taking place.

If the portrait be required to be of a person reading, a book of amusing pictures—or, perhaps, still better, of short anecdotes—

would be required; but be careful that the sitter does not know the moment of exposure, or the mind will instantly be taken from the subject of the anecdote, and the muscles of the face will be braced up to a fixed stare at the book.

The great point of Rejlander's studies from life was the expression on the faces, which, I have no doubt, was gained by the interest he got his sitters to take in their occupation at the time they were being photographed, though I am quite willing to allow that the expression on the face of his *Ginx's Baby* was through the want of interest in the matter shown by the sitter, which proves that the best rule is not infallible.

I annex a sketch of a stand and frame, in which pictures can be placed for the purpose I propose. It is simply a picture-frame sliding on an upright post, holes being bored in the latter like an easel. The post is let into a cross, and castors fixed to each foot.



In front of the top of the frame a small iron or brass rod is fixed, and a black curtain the size of the frame is hung on the rod by small curtain rings. To use this piece of apparatus a suitable picture is put in the frame, the subject of the picture being one which will be most likely to amuse or interest the sitter. For artists' studies, &c., in which it is required to procure expressions of anger, sorrow, joy, &c., &c., it will be found that suitable pictures will be of great help. The stand is moved to the point where the sitter is required to look, the frame is raised or lowered as required, and then, when everything is ready, the curtain is drawn aside by a small cord, and while the sitter's attention is centered on the picture the plate can be exposed.

There is one more important fact in connection with expression, and which is that, with the exception of anger or fear, it is very seldom the eyes are directed to the same spot towards which the face is turned. In calling a person's attention to anything it will be found that, although the eyes are directed to the spot, the head only moves about two-thirds of the distance; and I think it will be found that, if the head be turned about two-thirds towards the point of sight from the direction of the body, the expression of the eyes will be the most natural and lifelike. I would also advise photographers to hang amusing pictures in their reception-rooms and studios, instead of so many examples of their work. On a nervous sitter the latter would have the same effect as a dentist hanging round his consulting-room the extracted teeth of previous victims. The great thing required is that the whole of the surroundings should help to allay the natural excitement of the sitter when before the camera in the operating-room. What an awfully suggestive name! HERBERT S. STARNES.

PORTABLE PHOTOGRAPHIC APPARATUS.

I do not propose to myself to say much under the above caption which will interest the experienced travelling photographer. He will have gained his knowledge of apparatus, like that of all other branches of the art, by working it out. But to the increasing class of beginners, and those whose experience is small compared with my own, I may spare a great deal of experimenting by giving the results of my own trials and disappointments, having myself led for years a "wild-goose chase" for a perfect outfit.

As to lenses: people may differ on the merits of Steinheil's, Dallmeyer's, or Ross's rapid doublets. I believe each of those three forms of the same combination—of which the original was Steinheil's—may have its peculiar excellence; but, today, with the rapid plates, these aplanatic lenses have no advantage except for interior work and the most abbreviated exposures—the nearest approach to the ideal instantaneous. I use only for all outdoor work, except for animals in motion, the portable symmetrical of Ross, employing a series of from four to ten-inch focus for a half-plate, which is the size of my light camera, and it is large enough for any amateur's work. For experimental purposes and interior work, where I have to deal with the human model, I have five, eight, and twelve-inch rapid symmetricals. It is not, however, so much for the greater quickness in interiors, properly speaking, that the rapid is of use, but for the greater illumination in focussing and finding the subject, that I prefer it; for the available opening for work is rarely so large as the largest diaphragm of the portable lens. The four lenses I carry for out-of-door work all go into the two pockets of my waistcoat, each with two caps to keep dirt out and protect the lenses.

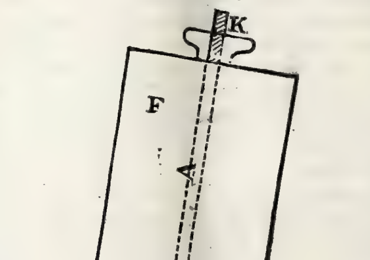
The camera is a far more complicated consideration, and involves, firstly, the size of plate we shall work. There is needless multiplication of sizes, which are mainly pure fantasy. One says that $6\frac{1}{2} \times 4\frac{3}{4}$ makes too wide a picture; another that it is too narrow for an upright; another prefers a plate a shade larger, &c., &c.; and the multiplication of the smaller sizes is a cause of great expense, both in plates and in apparatus. If what are known as the quarter and half-plate—which are English as well as continental sizes—were adopted to the exclusion of variations, the users would find, in a large majority of cases, a gain when travelling, as materials for these two sizes are found everywhere, and the half-plate is large enough for all artistic or topographical purposes. The limitation of the sizes would make it possible for the apparatus makers to keep the cameras of the adopted sizes in stock; and, in making them in larger quantities, the parts could be more completely made by machinery and the camera might be sold more cheaply. If a world's photographic convention could be held of delegates from all the societies to discuss and recommend the practical interests of photography, the uniformity and limitation of the sizes of plate would be, I am sure, one of the first things to actuate its deliberations.

I should in any case have the camera square, because the turning of any form of bellows camera on the side to get an upright picture is a clumsy expedient. I would recommend a beginner to choose either the quarter-plate, half-plate, or 5 × 8, with the alternative of using for the latter size an 8 × 8, which has certain advantages to be noted hereafter. Anything larger than 8 × 8 becomes a troublesome travelling companion, and, indeed, anything beyond half-plate is sure to make itself felt in a journey in difficult countries. If photographers would adopt these three existing sizes it would be easy to provide stock for them in most continental cities; or, if in consequence of combination with the continental photographers, the whole plate were adopted instead of the 5 × 8, the addition would not be grievous. This was the original French arrangement, and has the advantage of going by the metrical system, which it would be a good thing for photographers to adopt throughout, setting an example to the other trades and arts, which are less independent or more rigidly conservative than we need be.

All English cameras are somewhat heavier than they need be—most of them much heavier. The front which carries the lens cannot be too rigidly braced with the bottom board, and should never be made to fold. The swing-back should equally be rigid when in its position; but except in those two points, the camera may be made lighter than it generally is, and every ounce saved is, when it comes to carrying one's own apparatus for a day's walk, something to congratulate oneself on. Mr. G. Hare showed me a new camera last year, which, without employing any new principle, was lighter and more solid, especially when made square, than anything I have seen before.

A swing-back is a *sine quâ non* for a tourist's camera; and of this appliance I have seen no form so compact and rigid at once as one which I introduced some years ago, and which was made for me by Mr. Hare. It is shown in the diagram, *fig.* 1, partially swung forward.

FIG. 1.

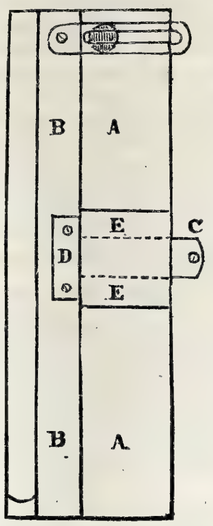


A A is a rod hinged at the middle, passing through a groove in the camera back. B is a button which terminates it below and catches under a strip of brass, C C, which is screwed along the base-board, D D. The camera back is composed of two parts—the back proper, F, which takes the plate-holder, and a shoe, E, and the two fit together in a curve struck from H, the hinge of the rod; and, while the lower part of the rod is free to swing in its half of the camera-back, the upper part is confined in a groove scarcely larger than itself. The camera back is moved out to approximate focus, and there *lightly* clamped by the milled nut K. By putting the thumbs of both hands to one side of the shoe and the forefingers at the other side of the swinging-back, the motion will be found to be easy, even when the camera-back will not move forward or backward without great force; and, by clamping hard when the back is in proper position, the whole will be as rigid as if in one piece. If the focus be found on the ground glass along the line of the hinge, H, the swing will not disturb the focus perceptibly; but, if desired, the swing may be arranged, and the focus found exactly by the focussing-screw or rack and pinion, which occupy the usual position. I object to a camera whose back does not clamp rigidly in the required position at focus, as the tension of the bellows tends to disturb the perpendicularity or even draw the back forward, as I have found with a camera I have with rack and pinion and a newer form of swing. I think that those who have used this form of swing-back will never care to use any other for the field, as it adds nothing to the weight of the simple camera, and gives rapid approximate

focus and fine adjustment with the screw, or rack and pinion, indifferently.

Another form recently introduced—I know not by whom—is but slightly more bulky than the former, but much more complicated though easily constructed, which mine is not, Mr. Hare tells me, requiring great exactitude of fitting. The second form to which I allude is shown in *fig.* 2. The camera back is divided into two parts, A A and B B, of which B B carries the plate-holder. Their separation is regulated by a slip of metal, C D, fixed to B B, and sliding under a plate, E E, which keeps it in its position, so that when B B is drawn back a pin at the extremity C of C D falls into a stop in E E, and serves as the centre of motion of B B, C D swinging freely at D. A clamp at the top keeps the swing in the position required. The objection to this swing-back, as compared with the former, is its inferior rigidity and needless multiplication of parts; but practically the rigidity is sufficient, and the multiplication of parts is the affair of the manufacturer.

FIG. 2.



The square camera—8 × 8, or over—gives very noteworthy advantages (especially when used with a square plate) over the oblong. Firstly, it is the natural shape for a circular field such as the lens has, and enables you to cut the print to the shape which suits the subject best. In architectural photography I find that many subjects require nearly, or quite, square prints to bring out the whole subject. When they are best upright or horizontal they can be printed from the square negative as well as from the oblong, and you have no annoyance about turning the plate or the camera. Then by using partitions I get two stereo. negatives on the plate or two panoramic or upright and narrow views, and I find subjects suited for both. In testing the rapidity of my plates I can give four exposures on one plate with the same lens, which in comparative trials is of great importance and economy.

The question of slides brings up that of changing-boxes. I have used Hare's changing-box for several campaigns, and when much work requires to be done in one locality it presents marked advantages over a number of slides; but when one has to make exploring excursions the slides are more portable and more easily regulated to your needs, as you may take from two to a dozen plates with you, and, what is more important, any mechanical arrangement menaces trouble in remote and half-civilised countries, or even in countries where the mechanical facilities are inferior to those of London. A changing-box out of order may have to go back to the maker to be put right. I have, therefore, a number of slides and a changing-box for the various needs; but on long excursions I leave the latter at head-quarters, and am independent of it. The system of double slides, too, seems to me absurd. Single slides which admit the plate from the front, and hold it by a spring catch, give a minimum of weight and chance of light-leakage, besides a maximum of compactness and convenience. The clasps which hold the two parts of a double slide together are continually springing open and letting in light or preventing the slide from going home, and now and then one exposes one plate twice and the other not at all. The single dry-plate slides may be made so that three will weigh no more than a double slide, take no more room, and be much cheaper.

The tripod is very important, as without perfect solidity you can get no good result. I consider a sliding leg very important, and will use no tripod that does not employ it; but the Kennett slide will not resist the least wind. I went out one year with one, and had more plates spoiled by light wind than by any other cause. The rigidity of the tripod is in exact proportion to the separation of the two branches of the tripod leg at the top, and in the Kennett form this is at the minimum. I changed mine by reversing the action, bracing the branches apart instead of clamping them together, and then putting a thumb-screw between the two brass bands which keep the leg together at its junction. This allows the lower division to slide up freely, and the screw has a firm grip with a push outward or inward, as you prefer. I changed mine at Athens with the aid of a common brass worker; but Mr. Hare has since made me two which are all that can be desired as to rigidity, with a slide of half the length of the leg.

A convenient device, for those who wish to develope where the views are taken, to be certain of a result, is a piece of india-rubber tubing a yard long, to one end of which is attached a leaden ring to keep it down in the water, and at the other a common clip. Put the leaded end into a jug or can of water, which put on a shelf a foot or two above your washbowl placed on the floor, and you have a convenient tap with sufficient head of water for any purpose.

An excellent portable bath may be made anywhere of the cardboard boxes in which the gelatine plates are sent out. Put the under portion into the upper, so as to double the material; wind a bit of fine, strong twine three or four times round it to keep the corners from opening, and then, having a tin dish made a little larger than, and twice as deep as, the bath so made, melt in it a pound of common beeswax, into which immerse the cardboard bath, and leave it till saturated. Now take out and drip it well over the wax dish, and, as soon as cool, you have a developing bath which resists all chemicals and any heat you will ever have to endure yourself. A half-dozen of these where water is scanty will enable you to wash a plate well by passing it successively through the series filled with water, giving the interval to each which you occupy in developing one.

Mr. W. England, in his *Hints to Tourists*, says that we may delay the complete washing after fixing till we get home; but my experience is that a plate left with a trace of hypo. in it until the morning after development loses a great part of its intensity, and becomes of a golden yellow, with transparent lower edge. I can always tell when a plate is quite free from hypo. by touching with my tongue the lower edge when it has drained for a minute or two. The taste is unmistakable.

After development I rub gently with a fine soft sponge the film before putting it into the hypo. bath—not on account of fog, which I have never had arise in this stage, but to avoid scum marks and inequalities resulting from the hypo. attacking the film with unequal vigour. If you use alcoholic solution of pyro. the plate must be washed before the hypo. until greasiness disappears, otherwise there is danger of marbling marks, mottled skies, &c.

Lastly: I advise every tourist to carry all the materials for developing, and to develope before leaving the locality of the views at least two plates out of every dozen which he opens, if he have time; and have every box of plates closed with a slip containing printed conspicuously in German, Italian, and French, the warning that the box contains photographic materials to which any light is destructive. *And be civil to the custom-house officials.* W. J. Stillman.

ON EXPRESSION-PHOTOGRAPHS.

[A communication to the Photographic Society of Great Britain.]

Allow me, for a short space, to occupy the time of the Society with a little subject which, although unconnected with emulsion making, may yet prove of interest to such photographers as have not been engaged upon it in the past, and may be called upon in the future to produce portraits by photography for the instruction of the portrait-painters. Now this at first appears a very easy matter; but when we come to consider that these photographs are produced to save the sitter many a long hour at the artist's studio, we at once see that, with merely a vulgar, hard reproduction of the features, the high light thrown in one mass, the face expressionless and inane, the artist will derive no benefit from the work, and the photographer will bring disgrace to his profession. But a little forethought and judgment will remove all these difficulties, and, instead of the stereotype likenesses we so often see, each portrait will bear on it the individuality of the sitter and the stamp of the master who produced it. Let us look at any face; is it expressionless? I think not: it has some one pervading character. There may be anger, fear, surprise, determination, or pathos; there may be high intellectuality, or its exact opposite; each one of these (or others not mentioned) may give the pervading likeness which we want to stamp upon the sensitive plate in our camera.

Let the face be carefully studied to find out its true peculiarity, and the most important quarter of our work is accomplished. We now come to the lighting: this must in all cases be appropriate to our pervading peculiarity. Let the mathematician at his work have the light falling from above as from a shaded lamp; let the angered face be lighted equally on both sides, and the face of the brunette be in the Rembrandt style, the silver rays of light fringing her massive hair, each light bearing out the subject, harmonising, blending, and beautifying the whole. Of course every one must use his own discretion as to detail, and only a few hints can be given. Half the difficulty is now accomplished.

The "pose" now claims our attention; nor need this be the same pose as that required for the oil painting, as the imagination of the artist can supply the required alteration and yet retain the same characteristics, and a couple of visits of the sitter will give him the due proportion of the features. Many faces differ immensely one side from the other, principally on account of the nose growing to some extent across the face, and not, as usually supposed, straight. The photographer must choose the side most suitable for his purpose—not necessarily the best looking, but the most suitable. If the hands can be worked into the picture with any appropriateness it should be done; and the introduction of a sensible accessory enhances the entirety of the subject. The fourth and last quarter of the difficulty is one on which I need not enlarge, for every one present is well versed in it, as it is merely the mechanical and chemical process of exposure, development, and printing. I shall not here attempt to argue the advisability of producing these photographs for artists' use, as I am afraid they are too often inclined to take advantage of all the facilities we can offer them, and retort on our art with abuse. And really I think they have some reason for doing so at present; but still I believe were photographers to turn their attention more to the study of art rules, while yet availing themselves of all the researches of the chemist, they might one day hope to see photographs hung and adorning the walls of many a gallery from which they are at present excluded. In the Photo-

graphic Exhibition of 1881 there was a frame containing prints taken from negatives both before and after retouching. I think that those who took the trouble to closely study these will agree with me that, although the retouching was admirably executed, it had in most cases the somewhat unpleasant effect of quite obliterating the individuality of the portrait; in fact, "expression-photographs" should never be retouched. All this species of photography is best served up in the form of transparencies. In conclusion: it must be borne in mind that my remarks this evening only apply to the special photographs under consideration. In speaking of the grades of facial expression which have no definite names in our language I have met with a difficulty, and I trust the meeting will bear with me if the poverty of phrases have caused unnecessary repetition. WILLIAM PEEK.

NOTES ON PHOTOGRAPHY.

LECTURE IX.—THE GELATINE PROCESS (CONTINUED).

FORMATION OF THE DEVELOPABLE IMAGE.—The exposure to light has the same effect in producing a developable image as when visible darkening occurs. It reduces the silver bromide or iodide to sub-bromide or iodide, thus:—

$$2\,Ag\,Br + \text{light} = Ag_2\,Br + Br.$$

Although no change is visible on the plate as might be expected, since the sub-salts are dark bodies, the evidence that this is what really occurs is practically conclusive. For instance: Captain Abney has found that the spectra produced, both as regards their limits of sensitiveness and relative sensitiveness to different colours, are identical, either when a brief exposure is given and the image developed or when a printed image is produced by prolonged exposure. Dr. Eder has also treated the developable and printed images on silver chloride with various re-agents, and found their behaviour under these circumstances to be the same. Thus, he finds that pretty strong nitric acid has no effect on either; that hydrochloric acid destroys both; that sulphuric acid slightly weakens both, and many similar results with other substances. The reason why the image is not seen is doubtless that the quantity of sub-salt formed is so exceedingly small compared with the quantity of unreduced salt present. If you were to mix a few grains of black paint with a pint of white paint you would not expect to be able to distinguish it, and the two cases are precisely similar. When the plate contains only silver bromide the bromine set free combines with the gelatine; but if silver iodide be also present the free bromine displaces iodine from it, forming a new compound, silver brom-iodide, thus:—

$$Br + 2\,Ag\,I = Ag_2\,Br\,I + I.$$

The iodine in this case combines with the gelatine.

Alkaline Pyro. Development.—The conditions usually required in development are that it should give a good quality of image with the shortest possible exposure. Alkaline pyro. development consists essentially in immersing the exposed plate in a solution of pyrogallic acid rendered alkaline, usually with ammonia, until an image is produced of the required character. A small quantity of potassium or ammonium bromide is also generally added. The functions performed by these ingredients should be very carefully studied and mastered.

Pyrogallic Acid ($C_6\,H_6\,O_3$), as its name implies, is obtained by heating gallic acid. The latter substance at a temperature of about 415° Fahr. splits up into carbonic acid gas, and a white sublimate, which is pyrogallic acid. It is a pure white, snowlike substance, very soluble in water, alcohol, and ether. In the dry state it keeps indefinitely, but in solution, more especially in water, it gradually undergoes oxidation by absorption of oxygen. It has a powerful affinity for oxygen when in solution, and the air containing one-fifth its bulk of this substance, the pyrogallic acid slowly absorbs it, forming a dark brown substance. It is noticed also, when dissolving pyrogallic acid in ordinary hard water, that the solution becomes at once more or less brown. This is due to the pyro. combining with the oxygen, which is dissolved in ordinary water. With distilled water, which does not dissolve oxygen, this immediate browning does not occur. In virtue of this same affinity it will abstract oxygen from many of its compounds. A solution added to silver oxide immediately abstracts the oxygen, reducing the silver to the metallic state, thus—

$$Ag_2\,O + \text{pyro.} = 2\,Ag + \text{pyro. and } O.$$

It also reduces substances containing no oxygen, if by doing so it can indirectly obtain it, thus—

$$2\,Ag_2\,Br + H_2\,O + \text{pyro.} = 4\,Ag + 2\,H\,Br + \text{pyro. and } O.$$

This equation brings us to the explanation of its developing power, which depends mainly upon two things—first, *that it reduces silver sub-bromide (Ag₂ Br) more readily than it does silver bromide (Ag Br)*; second, *that freshly-reduced silver in presence of silver bromide forms silver sub-bromide.*

I will first show that pyrogallic acid alone will develope an image if sufficient exposure be given, and then explain what occurs [experiment]:—1. The pyro. reduces the silver sub-bromide formed by the action of light, the bromine set free combining with hydrogen of the water present, forming hydrobromic acid and liberating oxygen to combine with the pyro., thus—

$$2\,Ag_2\,Br + \underset{\text{Water.}}{H_2\,O} + \text{pyro.} = 4\,Ag + \underset{\text{Hydrobromic acid.}}{2\,H\,Br} + \text{pyro. and } O.$$

2. The metallic silver thus reduced combines with the silver bromide to form twice as much sub-bromide as there was previously—

$$4\,Ag + 4\,Ag\,Br = 4\,Ag_2\,Br.$$

This becomes again reduced by the pyro. as before, and so the action goes on until the reduced silver extends right through the film. Obviously, the amount of silver formed at any part of the plate depends upon the amount of silver sub-bromide present at that part when the pyro. was added, and this again on the quantity of light which fell on that part during exposure; so that the image produced represents the relative quantities of effective light which fell on the different parts of the plate. It might be expected from this explanation that the image would have a tendency to spread laterally as well as through the film, and in photographing fine lines it has been found that this does actually occur. Dr. Vogel has found that an ounce of pure pyrogallic acid is sufficient to reduce rather more than an ounce of silver bromide to the metallic state.

Ammonia.—The effect of adding ammonia or other alkali to a solution of pyro. is to greatly increase the avidity with which it absorbs oxygen. This is readily shown by shaking up a solution of pyro. with air, which does not have much effect. On adding, however, a little ammonia it absorbs the oxygen very rapidly, becoming almost black in colour, and an insoluble substance soon separates out. When ammonia is present with pyro. in the developer the reaction which takes place is not exactly the same as that previously given; it is as follows:—

$$2\,Ag_2\,Br + \underset{\text{Ammonia solution.}}{2\,HH_4\,HO} + \text{pyro.} = 4\,Ag + \underset{\text{Ammonium bromide,}}{2\,HH_4\,Br} + H_3\,O + \text{pyro. and } O.$$

It will be seen that the only difference is that ammonium bromide instead of hydrobromic acid is formed. It is also probable that the ammonia dissolves a small quantity of the silver bromide, which would be immediately reduced, and the silver precipitated on the image in a similar manner to wet-plate development. It is found in practice that the use of ammonia gives density, which confirms this action. As might be anticipated, the use of ammonia enables the exposure to be very much shortened. The quantity cannot, however, be indefinitely increased, since it is found that fog occurs if the quantity be too large.

Potassium or Ammonium Bromide.—The addition of these substances is for the purpose of preventing fog, which they appear to do by forming a double salt with the silver bromide, and thus rendering its reduction more difficult. They are also used in cases of over-exposure.

Now, let us see what effect these three ingredients have in practice; and for this purpose I have here an arrangement by which we can compare any two plates together on the screen. Normal developer:—This is practically of the same strength as Mr. Edwards's, with the exception that there is only half as much pyro.; it is as follows:—

Pyro.	1 grain,	to each ounce of developer.
Ammonia, ·880	2 minims	
Potassium bromide	¼ grain.	

With the normal exposure, which we will call "one," this was found to give a proper image (portrait) with one minute's development.

Pyrogallic Acid.—Here are nine plates, all of which had the normal exposure (one), and were developed with the normal quantity of ammonia and bromide, but with different quantities of pyrogallic acid. What do they teach us? First: as you observe, that as the quantity of pyro. increases so the density increases; or, more particularly, that a quarter of a grain to the ounce gives very little density in four minutes' development, while one grain to the ounce gives too much density in four minutes. Further, that half-a-minute's development with one grain gives nearly the same result as one minute with half-a-grain, and one minute with one grain the same as four minutes with half-a-grain; so that a weaker pyro. developer, if given time, produces the same effect as a stronger one in a shorter time. This is a similar result to that obtained by Mr. Swan some time ago. This series also shows us that by employing weak pyro. solutions we get beautiful, soft negatives full of detail, which answer as well in portrait work. Finally: that, besides the difference in density, weak pyro. solutions give light-coloured, semi-transparent images, while the strong solution gives dense black, organic films.

Potassium Bromide.—Here are nine plates all exposed for the normal time (one) and developed with the normal strength of pyro. and ammonia, but with different quantities of potassium bromide. We notice, first, that as the quantity of bromide increases so the time taken for development increases. For instance, a plate developed with no bromide at all for half-a-minute is about as dense as one developed with the normal quantity (a quarter of a grain) for one minute, while the latter, again, is about the same as one developed for sixteen minutes with eight grains to the ounce. We further notice that as the bromide increases the images become harder, show more contrast, and have a general appearance as if less exposure had been given; also, that those developed with the quarter-grain solution are cleaner than those developed with none at all. From these facts we learn that potassium bromide acts as a powerful retarder of development, and that it tends to destroy detail and acts as a preventive of fog.

Ammonia.—Here are nine plates exposed for the normal time (one) and developed with the normal quantity of pyro. and bromide, but with different quantities of ammonia. The first thing we observe is that increasing the ammonia increases density, but only to a certain extent, for as we go on increasing it the density again falls off. Why is this? Unfortunately you cannot see on the screen, but on examining the plates it is found that solarisation, or reversal, has set in, although, remember, the plates have only had the normal exposure. On some of them there is a distinct positive picture on one side of the film and a negative picture on the other; also, on some of these plates developed with a large percentage of ammonia fog has set in, so that we have exceeded the practical limit. We further notice that as the ammonia increases the plates appear as if they had had more exposure.

Variations in Exposure.—Since we find that a large percentage of bromide gives the appearance of less exposure it might be expected that it would prove a cure for over-exposure. I have several examples showing this. For instance: here are two plates exposed four times as much as they should be. One is developed with the normal developer, and the other with eight grains per ounce of bromide added. The first one, as you observe, is hopelessly over-exposed, the image being hardly visible, while the second one is all right; and on comparing it with one which has had the normal exposure you can hardly distinguish which is which. There is thus no doubt about bromide curing over-exposure.

Finally: we have found that excess of ammonia gives the appearance of more exposure, so it would appear to be a remedy for under-exposure. Here are two plates exposed for one-fourth the correct time—one developed with the normal developer and the other with four times as much ammonia added (eight minims to the ounce). On looking at these a feeling of disappointment is experienced; for, although the second is better than the first, it is nothing like what it should be, and we are forced to conclude that there is no cure for under-exposure. Since we know that with sufficient exposure increase of ammonia gives apparent increase of exposure, the reverse of this ought to hold; that is, diminishing the ammonia ought also to cure over-exposure. You see on the screen a plate which has had four times the correct exposure and developed with the normal developer, and another one exposed the same time but developed with half as much ammonia. While the first, as we have before seen, is hopelessly spoilt, the second is all one could wish, and on comparing it with one correctly exposed, it is hard to say which is the better.

In conclusion: we will compare the over-exposed plate developed with more bromide, which took sixteen minutes to develope, with that developed with less ammonia, which took four minutes to develope, with the result that the latter is much the better. E. H. Farmer.

A SUMPTUOUS STUDIO.

Readers of the Journal will remember that, a few months ago, I congratulated Provost Stuart, of Helensburgh, on the destruction by fire of his Glasgow studio, on the score that it would give him an opportunity of reconstructing it according to modern requirements and the dictates of a quarter of a century's experience. If justification of such congratulation were needed it may be found abundantly in an examination of the establishment as reconstructed, and which I had the pleasure of visiting a few days ago.

The only fault to be found with Mr. Stuart's studio is that, like the majority of photographic premises in Glasgow, it is reached only after a pretty stiff climb; but for that even those who may have no other object in view than to see what can be accomplished by exquisite taste and ample means will consider themselves well rewarded.

The establishment consists of the third and forth "flats" of one of the buildings in the centre of Buchanan-street, and is heated throughout with hot water. The lower "flat" contains entrance hall (which has been considerably enlarged), reception, dressing, work, store, and packing rooms, and also the office. On the upper "flat" are two galleries, enlarging room, ample accommodation for a number of artists, and two well-equipped laboratories.

While the various apartments in which work is carried on are fitted with every necessary appliance, and the dressing-rooms are luxuriantly furnished, the artistic designer has evidently concentrated his attention on the reception-room, with the result that it is both unique and elegant—certainly the most chastely-beautiful reception-room I have seen, either at home or abroad. The room, as a whole, may be said to take its tone from the windows, which are glazed with small panes of geometrical leaded glass. The woodwork generally is of brown and gold, and the whole decorations are quietly harmonious. The walls are covered with what is known as "Japanese leather paper" of exquisite design, and arranged in the form of a dado seven feet high, separated from the frieze by an elegant carved wood moulding. Reception-rooms are too frequently so filled with specimens as to give them the appearance of picture galleries. Mr. Stuart has wisely avoided this, and by hanging only a few high-class examples of his work has retained the feeling of an elegant drawing-room.

Two easels in black and gold support the latest achievements of his artists in oil, and an octagonal cabinet in the centre of the room, containing fancy frames and specimens of smaller work, complete the display in that department. The Japanese tone of the room is further strengthened by a fine collection of the pottery of that nation, arranged in a beautiful ornamental overmantle, and placed in various positions round the room.

Probably one of the most interesting features of the room is the cash desk. Designed to overcome a structural difficulty incident to a necessary staircase, it occupies a corner, is, architecturally, a beautiful piece of work, and includes several feet of the peculiar open wood work, made up of small pieces, for which the Japanese are famous. Here, also, is placed a telephone instrument, by which the fair presiding genius may almost instantaneouly communicate with any one of more than eight hundred subscribers to the exchange.

On ascending to the upper "flat" by the stair already mentioned, the visitor finds himself face to face to with two large galleries—one running east and west, the other north and south, and both of the good old ridge-roof pattern. Each contains an ample expanse of glass, fitted with wooden shutters and cloth blinds in such a way that each gallery may be worked from either end or at any desired angle. In the larger of the two I noticed an excellent idea in the shape of sheets of paper suspended from the astragals. They looked like white demy, and, while they prevented the ingress of sunshine to the place occupied by the sitter, they acted very much as does a fine white cloud, diffusing the light and literally shortening the exposures.

The galleries are well supplied with backgrounds, principally by Seavey, mounted on laths and rollers, each being hung, when in use, on a frame something like a large towel-rail standing on feet, so as to admit of being placed in any position that the operator may desire.

The enlarging-room, laboratories, and artists' apartments contain nothing requiring special notice, except that they are exceptionally roomy and comfortable.

During the course of my visit I noticed a rather unusual method of mounting being carried on. Gelatine, or glue, and sugar are boiled together in such proportions that when poured into shallow dishes and dried they form leathery-like sheets, pliable and very soluble in water. A piece of this is dissolved when required, and the moist prints coated with the solution and allowed to become quite dry. In mounting, all that is necessary is to damp the boards, lay the prints in position, and pass them through a rolling-press. This method is said to offer many advantages over those generally in use, notable amongst which are the absence of cockling and the distortion consequent on irregular expansion of the paper. John Nicol, Ph.D.

FROM TRÉVES TO HANOVER.

[A communication to the Liverpool Amateur Photographic Association.]

The direct route to Brussels is too common to merit remark. Belgium itself is worthy of a special note. I will, therefore, commence at Tréves, specially and solely interesting on account of the grand remains of Roman architecture.

First in rank is the Porta Nigra, supposed to have been built by Claudius as early as the year 700 for military defence. After many viscissitudes it was restored early in this century by government to the state in which it now stands. Next in interest is the Amphitheatre, in a very fair state of preservation, formerly capable of seating 60,000 spectators. The gateways leading to the dens can be plainly seen in the photograph. Near the Amphitheatre is the Roman Baths, so called; but it is doubtful if they were ever used as such, but more probably as a palace. The Cathedral, formerly a palace, has a disappointing exterior. The Liebfrauenkirche is pretty, but too cramped to photograph, and requires a north light. A few miles from here is the Igelsaüle, or column of Igel—the most remarkable of the old relics in Germany, or even Europe, and partly so because shrouded in mystery as to its purpose. The legend is that it was raised to the memory of a merchant's son, who, with his bride, was drowned on their wedding day.

From Tréves to Berncastel by boat. The town is in itself not particularly interesting, being mostly new, or nearly so; but the valley behind (Tiefenthal) is one of the prettiest and most romantic in this district, and affords a fine view of the old ruins of Landshut. It is well worth a half-day's camera work. I commenced my walk here, first putting wheels to my box. I may here explain that I carried the bulk of the *impedimenta* (in all about 140 lbs.) in a large and strongly-made box, to which I could in five minutes' time fix an axle and pair of wheels, and also a perambulator handle. Thus I was independent of help and trudged along at the rate of fifteen miles a day comfortably, with a weight of perhaps eighty to one hundred pounds. Three or four wheels would, however, be preferable, as having to balance the whole takes too much attention. Two-wheelers or four-wheelers count only by weight on the continent, so that they are no more expensive by rail.

From Berncastel the route along the river increases in interest, though occasionally tame. Many pretty villages—often buried in orchards, though more frequently backed by vineyards—are passed. I put up at Kinheim, a large village with a good view. Some old streets and farm-houses here are worth doing, but the weather was unfortunate. Later,

we reach Trarbach, commanded by the ruins of Gräfinburg, and presenting many good views. Gräfinburg derives its name from the Countess von Starkenburg, who, it is supposed, built this castle. The lady, not satisfied with defending herself when necessary, attacked the archbishop of Trèves for some insult, real or fancied, and, defeating him, confined him in her castle dungeon for some eighteen months, releasing him only on payment of a large ransom, with which this castle of Trarbach was erected for her own use, when her son coming of age took possession of Starkenburg on the hills close by.

The road from Trarbach to Alf is very interesting, but not so strikingly picturesque as to be worth walking, so I saved a day by riding. Zell would be well worth two or three plates. A trial from the carriage was a failure, as the jolting interfered somewhat with the steadiness of the camera. Several good views are also obtainable of the Marienberg, round which the river winds very considerably—so much so that any one leaving the boat at Alf can walk up to the ruins, drink "a schoppen of wein" at the inn, and meet the steamer at the other side without hurry. A beautiful winding valley leads from Alf to Bertrich, passing the ruins of Burg Arras. Bertrich itself is a "Bad," and not a *bad* one, though not much frequented, but its situation is attractive. There is here an elfin grotto, or Käse Keller, so called from the peculiar cheese-shaped basaltic rocks and a very pretty little fall, only there was no water in it.

To Beilstein is sixteen miles by road. Passing through Eller I met with a most singular and unprecedented occurrence. Having been three hours on the way, perfectly free from shelter from the sun's rays, the sight of a hotel made one's mouth water. Judge, now, of my surprise when refused a bottle of wine because it was church time. I did not even know it was Sunday, and am doubtful of it to this day. It must have been a saint's day. I cannot account for it, but so it was. Beilstein is most artistically placed. The old castle stands on the brow of a hill overlooking the village, which flows out of the valley like a glacier. The views of both village and river are eminently picturesque from whichever point seen. I regretted it was not more visited, as, being the only one, in the hotel, where they get one visitor a week (perhaps), I could get nothing for dinner, and had to content myself with bread and wine till bedtime. Beilstein to Cochem is not more than five or six miles, but is by far the most beautiful portion of the river. The rocks are higher and approach near the river. Cochem itself is well situated, almost at the foot of a fine and still-inhabited pile, formerly a monastery-

I went by rail from here to Hatzenport, where I advise no one to put up, for the village is a mile from the station and the accommodation poor; though, as hotel bills only come to about two shillings and sixpence a day, there is some compensation. Moselkern, between the two, is better, and is at the entrance of the charming valley of Eltz, through which, after a walk or scramble of four miles over brooks and through woods, one comes suddenly to Schloss Eltz, one of the best preserved of the inhabited castles of the middle ages. It stands upon the summit of a conical hill in the middle of a valley, only a narrow neck of land joining it to the table land around, where is the ruin of a castle built by the Archbishop Baldwin, of Trèves, to combat and overcome the Count of Eltz; but he did not, for the bishop got the worst of it. This was the same bishop who waged war against the Gräfin von Starkenburg, of whom I spoke just now. From Hatzenport to the Rhine, at Coblentz, the river, although always pretty, deserves no special notice.

Having in view a figure study for our competition I kept a sharp look out for the "peasant girls with bright blue eyes," but am afraid they have died out since Byron's time, and the "hands that offer early flowers" are generally coarse with manual labour. At best they are but a pleasant, homely kind of folk, dressed very like our own English girls.

I crossed the Rhine by rail to Oberlahnstein. I had intended to spend a day on the river doing some instantaneous views from the boat; "but one thing lacked these banks of Rhine," and old memories made the place distasteful to me. The railway runs mostly along the banks of the Lahn, from Niederlahnstein through Ems to Nassau, and is pretty all the way. The old castle of Nassau stands a prominent object in the view. I walked from here to Langenau, in the basin of a beautiful valley. Further on is the monastery of Arnstein; both are in the same view, and most picturesque. A nearer view of the latter from the hill and from the river is well worth securing. Hence to Balduinstein, with the fine Castle of Shaumberg on the heights; and the old ruins in the narrow valley; Dietz with its old castle and bridge; and then Limburg, whose sole attraction is its cathedral, erected in the tenth century, and well worth delay, and a beautiful view from the bridge at the back of the town by evening light. Dietkirchen is only three miles further, with an old church on the top of the hill; then Löhnberg, with its castle. Runkel is well worthy of a photographic visit. The ruins are superbly placed above the town and river, and a good picture is also had from above. Weilberg is the last place worthy of note, except Wetzlar, at the junction of the Cologne line.

The whole journey along the river from the Rhine to Weilberg is exceedingly beautiful and replete with interest, surpassing the Moselle, but has no boat navigation for passengers. Giessen, the junction on the Frankfort and Cassel line, is an old town, but too prosperous now to offer any attraction to an artist. The journey north affords little to interest, and is tedious on account of the slow rate of the trains; they seldom go quicker than twenty-five miles an hour, and the stopping trains are awful. I ended the day at Herzberg (passing Hattorf), at the entrance of the Sieberthal, which is pretty clean and prosperous—a combination very unfrequently seen; also Osterode, ten miles hence by rail. Here the older streets are full of quaint black and white houses, but do not fulfil the impression formed by Baedeker's description of the spot. Railways and prosperity soon destroy the beauty of a place as far as the ordinary sightseer is concerned, and the occasional peeps in to the past through the old relics only make the modern streets and houses more hideous, proving plainly that in architecture at least we have not progressed.

To St. Andreasburg, through the Sieberthal, is twelve miles—a small town in a wild and romantic situation. So Baedeker says, but this is misleading, the steepness of the roads being the only novelty. I started early next day, intending to finish at Elend; but finding nothing to do on the road except Oderhaus, a village of three houses, I pushed on to Schierke, and was still disappointed. I made for Ilsenberg, another ten miles distant. This, however, I found too much, so turned aside and put up at the Brocken. This noted spot is "a delusion and a snare." The witches no longer visit it, and a more uncomfortable hotel I do not remember. The feeling of being suspected at every turn is very annoying, for everything has to be paid for as you get it. Beer, dinner, bed, and breakfast mean so many distinct payments. No doubt they have learned by experience the forgetfulness of mankind, and students are here the most frequent visitors.

Through the Ilsethal to Ilsenberg—a pretty valley, they say; but all the roads through the Harz mountains are so lined with trees that for miles nothing else can be seen. If owners of mountains in Ireland or elsewhere would take a "wrinkle" from Germany it would be a great blessing for themselves and the people; there is no poverty here. I pushed on again to Harzburg, six miles further—an uninteresing walk. Harzburg is a true watering place, very artificial, but still pretty, for the hills remain. From Harzburg through a valley similar to others, except that it contains the Radau fall about 100 feet high, which I almost suspect of being artificial also. Only when the Okerthal is reached is the walk worth the labour and worthy the description given of it, and that is almost spoilt by want of water, the river being nearly drained to supply the mills along its banks. Oker itself is worth a picture or two. Goslar is reached by rail, and here my catalogue of disappointments reached its climax; for the Kaiserworth Inn, undoubtedly the finest building in the town, was covered with scaffolding. The town is full of pictures, too numerous to mention. Here is the Zwinger with its walls of twenty-two feet thickness, also Paul's Tower. I went back considerably by rail to Thale for the Bode Thal, the only valley which approaches grandeur. It is in the Bode Thal that all the pictures representing the Harz mountains are found, and it is certainly worthy of its reputation. The extent is not great—five miles, perhaps—but replete with all the glories of a narrow winding rocky valley, changing almost every 100 yards, rocks of the most fantastic shapes well wooded; the path sometimes ascends the hill side, sometimes decends almost to the river, and once is crossed by the inevitable Devil's Bridge, which, like all his majesty's productions, is in a most romantic situation. I walked back in early morning over the same ground, and understood how it is that the early bird catches the worm; for it was impossible to get along quickly without sending some to their last home. Hence to Halberstadt, another old town full of interest; but by an accident I lost all my pictures of this place. Beware of postal vans. If you want a sample of spiteful rudeness the drivers of these red waggons stand prominent. Twice—once in Paris, once here—they have gone out of their way to stand immediately between the camera and the object—no doubt taking their tone from those above them. I don't think I moved a yard in this place without a guard of honour(?) throughout the whole day. A thirst for knowledge is praiseworthy—but when it shows itself by peering into the lens when you are focussing, and examining, and making remarks on your traps with a crowd of a dozen or eighteen round you, it ceases to be amusing to the operator after a little time.

Hildesheim—the finest, perhaps, of these old towns, rich in relics of ancient architectural skill—brings nearly to a close my wanderings. Of the public buildings I failed to get good photographs, but outside these more renowned objects there are two—Little Venice, as it is here called, and the Roman emperor's house—a small place in a cramped street, covered over with carvings of figures, many life-size, out of black oak.

Brunswick also contains many old and fine buildings, and furnishes some half-dozen pictures.

Hanover is hardly worth a call; the place is thronged with military. Hanover is evidently head quarters for the aristocracy, for whose energies the only outlet is the army. It is a pity they and their brethren in other countries could not find some better occupation for their time, We talk much of finding occupation for women, whose work should be at home: could not employment be found for these people without draining the resources of the country to keep them in insolence and idleness?

J. H. T. Ellerbeck.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 5	W. Riding of Yorkshire	Godwin-street, Bradford.
„ 6	Sheffield	Freemasons' Hall, Surrey-street.
„ 6	Halifax	*Courier* Office, Regent-street.
„ 7	Benevolent	181, Aldersgate-street.
„ 7	Edinburgh	Hall, 5, St. Andrew-square.
„ 8	Manchester	Mechanics' Institution.
„ 8	London and Provincial	Mason's Hall, Basinghall-st.
„ 9	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on the 25th ult., the chair was taken by Mr. A. Haddon.

A gelatine negative was shown by Mr. A. L. Henderson, which had been sent by Mr. Crosby, of Rotherham, for the opinion of the members of the Association. In addition to the portrait of a lady there was a faint image of an easel and of a porcelain tablet that Mr. Crosby thought was due to some action upon the glass from a former picture, which had, however, been cleaned off with bichromate of potash and sulphuric acid.

Mr. Leon Warnerke had frequently seen traces of a former image on a fresh picture.

Mr. W. E. Debenham said that this was certainly true with collodion negatives; but in that case the nitrate of silver to be reduced and form the image was in a soluble condition. With gelatine the case was different, and he thought the secondary image shown might be due to some short accidental exposure—possibly not from the lens, but through a tiny hole. He inquired whether Mr. Warnerke had had these repetitions of old images when using gelatine.

Mr. Warnerke could not say that he had.

Mr. H. N. King thought that if the first image had been intensified with mercury it might leave such a strong impression on the glass as to show on a fresh gelatine film. He could not be sure that he had seen this, however, except with collodion.

Mr. W. K. Burton then proceeded to demonstrate the method of preparing emulsion by precipitating the silver bromide from a boiled dilute gelatine solution. He said that for the preparation any formula would do in which not more gelatine was employed than one-fifth of the weight of nitrate of silver. His usual formula was Nelson's No. 1 gelatine thirty grains, bromide of potassium 160 grains. When these were dissolved in ten ounces of water 200 grains of nitrate of silver in crystals were added, and the whole shaken for a few minutes. After the usual boiling the emulsion was cooled down to 100° Fahr., and three per cent. of ammonia at ·880 was added; it was to be digested for two or three hours at this temperature, and then set aside for two days, when the silver bromide would be found at the bottom of the vessel. Producing a batch—which, having been made some days before, was now in this condition—he poured off the supernatant liquid, and added swelled gelatine to the precipitate. After mopping all the latter from the bottom of the vessel with the wet gelatine he added hot water to melt the whole, and, stirring it well, declared the emulsion complete. It could be used immediately, but generally worked quicker after being kept in the jellied state for a few days. Sometimes it worked rapidly at once, and sometimes only after keeping. He could not account for the uncertainty. He (Mr. Burton) said that the bromide would precipitate itself from the boiled gelatine without the addition of ammonia if sufficient time were given; four days he had found sufficient. He also found that the less the excess of soluble bromide present the quicker the precipitate was formed. There was no green fog in plates prepared as directed, although it might be induced by making the finished emulsion very alkaline with ammonia, or by using dirty vessels or coating on dirty glass.

Mr. A. L. Henderson said that the question as to whether a washed emulsion became more sensitive with keeping depended upon whether it was alkaline or not.

Mr. Burton replied that he always added a trace of ammonia.

The Chairman remarked that in the formula now given by Mr. Burton there was no alcohol. He should like to know why that was omitted.

Mr. Burton said that the emulsion passed to the rapid stage in boiling rather quicker when no alcohol was employed. As to the addition of alcohol to the washed emulsion any considerable quantity caused it to set with more difficulty.

Mr. Henderson said that if gelatine were boiled in presence of ammonia till its setting powers were destroyed, and bromide and silver were added to form an emulsion, in twelve hours the liquid might be poured off and the precipitate emulsified with fresh gelatine. An emulsion fine in structure but not in quality would result. He had never obtained an emulsion of fine quality when the original emulsifying gelatine and the soluble salts were removed by washing before the addition of the body of gelatine.

The Chairman inferred that it was desirable to keep the altered gelatine in the emulsion. Colloid bodies, such as metagelatine, did not dialyse or pass through such a substance as a film of set gelatine, and, therefore, although the gelatine decomposed by boiling was itself soluble in cold water, there was no reason for supposing that that which was locked up in shreds of set emulsion would be removed by washing along with the nitrates and excess of soluble bromide.

Mr. Warnerke inquired whether Mr. Burton washed his precipitate with hot water or cold; also, whether, if an emulsion were found to be bad it could not be diluted so as to precipitate the silver bromide, which could be again emulsified with fresh gelatine.

Mr. Burton said that he used cold water for washing. He had no doubt that bad emulsion might be successfully treated, as suggested by Mr. Warnerke. Heat should not be employed after the first washing. If it were hopeless fog resulted.

Mr. Henderson had added as much as twenty minims of ammonia to a finished emulsion without inducing fog. The emulsion flowed very easily over the glass. He had noticed a great difference in the keeping properties of emulsion, and thought that the condition of the weather at the time of setting, independent of heat in the set stage, had something to do with it.

Mr. Debenham said it must not be assumed that because something occurred (the cause of which had not been discovered) the weather was to blame. He had made, washed, and coated emulsion during the most violent heat and storms which had shown no evil result.

Mr. Warnerke believed that weather had nothing at all to do with it. He had left some bottles of emulsion for seven months owing to absence, and found some perfect, others decomposed. He inquired why it was that green fog was within the last two or three years so often complained of, whilst formerly it was unheard of.

Mr. Debenham said that in the early days of gelatine photography the development of plates was carried on, very similarly to that of collodio-bromide, with but little ammonia. It was now found that much more ammonia could be advantageously employed, this change being undoubtedly favourable to the production of green fog.

Mr. Henderson remarked that with a plate liable to green fog this might be overcome by immersing in the normal mixture of ammonia and bromide before adding the pyro., which, however, slightly slowed the plate.

Mr. W. Coles found that this method tended to give green fog, but he used it when insufficient exposure had been given to quicken the plate.

Mr. Archer Clarke said that the development was slowed by the use of bromide and ammonia in the first instance.

Mr. Henderson did not think the presence of soluble bromide—either in an emulsion or used as a bath before development—had any particularly slowing effect. If a plate were coated with an unwashed emulsion, and another with the same emulsion washed but not dried, the sensitiveness would be nearly equal.

Mr. A. J. Brown thought that a decided excess of soluble bromide in making emulsion was an advantage. He used two parts by weight of ammonium bromide to three of silver nitrate.

Mr. J. Barker did not believe in a large excess of bromide. He never had green fog, and had not more than two grains of excess of bromide to ten ounces of emulsion. He thought a better quality resulted. After boiling he found a little rough precipitate at the bottom of the bottle. This he left, and possibly the exclusion of this deposit from his emulsion accounted for its immunity from green fog.

Mr. Warnerke said that Captain Abney had stated that the greater the excess of soluble bromide the greater the rapidity of the plate. He (Mr. Warnerke) had found this to be the case.

Mr. Henderson had used large excess without finding any evil results. He had even used equal weights of silver and bromide. He found that keeping an emulsion tended to produce green fog.

Mr. Burton said that emulsion improved by keeping.

It was announced that at a future meeting Mr. Warnerke would exhibit a new system of lime light of Russian origin.

Mr. C. H. Cooke was elected a member of the Association.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The annual general meeting of this Association was held at 181, Aldersgate-street, on Wednesday, the 24th ult.,—Mr. W. S. Bird in the chair. The Rev. F. F. Statham, M.A., was also present.

The minutes of the previous meeting were read and confirmed. Messrs. W. Dallyn, W. Hayes, H. Maulden, and J. Matthews were proposed, seconded, and duly elected members of the Association.

The Secretary then read his report and balance-sheet, which was followed by the report of the Board of Management, as under:—

Secretary's Report.

Gentlemen,—It has been a pleasure to me to congratulate you upon the progress made by the Association when submitting my report in previous years, but never have I been able to submit one so favourable as the present.

The receipts for the year are £57 16s., against £50 16s. for 1881. The honorary members having contributed £18 7s. 6d., as against £10 19s. 6d., fully confirms the statement in last year's report that the vitality then shown by the ordinary members would be readily and generously responded to by the more wealthy members of the profession. The ordinary members have exceeded previous records by subscribing £19s. 6s. to the funds, which, with the proceeds from the *soirée* and ball, and the exhibition of the Photographic Society of Great Britain, make up the income to the amount quoted above.

The expense of management has been slightly under the average, the disbursements for all purposes, including assistance, being £32 9s. 9d., thus leaving a clear gain of £25 6s. 3d. to be added to the funds, raising them from £114 11s. 10d. to £139 18s. 1d.

Balance Sheet for year ending December 31st, 1882.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Cash in hand, January 1st.	114	11	10	By Rent	1	16	0
„ Donations and Subscriptions from Hon. Members.	18	7	6	„ Advertisements, Printing, and Stationery	4	13	11
„ Subscriptions from ordinary Members	19	6	0	„ Postage and Petty Expenses	2	14	10
„ Photographers' *Soirée* and Ball	9	16	6	„ Assistance	8	10	0
„ Photographic Society's Exhibition	10	6	0	„ Secretary's Salary	14	15	0
				„ Cash in hand, December 31st	139	18	1
	£172	7	10		£172	7	10

REPORT OF THE BOARD OF MANAGEMENT.

In submitting the annual statement to the subscribers and members of the Association, the Board has pleasure in noting some small, but sure and steady, signs of progress.

There has been, as shown by the Secretary's report, an augmentation of the funds of the Association. There has been increased income from subscriptions of members, and liberal assistance from honorary members.

Early in the year several gentlemen combined to organise a photographers' *soirée* and ball, for the express benefit of our fund. The gratifying result was a donation of £9 16s. 6d.; and as the entertainment was in itself an agreeable success, we may hope the *soirée* and ball will become an annual entertainment.

The President and Council of the Photographic Society of Great Britain very generally recognise the benevolent aims of this Association, and willingly granted again an evening at their Exhibition in Pall Mall. The proceeds this year amounted to £10 6s. 0d., being in excess of the benefit in previous years.

The photographic press are ever willing to give reasonable publicity to our proceedings, and the editors are entitled to our warmest thanks.

There have been a few applications for temporary assistance from members, and about one-seventh part of the year's income has been beneficially expended. Applications from non-members have been somewhat numerous; but, under existing rules and with the present funds, could not be entertained. The Association is benevolent, but mutual; the subscriptions are paid to help members in difficulty. Photographers' assistants who contribute annually know that substantial help is forthcoming if the necessity arises, and it is anticipated that this large class will gradually see the advantages that would accrue to the whole body if the Association was more widely supported.

This Association has been some years in existence, the expenses of its management are trifling, its progress has been and still is slow, but there is progress in the right direction. The funds increase, friends increase, members increase, and its object is essentially philanthropic and calculated to benefit members of the photographic profession.

The balance sheet and reports were put to the meeting and carried.

The SECRETARY then stated that he had the pleasure of announcing the receipt of £10 from Edward Horner, Esq., of Crayford, in aid of the funds of the Association.

The meeting passed a vote of thanks for the liberal donation, and expressed a wish that the example would be followed by other sympathisers with the Association and its objects.

The retiring Board of Management suggested that the following alterations should be made in the rules, which were ultimately passed, and members are requested to note the same. In Rule 6, line 6: the words "with power to add to their number" to be inserted after "Association." In Rule 10, line 3, read "any three members" instead of "any five members."

The following are the officers for the current year:—*Vice-Presidents:* Rev. F. F. Statham, M.A., F.G.S. and J. H. Dallmeyer, Esq., F.R.A.S. —*Trustees:* Col. Stuart Wortley and Capt. Abney.—*Treasurer:* H. Baden Pritchard, Esq.—*Auditors:* G. Taylor, Esq., and J. S. Ralph, Esq.—*Board of Management:* W. S. Bird, Esq. (Chairman), H. J. Thorne, Esq. (Deputy-Chairman), Messrs. W. M. Ashman, H. J. Burton, T. Bolas, F. H. Berry, A. J. Brown, C. G. Collins, J. A. B. Hall, J. O'Connor, J. S. Rolph, A. Strivens, S. Saunders, and R. E. Wilkinson.—*Secretary:* H. Harland.

A general discussion then took place, and several methods were suggested whereby to improve the position of the Association. The Rev. F. F. Statham promised to use his best efforts to promote the interest of the Association.

The meeting closed with a hearty vote of thanks to the Chairman (W. S. Bird) and Vice-President (Rev. F. F. Statham), which was carried unanimously.

The next meeting of the Board of Management will be held at eight o'clock on Wednesday next, the 7th inst., at 181, Aldersgate-street.

LIVERPOOL AMATEUR PHOTOGAPHIC ASSOCIATION.

THE monthly meeting of this Association was held at the Free Library, on Thursday evening, the 25th ult.,—the President, Mr. E. Roberts, in the chair.

The minutes of the last meeting, having been read by Mr. Ellerbeck, in the absence of the Rev. H. J. Palmer, they were passed unanimously. The following gentlemen were then elected members of the Association:—Messrs. Hardman, James, Rowlandson, and Ward. Through inadvertence, in the unavoidable absence of the Hon. Secretary, the election of Mr. Wynne was postponed till the next meeting.

The CHAIRMAN, after a few farewell remarks, vacated the chair to the President for the year 1883, Mr. B. Boothroyd, who thereupon distributed the certificates of honour to the gentlemen to whom they had been awarded at the annual meeting, namely, Messrs. Kirkby, Palmer, Day, Bean, and Ellerbeck, and then delivered the

INAUGURAL ADDRESS.

WHEN it is considered that I only became a member of our Society in 1874, and that there are among us many who have been much longer connected with it, and also many new members who would have filled the position of President with greater ability, it will probably be a puzzle to you, as it is to myself, to discover the wherefore of my election to the office. However, it is through your kindness, and I must make the best of the situation, trusting to your sympathy and help. On looking over the list of members with which the Hon. Secretary has furnished us in the report for 1882, I find the existing members joined the Society as follows:—In 1863, 17; 1864, 4; 1865, 1; 1866, 0; 1867, 1; 1868, 0; 1869, 3; 1870, 1; 1871, 1; 1872, 3; 1873, 2; 1874, 4; 1875, 2; 1876, 2; 1877, 7; 1878, 7; 1879, 6; 1880, 6; 1881, 8; and 1882, 18—total, 93. This would show that of late years—or, say from 1877—there has been a growing interest in the science of photography; but it will be noted that in 1882 we received no fewer than eighteen new members, or more than double those in any previous year, excepting that of the formation of the Society. This will point, in the minds of all, to the conclusion that the discovery of the gelatine process has given a wonderful stimulus to our art-science. I imagine there are many ardent workers among us today who have had no practical acquaintance with the collodion or wet-plate process, for which, however, I have a considerable regard.

My acquaintance with practical photography began some twenty years ago, with a small affair for wet plates, known as Dubroni's camera. The illustrated instructions were so explicit that on first attempts I succeeded in the manipulation, and this soon led to the obtaining of larger cameras, and the working of the collodion process, with the use of a tent when away from home.

Now, though dry plates are very well in their way, I must confess to a love for the wet process; and if I were other than an amateur with a minimum of leisure should work it still. Not long ago I came across a gentleman at Warrington station, with tent, &c., and on speaking to him found he was employed by a firm in the Midland counties for taking views in various parts of the country for trade purposes, and he was then on his way to "do" Edinburgh. Of course, he had tried gelatine plates, but had not found them so well suited to the purpose as wet ones. It cannot but be an advantage to know for certain that a good picture is obtained, and then, if on development anything is wrong it is easy to expose another plate. By the way, this gentleman told me how much he was amused with amateurs, who would often arrive on the scene of his labours in an afternoon, and in the course of an hour or two would "fire off" a lot of plates and go away happy in the delusion they had taken pictures. Let none of us be guilty of such folly. It is easy enough to expose by the gross, but not as easy to secure artistic pictures. These require consideration as to lighting, and often involve a lengthened stay in a locality.

Besides wet plates I have had considerable acquaintance with collodio-albumen, using Pollitt's plates, than which none better or more reliable could be had. Then there were in the days gone by Hill Norris's plates, which for rapidity were probably equal to the bulk of the gelatine plates of today. My friend, Mr. Sampson, of Southport, having been very successful with these plates, Mr. Norris came from Birmingham wishing to know how they were developed; but Mr. Sampson, believing in the principle of "tit for tat," wished in return to be informed how they were prepared. Mr. Norris, not willing to impart his secret, went home no wiser than he came. I believe these plates were collodion and gelatine. On these plates, exposed many years since, the films have become very tender, though, of course, they were varnished. *Query:* How will gelatine stand the effects of time? I think it will do so, but *experientia docebit.* Then, also, there were the collodio-bromide plates of the past, which had their origin in this Society, and with these I was not very successful. I am referring to commercial plates, the best known of which were often covered over with spots, and were otherwise faulty from inherent defects in the film or preservative. Amateurs and other photographers of today may pride themselves on the fact that gelatine is in the ascendant; for there is no doubt that any plates which may now be purchased are infinitely more reliable than were other makes in the period to which I refer, with the further great advantage that they are not more than half the price. What a wonderful industry has sprung up in connection with the gelatine process! If it be true that the man is a benefactor to his race who gets a blade of grass to grow where one has never grown before, it cannot be denied that Mr. Bennett has proved himself a benefactor of no mean order.

A few years ago I was shown the album of an amateur at Warrington who worked exclusively the so-called "coffee process," and more beautiful views I have never seen. There was a richness, delicacy, and detail about them that was simply charming. I believe the coffee process was at one time used largely by the members of this Association, and I mention these views for the purpose of saying that good pictures can be produced by almost any process if one only determine to stick to it and not to be led away by the voice of other charmers, "charm they ever so wisely." If, when we get into the working of a process and succeed well with it, we are not satisfied to let well alone, but are always after the latest novelty, which is probably no improvement, the quality of our work will not be of a high standard—at any rate it will not be as good as it ought to be with those of us who have precious little time at our disposal. For others with ample leisure I would say—by all means experiment as much as you please, and possibly you may some day discover the Eldorado of photography, which, I suppose, is the securing of natural colours. No doubt many of us have been novelty-seekers. For myself, at anyrate, I may say I have tried numbers of new developers, each said by their originator to be of superior excellence. Some were strange compounds, and would not mix properly or filter clear, and were the opposite of improvement on old and well-established formulæ.

Then there is the matter of sulphite of soda in the developer. What difference of opinion about that! Indeed, in matters photographic opinions are diverse and often opposite. Some work in almost total darkness, while others use a fair amount of light in the dark room. Some recommend a good quantity of bromide in development, while others say none is needed. In these things each must decide for himself and work accordingly.

Next to these differences of ideas rapidity seems to be the order of the day; for are we not offered plates up to sixty times the rapidity of wet ones? For myself I should like to see gelatino-bromo-iodide plates in the market certainly not more rapid than wet ones, as I do not believe there is any advantage in this excessive rapidity for landscape work. For instantaneous pictures, of course, plates cannot be too rapid. For amateurs commencing the practice of the art a slow plate is most desirable, as there would be greater latitude in exposure and more certainty of obtaining a dense and vigorous negative.

If at the next *soirée* of the associated societies we could get together specimens of the photographic art from its commencement until now they would be very interesting and instructive.

The matter of the question-box has several times been mentioned, and, as we are having so large an increase of new members, it would be well if those seeking instruction on any point would make known their needs through the box, when, no doubt, they would get the information desired.

In concluding these rambling remarks I would express the hope that this year may be the most successful the Society has known. May there be a healthy stimulus and emulation among us! and may the weather so favour us that, when on photographic pleasure bent, we may come back laden with numbers of good negatives, which we shall have pleasure in submitting to our fellow-members, or reserving for the competition subjects or the presentation print!

The proof of the presentation print—an enlargement from a negative by Mr. J. H. T. Ellerbeck—was exhibited and approved by the Society. Mr. Ellerbeck also produced proofs of the pictures printed in platinotype, and these were preferred by many to the carbon prints.

Mr. Ellerbeck read a paper on a recent photographic tour across country in Prussia, and illustrated the same by about 100 views taken during his tour. [See page 65.] In answer to inquiries he stated that the stop used with a lens of thirteen inches' focus was one-eighth of an inch, which accounted for the extreme, almost microscopical, sharpness which characterised the prints. The usefulness of the actinometer was proved by the evidently correct exposure in all cases, even in the most difficult subjects.

Mr. Potter passed round a large number of very excellent photographs taken by him during his recent stay in South America.

Dr. Kenyon exhibited an improved mode of using the magnesium light, by burning the wire in an ordinary bottle containing pure oxygen.

Mr. H. Cussons sent, through the Hon. Secretary, his usual kindly gift of almanacs for 1883.

Mr. R. Crowe exhibited a camera, with a finder of his own construction attached.

After a hearty vote of thanks to the above-named gentlemen, the meeting was adjourned to the last Thursday in February.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

At the usual semi-monthly meeting, which took place on the 1st December last, the chair was taken by Professor Vogel.

A Provincial Member wrote to ask what was understood by "aurine." The explanation tendered was that it is a well-known aniline dye, which forms a red solution with alkalies and a yellow one with acids.

Herr A. Schwartz took the opportunity of remarking that the backing of dry plates with aurine collodion, which should prevent the halo round the image of very bright objects, had not had the expected results in his hands.

A second letter complained that negatives intensified with lead, according to Dr. Eder's directions, when drying after being washed, showed rents and sprang off the glass. The same thing had been remarked by several members of the Association, and it had been supposed that the properties of the collodion cotton exercised a great influence upon this matter; but the writer had tried a great variety of collodions without finding any difference in respect to this phenomenon.

Herr Grebner was of opinion that the composition of the collodion cotton was of subordinate importance in this case, but that by accident he had succeeded in finding a very certain method of preventing this fault. The fixed plate is laid in the following solution:—

Nitrate of lead	4 parts.
Red prussiate of potash	6 ,,
Distilled water	100 ,,

When this solution has acted sufficiently long upon the plate it is taken out and washed; it is then placed in a mixture of one part of a saturated solution of potassic chromate and five parts of ammonia, after which it is only *washed for a short time*. When thus treated, according to the speaker's experience, it was only when the plate was too long washed that it sprang off.

Herr O. Lindner complained of an instance of the bonus system. A woman called at his place of business to have her portrait taken, bringing with her a signed receipt for fivepence. It seems a certain E. Döring had called upon her and persuaded her to have her portrait taken and pay him a commission of fivepence, in consideration of which he signed the foregoing receipt, on the production of which, at any one of certain studios mentioned by him, an abatement of a certain percentage on the usual charges would be made to her. Herr Lindner's studio was one of these, but he (Herr Lindner) repudiated indignantly all connection with this or any other *tout*.

The Chairman showed a collection of views of the Munich Electric Exhibition, and a number of enlargements of photographic representations of sections of minerals and stones by Herr Grimm, who has already repeatedly sent similar collections.

Herr Schöne, of San Francisco, sent a collection of views of the Chinese quarter of that town.

The Chairman spoke at some length regarding the injurious action of certain substances sometimes contained in photographic mounts, and subsequently the same subject was discussed.

Shortly afterwards the meeting was adjourned.

Correspondence.

MICROPHOTOGRAPHY.

To the Editors.

Gentlemen,—The microscope has ever been a source of great delight and instruction to lovers of nature whose circumstances can afford the cost of a first-class instrument; but to the great masses of the people it has been a sealed book, consequently the unseen world of God's creative perfection in this revelation has been lost to them. Thanks to photography, as the handmaid of art and science, invention has come to the rescue.

The pioneers of this great movement in microscopy have been Dr. R. L. Maddox, Mr. Geo. Shadbolt, and Mr. F. Wenham, of London; also Mr. T. Higgins and Dr. Paul, of Liverpool. Now we have a new effort realised by Messrs. York and Son, London, whose photographic landscapes have long been known and appreciated. These gentlemen have now entered the field of microphotography, having produced 150 slides of exquisite delineation, all of which can be thrown on a screen—the size magnified to the extent of twelve feet in dimension. The lecturer can now bring this branch of science within the knowledge of any audience, however great in number.

The magic lantern has done more in the development of art, scientific and educational, than any other instrument during the last ten years; and, in the future, has in prospect a great field of usefulness. For six years I have given in Liverpool an exhibition of art slides every winter, and on each occasion, long before the time arrived for the commencement of the lecture, the hall at the Free Library has been filled to the door. At present, few lectures are given in Liverpool without the aid of the lantern.

To return to micro-illustration: there are peculiar difficulties in the way, such as colour or opaque objects, but these difficulties can be overcome; and I see no reason why pond-life, with its marvellous wonders in colour and animation, should not be effectively exhibited, thereby producing a charm beyond all description. Amateurs are doing a great deal in making the process of slide-producing simple; and in the course of a little time we may expect to see delineations of high-power subjects which will widen the field of microscopical investigation.—I am, yours, &c., Jas. Alex. Forrest.

Liverpool, January 29, 1883.

GREEN FOG.

To the Editors.

Gentlemen,—However much has been written about this ubiquitous creature of chameleon hue, you will not say enough has been published until its origin has been clearly traced, and we are safe from a recurrence of the plague.

In your issue of the 19th inst. "Shamrock" says:—"Mix how you may you will find the same appearance, if you will go on long enough with development, or over-development." On reading the foregoing, as it happened, I had just been testing two plates of a batch made by a friend. They were printed by superposition by gaslight, each having a safe edge—a good test for green fog. No. 1 was developed with a developer containing pyro., sulphite of soda, citric acid, and *ammonia*; No. 2 with the same formula, only substituting *washing soda* for ammonia. No. 1 developed quickly and *had* green fog; No. 2 was three times as long under the developer, and had *no* green fog.

This evidence, as far as it goes, militates against the theory of slow development being the cause of green fog, and favours the impression that ammonia has mvch to answer for in connection with this defect.—I am, yours, &c., Geo. S. Penny.

Cheltenham, January 27, 1883.

PHOTOMICROGRAPHY.

To the Editors.

Gentlemen,—I am sorry the engraver did not send me a proof sketch of my photomicrographic apparatus before it was inserted in the Journal. Every one present at the meeting of the Club can see what a misrepresentation it is; but those in the provinces and other places, who read the Journal, if they do not read the letterpress will wonder what fool is "rushing into print" now.

Will you kindly oblige me by doing what you consider best to rectify this, perhaps, pardonable mistake on the engraver's part. I know the photograph of the apparatus I sent was not good, and only intended as a guide to your artist. The chimney has been represented as perfectly black and as if my paraffine had smoked it dreadfully, and how could light get through that? Again: the outside tin chimney, which should cut off any light upwards, is entirely omitted.

If necessary, I will try and make *a drawing* for the next Journal if you cannot do without it.—I am, yours, &c., T. Charters White.

32, *Belgrave-road, S. W., January* 27, 1883.

[We find our artist has misunderstood the photograph sent to him, and has represented an opaque glass chimney to the lamp. This, of course, should be translucent, and with the addition of an ordinary bent chimney, such as is used in a magic lantern, in order to carry away the heat, &c.—Eds.]

SAVING SILVER WASTES.

To the Editors.

Gentlemen,—In Mr. Clement Williams's letter defending his method of using a zinc dish for the hyposulphite fixing solution I am at a loss to see how he can claim to obtain a "safer and more perfect fixation."

If I understand him aright he considers that the hyposulphite of soda is resuscitated by the deposition of the silver; but this is not so, as for every particle of silver deposited a particle of zinc is dissolved, and the bath will be as saturated with zinc as it would otherwise be with silver. What advantage would the former have over the latter? His plan of using a zinc jar or vessel is much to be preferred as far as giving a large surface, but the risk in this case would be that some fine morning the hypo. would be found wandering over the floor from the zinc being eaten away.

I have used unvarnished tin trays for development, both with ferrous oxalate and pyro., and I see no reason why zinc should not answer as well, so Mr. Williams has not astonished me on this point, as he evidently expected to do; but the chemical actions of the developer and hypo. on zinc are so different that this fact lends no force to his argument.

That he has for so long used his zinc tray without injury to negatives is his only strong point, but the risk of disturbing the deposit must be great; and the deposited silver is in so fine a state that once disturbed it would take a long time to settle, and woe betide the negative on which it did settle.—I am, yours, &c., W. Horseman Kirkby.

Liverpool, January 29, 1883.

EXCHANGE COLUMN.

I will exchange a handsome gold Albert and locket for a cabinet lens and camera.—Address, Photographer, Fore-street, Abingdon.

I will exchange a Fallowfield's nickel-silver rolling-press, *carte* size, new, for a single landscape lens ten inches focus; difference in cash.—Address, 6, Ann's-place, New Charlton, Kent, S.E.

I will exchange a first class extra-rapid quarter lens (by Squire), a posing table (carved), also a profile painted balustrade, for a half- or whole-plate bellows folding camera and landscape lens, and double slides; must be in good condition.—Apply W. Mallin, Talbot-street, Southport.

Thirty-six cell bichromate battery, seventy-two one-pound zincs and thirty-six carbons, braced together to lift out of solution as a whole, mahogany cells in three troughs of twelve each, also two Swan's twenty-five candle lamps. Wanted in exchange lime-light apparatus.—Address, E. A. Maxwell, Hadley Green, Barnet.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

H. S. Storey.—The enlargement is certainly not so good as it might be, as you suggest.

Jas. Fletcher.—You will be able to obtain a circular spirit level at any photographic warehouse. The cost is very trifling.

H. Jacobs.—Either way, whichever is more convenient. It is usual for the spectator to view the image *on* the screen and not through it.

W. W.—The deposit, we imagine from your description, is oxide of iron; but we do not see how you can remove it without injury to the film.

Sigma.—Clearly the glass was not thoroughly clean, and that is the cause of the marking on the transfers. The glass appears to have been rubbed either with a dirty cloth or brush after it had possibly been properly cleaned.

Lux.—The best plan for you to pursue in mounting is that which you have hitherto employed, with this exception—instead of thinning the solution with water, thin it with alcohol; methylated spirit will do. The spirit will not cause the paper to cockle, as water does.

Will-o'-the-Wisp.—1. Yes, certainly.—2. Quite as rapid.—3. Make up with a mixture of equal parts of the two gelatines mentioned (if you prefer those), so that the emulsion contains twenty grains of gelatine to the ounce.—4. The quantity should be made up to twenty ounces.

W. Hart.—Extra sensitiveness requires extra care and skill in the preparation of the emulsion, and greater care in the manufacture of the plates; hence it is not to be wondered at, we should have thought, that an extra price is charged for plates having an extraordinary degree of rapidity.

J. Rayner.—It is impossible for us to say who is the maker of the lens in question without seeing it. Why not write to the firm whose name it bears, if you are anxious to learn? If you send the lens here we will give you our opinion upon it, and, possibly, inform you the name of the manufacturer.

Canvas.—There is no very satisfactory method of preparing canvas upon which to enlarge direct. The best method of producing enlargements on canvas is either by the powder or the carbon process. The same processes are well adapted for pictures on opal, as you do not like the collodion process for the purpose.

Boiler.—An ordinary gas stove on the Bunsen principle will be the best source of heat for your purpose. There is a kind sold under the name of "French gas stoves" which you will find very convenient. Mr. T. Fletcher, of Warrington, has some very convenient forms, which will answer your purpose admirably.

Subscriber.—Certainly the production of photographs on zinc plates is a daily occurrence; but the work is not done in the manner you propose. A suitable method in your own case will be to coat the plate with a thin film of bitumen, expose in the printing-frame under a negative in the ordinary way, and develope with turpentine.

A.A.A.—Yes, it is quite correct that good black tones can be obtained in silver prints without the use of gold, and the earlier prints were so produced, the toning agent being sulphur. But the prints proved to be very fugitive, as they quickly faded; also, the whites, as a rule, had a sickly yellow appearance. Hence sulphur toning was replaced by that of gold.

A. Warman.—The flat appearance of the developed print is due to fog from some cause or other—possibly from too little acid in the developer.

Received.—Archer Clarke; R. A. Hunt, M.A., F.G.S.; George Smith. In our next.

Photographic Club, Ashley's Hotel, Henrietta Street.—The subject for discussion at the next meeting, to be held on Wednesday next, the 7th inst., will be *On the Most Suitable Outfit for Amateur Photographers, and How Best Carried.*

"Brilliant."—We have received from Messrs. Adams and Co., of Liverpool, a bottle of their preparation for clearing negatives, to which they have applied the name "*Brilliant.*" We shall take an early opportunity of trying its efficacy, and report in due course.

Curious Action Against a Newspaper.—On Thursday, the 25th ult., at Nottingham, the proprietors of the Nottingham *Evening Post* were prosecuted by the Treasury under the Lotteries Act. It appears that about Christmas certain photographers in Nottingham made arrangements for lotteries, by which cabinet photographs were given to holders of one shilling tickets. In addition to the proprietors of the *Post* the photographers in question were summoned. Their advertisements had appeared in the *Post*, which gave rise to the summons against the newspaper for publishing a lottery scheme. The offence was admitted, and it was pointed out that, as soon as the proprietors learned that the act was illegal, the advertisement was stopped.—The case against the *Post* was dismissed, and the other defendants were each fined 10s.

The Recorder of Liverpool on Photographing Prisoners.—At the Liverpool Court of Quarter Sessions, on Thursday, the 25th ult., William Henry Jackson (63), hawker, was sentenced to eighteen months' imprisonment for having on December 22nd stolen a watch, the property of Thomas Acton Baines, and also for having attempted to steal certain articles the property of Thomas Ogilvie. It was stated by Mr. Robinson, chief warder of the city prison, that the prisoner had refused to sit for his photograph in gaol.—The Recorder remarked that he thought the prisoner's consent was rendered unnecessary by the instantaneous process of photography.—Mr. Robinson: That process has not been introduced into the gaol.—The Recorder said that with so liberal a Government and with so liberal a Treasury there ought to be no difficulty in obtaining the requisite appliances. If the suggestion had been made by him to the justices when they had control of the prisons it would have been at once carried out.

Microphotography.—On Thursday evening, the 25th ult., Professor Miall, of the Yorkshire College, delivered a lecture to the members of the Students' Association on *Microphotography.* He stated that the essential parts of the process were the formation of a microscopic image and the action of this image upon a sensitive plate. The microscopic arrangements did not essentially differ from those of the working microscopist, and the photographic manipulation was that of ordinary photography. If worked with low powers the difficulties were not great, and the process was to be recommended to all who required an exact copy of a microscopic preparation. As the magnifying power was increased the difficulties grew in a rapid ratio; and in a climate like ours, where steady sunshine was not to be counted upon, microphotography with high powers had hitherto proved almost impracticable. There was reason to believe that the electric light would shortly be available. At present the arc lights were costly and troublesome on a small scale, and incandescent lamps, if worked so as to get a sufficiently-actinic light, were not very lasting. After some preliminary explanations the process was demonstrated to the audience, and the negatives so obtained were exhibited by the aid of the lime light.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For two Weeks ending January 31, 1882.

These Observations are Taken at 8.30 a.m.

Jan.	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
18	30.16	SW	51	50	—	52	40	Overcast.
19	30·33	E	41	41	—	51	37	Foggy.
20	30·21	W	50	48	—	51	37	Overcast.
22	30.50	E	43	41	—	45	39	Overcast.
23	30·73	SE	35	34	—	40	31	Hazy.
24	30·33	SW	34	32	—	37	28	Hazy.
25	29·64	W	38	36	—	48	31	Overcast.
26	29·17	W	30	36	—	45	34	Cloudy.
27	29 73	W	32	36	—	50	33	Overcast.
29	29·55	W	52	51	—	54	41	Overcast.
30	29·60	W	39	32	—	46	33	Fine.
31	29·54	SE	35	34	—	40	30	Foggy.

CONTENTS.

Sprague & Co 22, Martins Lane Cannon St EC

"THE FLOWER GIRL".
By Alexander Cowan.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1188. Vol. XXX.—FEBRUARY 9, 1883.

OUR ILLUSTRATION.

The picture which we present with the present number is by Mr. Alexander Cowan—a gentleman well-known alike for his manipulative and artistic skill, as well as for his ability in experimental matters. The *Flower Girl*—an enlargement of which appeared in the exhibition of the Photographic Society of Great Britain in 1881 —was considered by many to be the gem of that year's collection, although it was not honoured with a medal. It will, we trust, form, especially for our country readers who have not opportunities for visiting the exhibitions, a valuable study in the artistic grouping of figure and accessories.

EMULSIFICATION WITH CARBONATE OF SILVER AND BROMIDE OF AMMONIUM.

Since writing a fortnight ago on this subject we have continued our experiments with the emulsion then described, and with various modifications of the formula then given; but we are not able to record any great amount of success in the endeavour to dispense with the troublesome operation of washing. Further than this: the emulsion, if kept in the liquid or even in the "jelly" state for more than a certain period, begins to develope symptoms of fog and, moreover, actually becomes slower in action instead of increasing in rapidity.

These results have not only disappointed but have also surprised us; for, though we were prepared to have a certain amount of fog (or tendency to fog) to fight against, the gradual loss of sensitiveness was quite unexpected.

The emulsion to which we referred in our last article was used up in coating successive batches of plates at intervals of twenty-four hours, the last batch being coated ten days after the preparation of the emulsion. It will simplify our description of the results if we say that the increase of fog and decrease of sensitiveness progressed with the greatest regularity in the different batches; so that it was possible, with the greatest certainty, to pick out, from a number of plates treated identically and developed in the same dish, those which had been coated at the early and those at the later stages of the ripening of the emulsion.

In another series of experiments we found that even among the plates of the same batch—that is, the plates coated and dried side by side—a change, though less rapid, occurred. For instance: a plate from the batch coated four days after mixing the emulsion, and which was exposed and developed as soon as dry, proved, according to the actinometer, from four to five times more rapid than another (of the same batch) which was not exposed and developed until three days later, the latter being at the same time much more heavily veiled.

This set us experimenting to discover whether the mere presence of the carbonates of ammonia (and of the ammonia liberated therefrom) could be the sole cause of this peculiar effect. We may here remark that in the same room and, indeed, on the same shelf upon which some of these plates were stored, there were at the same time other plates prepared by different processes; and to show that the fogging and loss of sensitiveness had not arisen, as we suspected they might, from accidental access of light or deleterious fumes, it was found that the latter developed perfectly clean and showed no progressive falling off in rapidity.

To try, therefore, whether the ammonium carbonate was in fault, several plates picked from different batches were soaked in several changes of water for about half-an-hour, and were then drained and dried. These, on comparison with previously-developed plates from the same batches, showed nearly identical qualities both as regards sensitiveness and clearness, but they developed much more rapidly. Another set were immersed for five minutes in a ten-grain solution of potassium bichromate, and then washed for an hour in several changes of water and again dried. These on exposure proved to be about equal in sensitiveness to their respective comparison-plates, but showed little or no sign of fog, and developed as rapidly as those in the previous lot.

This would seem to show that the continued contact of the gelatine and silver bromide with ammonium carbonate and free ammonia sets up a gradually-increasing fog, which also in its turn brings about insensitiveness. That this change is more rapid while the emulsion is in the wet state is not to be wondered at; nor is it surprising, looking at the unstable character of carbonate of ammonia, that it should continue after the film is dried.

Two more experiments produced similar impressions. Plates (prepared by other methods and known to be good) were immersed in carbonate of ammonia, carbonate of soda, and bicarbonate of soda respectively—each in ten-grain solution. After drying these were exposed and compared with similar plates untreated, with the only result that the development was slowed. Secondly: a fresh emulsion was made with carbonate of silver and bromide of ammonium, and after five hours' cooking at about 140° Fahr. it was allowed to set, and was washed in the usual manner. The resulting plates were quick, clean, and in every way good.

We shall probably return to this subject shortly, but must say that, so far, the only real gain we have recognised is that the carbonate seems to be a perfect cure for "pits."

HINTS ON THE PACKING AND TRANSPORT OF NEGATIVES.

Which is the best and safest means of transporting negatives from place to place? Now that so many demands are made from negatives which the majority of photographers are unable to supply without external aid—such as enlargements, Woodburytypes, collotypes, or prints by the numerous other mechanical processes—it is perforce compulsory to forward the negative very frequently a long distance for the execution of the order. Consequently its safe transmission becomes an important affair, and it needs no apology on our part for referring to it, simple matter as it may appear.

It is by no means uncommon for us to receive from correspondents seeking information a negative (or, to speak more correctly, the fragments of one, for it invariably arrives smashed to atoms) by post, simply placed between two pieces of board, or perhaps millboard, and sometimes even thin cardboard. One would have

thought that common sense would have suggested a different mode of packing, but such is the fact. In some instances, instead of receiving the negative itself, we have received a formal intimation that a packet containing glass addressed to us is lying at the district post-office, and it will be given up on personal application.

Again: we have on several occasions been asked by correspondents if they cannot recover compensation from the post-office for negatives broken in transit. Now, it does not appear to be generally known that, according to the post-office regulations, glass, in any form whatever, is strictly forbidden to be sent through the post at all; but, as we all know, if it be packed in such a way that it cannot be seen, and so that it cannot cause injury to the officials or to other parcels, it is, at least, tolerated, and thousands of negatives are thus daily transmitted from one place to another. That this can be done is a great boon to photographers; for, with small parcels of one or two negatives, it is not only the most expeditious but also the cheapest mode of conveyance.

In sending negatives through the post they should always be packed in a wooden and not, as is frequently done, in a cardboard box; for, if it be in the latter, there will necessarily be considerable risk of its being smashed when the obliterating and different office stamps are applied, which is generally done with a somewhat heavy blow. The box must not be too thin, as is often the case, with a view to saving postage, and the negative should also be well protected, and not be allowed to touch any portion of the box itself.

The best plan of packing is to have a box somewhat larger than is really necessary to contain the negative, and to place at the bottom some pieces of paper roughly crumpled up, or paper cuttings (trimmings of prints answer well), and on this lay the negative; then pack the sides with more paper to prevent a lateral movement, and fill the box up with more of the same material. Care should be taken that the paper is packed somewhat loosely, so that it forms an elastic *couche* for the negative. When a negative is thus packed there is very little risk of its being injured by the post-office stamp or by rough usage, which would be the case were it in contact with any portion of the box itself. It is a very common practice for the address to be put on the package. This is a mistake. It should always be written on a luggage label tied to the box; then all the stamping will be done on the label instead of the package—a further security against injury. The word "glass" should never appear on a parcel sent through the post, as that is a prohibited article, and it may therefore cause delay and trouble.

When several negatives at a time have to be transmitted, it is best to send them by rail or through some of the numerous carrying agencies. The quickest plan is to forward them by rail direct, now that most of the railway companies carry small parcels by passenger trains at extremely low rates. When forwarded through agents they are, as a rule, longer in transit. Too much care cannot be exercised in the packing, and, as a slight increase in weight makes but little, if any, difference in the cost for carriage, the boxes or packing-cases should therefore be made much stouter in proportion than those used for posting.

A very common method of packing negatives for transmission by rail is in grooved plate-boxes, the tops and bottoms of which are padded with india-rubber. When this method is adopted the space between the plates should always be filled up either with fine sawdust or bran, otherwise, should the box be dropped or submitted to rough usage, the concussion frequently breaks the glass. Perhaps the best method of packing negatives for travelling is to make them into a solid parcel with paper between each, securing the package with sealing-wax instead of string. This parcel is then packed in a stout box, with plenty of straw or crumpled-up paper, so that it is well protected from all sides of the box. As an extra precaution, if there be many negatives or those forwarded are very valuable, it will be well to put the box into a second one, as by this means all risk of the first one being injured by other packages in loading or unloading is avoided.

We have known instances where negatives, packed with every care, have been broken by a nail driven awry in fastening on the lid, and also by using tacks too long to secure the address card. Accidents of this kind—which, by the way, are not discovered till the box is unpacked—may always be avoided by employing boxes considerably larger than is absolutely necessary to contain the negatives. Bran or sawdust is frequently used instead of straw for the purposes of packing; but we prefer the latter, for with much jarring on a long journey the parcel of negatives is apt to work to the end of the box, and thus become liable to injury by rough usage.

All packages sent by rail or similar conveyances should be conspicuously labelled "glass," and then the company or agents are responsible to a certain extent for damage sustained. It is best, however, to avoid having to call upon them for compensation by careful packing; for it is seldom that the sum recovered is commensurate with the loss sustained. We have known instances where the judge, in a suit for compensation for broken negatives, has only awarded the claimant the bare value of the glass itself and the chemicals upon it, taking no heed whatever of the value of the negative as a picture. When negatives of great value are forwarded it is better to insure them for a definite amount. This may always be done at a trifling cost on declaring their value at the time of booking the parcel, and then the carriers will be responsible to that extent in case of breakage.

There is one other matter in connection with the packing of negatives to which we will direct attention. When they have to be sent great distances, or when it is anticipated that they will be a long time in transit, care should be taken that the packing material is thoroughly dry. We once saw a number of valuable negatives (collodion), which were sent from Africa to illustrate a work, completely spoilt by the well-known vermicular cracking of the varnish and loosening of the film. The negatives had been most carefully packed (for not one was broken) in grooved boxes, and the interstices between them filled with the husks of some kind of seed; but, unfortunately, these at the time of packing were damp, and so the whole of the negatives became irretrievably ruined. If this happened with collodion, how much more likely is it to happen with gelatine should the packing be at all damp! On the other hand, it is not advisable that it should be abnormally dry; for we all know that when gelatine is made absolutely dry it contracts very considerably, and there might then be some risk of the film splitting up and leaving the glass, although we have not seen an instance of its doing so when the negative has been varnished. Still, such a thing is within the bounds of possibility.

EXPRESSION IN PORTRAITURE.

By an accidental coincidence our readers last week had an opportunity of perusing the views of two writers upon the question of expression in photographic portraits, a paper by Mr. H. S. Starnes and one read at the last meeting of the Photographic Society of Great Britain having both been published in our pages at the same time. The subject is one of particular importance to photographers, the more so as, at the present time, the impression seems to be gaining ground that the better-educated public are inclined to rebel against the excessive extent to which the retouching of negatives is now carried by so many firms. "They are sick of the bladder-of-lard business," a clever painter, who is no opponent of photography, said to us a short time ago.

Yet to some extent this appears contradictory; for, taking the average photographs of a little over a dozen years ago, it will be found that they were characterised by great uniformity of expression in one direction, in that few were without that puckered brow which was an almost necessary consequence of the glare of the bright studio light. Retouching quickly got rid of that difficulty, and, if allowed to remain there, would have been a gain which no one would have denied. It has been extended in other directions with further amelioration of bad points; and, further still, in a totally illegitimate and inartistic manner, by means of which expression has totally gone to the wall in the endeavour to obtain a silly smoothness fatal to expression, character, and all real artistic merit.

We are afraid, however, that too much is expected of photography, and it will always remain a truth that a large proportion of photographic portraits will be objected to on the score of expression. We

ıall, we need scarcely say, in the course of this article, use the ·rm, not in its wider artistic sense applying to the picture as whole, but only in its more restricted form as applying to facial ıaracteristics. It is well known that one of the leading continental hotographers, whose works were of the highest class and perfect in ›rm and execution, retreated from photography in despair of its mited scope. He was a true artist, and could feel the extent to hich he was trammelled by photography, though there have been ;her artists of great skill who have appeared to be able to do almost ıything with the camera and lens.

The great point as regards expression—to which we allude in ›eaking of the frequent impotency of photography—lies in the fact ıat, though many people have an habitual expression, the mental nage or the apparent recollection which one friend has of another oes not consist of a single characteristic phase of the facial play. 'he mind averages, as it were, a number of expressions; the whole ·tained image of a friend's features are decidedly misty, and mbrace or allow a multitude of expressions — all blended and ıought of as one decided and distinct picture visible to the mental ye. If there be one thing more than another in this connection 'hich may be held as a positive fact, it is that the actual features of person are what his friends know almost less about than a casual acuaintance. It is only necessary to look at a well-known face through he intervention of a mirror to perceive this: how crooked it intantly becomes! The cause is that the mind has already been at work roducing an average and not the real thing in the brain, and the ›nsequence is that, when through the reversal the real thing is rought to view, its very irregularities become all the more striking wing to contrast with the picture which fancy painted.

And so it is with expression. If a "natural expression," as aserted, were found in everyone, the present rapid mode of taking ortraits would discover it and enable it to be portrayed, yet every hotographer knows such is not accomplished. It is in the experience f every photographer how the eternal question of expression will ome to the front. "Yes, this is charmingly taken; but it is not ıy expression," is a stereotyped formula employed to the portraitist y his frequent torturers—the members of the "general public." 'hey do not intend to be unjust. It is simply that the picture fails o realise an impossibility; that is to say, to commit to paper in one pecial expression the mental average they have formed.

Another great difficulty exists when faces are changeable as the motions or feelings are expressed. No one would like to be repreented with a decided smile or laugh on his face.. "How large the nouth is!" would be the instant exclamation when such a picture was hown, the truth being that in the ever-changing and varied play of the features the observer, unless trained and naturally acute, ıtterly fails to catch each phase, and the average is again formed.

A well-known photographer has given much amusement by narating his experience with quick plates. A sitter arrives who states how difficult it is to obtain a picture giving her correct expression, and a message is sent to the photographer in his studio. He poses ıis subject, and, with the help of a Cadett shutter inside his camera, secures a couple of pictures without her being aware of it. She is delighted when informed that the "operation" is over; but when the picture comes home the expression, as usual, is disapproved of, and its failure is explained by the naïve contradiction—"Oh! I was not told when I was being taken, or I should not have put on that expression!"

All the photographer can do is to put his sitter as completely at ease as possible; to make the sitting as short as he can; to use and train his judgment in the expressions he observes; and not to ruin his negative by taking out all individuality in his sitters' faces by illegitimately retouching them.

It will be within the recollection of many of our readers that, some two years ago, Mr. L. Warnerke and Lieutenant Darwin independently, but almost simultaneously, published what was described as a "new system of photography." This consisted in exposing a phosphorescent tablet under a negative so as to form a luminous image, which, in turn, was to be placed in contact with a succession of sensitive plates, and so produce a number of *facsimiles* of the original with only one exposure to light. No practical application has, so far as we are aware, yet been made of this principle, owing to the difficulty in obtaining a sufficiently sharp impression. This defect was attributed to the want of perfect contact between the phosphorescent surface and the negative and sensitive plate, caused by the slight roughness of the layer of luminous paint. We have recently had an opportunity of proving that this is not really the cause, but that the loss of sharpness is occasioned by the "lateral spreading," if we may so term it, of the light in the phosphorescent substance or on its surface. Having occasion to cast a thick slab of the mixture of paraffine and sulphide of calcium upon a plate of glass, the mass, when cold, left the glass with a perfectly smooth and polished surface, and sufficiently flat to give as perfect contact as is usually obtained in contact printing. This tablet, however, when applied as indicated above, failed to give a sharp image on the gelatino-bromide plate. This is to be regretted, for otherwise its behaviour was excellent, a single insolation sufficing for the "exposure" of five successive plates, the last being impressed thirty-five minutes after the luminous image was formed.

The achromatism of lenses possesses well-known importance in connection with photographic work; but many who would wish to learn something theoretically about the subject are driven away by its mathematical surroundings. An interesting experiment is described in a scientific contemporary, which would be very instructive to anyone wishing to know more about achromatism than the fact that such a quality existed in a well-made lens. Taking a lens and holding it in the sun, a little above a bucket of slightly-turbid water, the cone of light produced may be seen tracking its way through the water like a sunbeam in the air. If the lens be not achromatic there will be seen the effects of both the spherical and chromatic aberration painted on the motes suspended in the water. The former shows itself as a central bright line, starting somewhat beyond the apex of the cone formed by the rays from the marginal part of the lens; but the writer says it is the chromatic aberration, which is most beautiful in this experiment. *Before* the crossing of the rays at the focus the cone of light is tinged with red, and *after* having crossed the colour is blue, the latter rays having passed from the inside to the outside of the cone. A piece of white card placed in any part of the cone will show both blue and red rays in their proper place. An achromatic lens (if possible of about *the same focus*) can next be used, and the difference in the performances of the two will be most striking.

Apropos of the subject of balloons, which possesses a great fascination for photographers, it may be stated that at M. Tissandier's aëronautical workshops a trial was made on the 26th ult. of a new apparatus that gentleman had designed for actuating balloons by electricity. The total weight of machinery and battery is a little under a quarter of a ton. Dupuy de Lorne obtained the same amount of energy by employing eight men—a much larger weight.

We are surprised that of all accounts of the sea serpent none have been accompanied by photographs. There is, however, now a good opportunity for the enterprising photographer. A gentleman writing to *Nature* describes a sea serpent which he and several other veracious witnesses saw in Llandudno Bay a little while ago. This account is followed by that of another gentleman, who has often seen a precisely similar appearance to that described by narrator No. 1; but—there is always a "but"—narrator No. 2 says the appearance was that of a shoal of porpoises. If he could only manage to secure a photograph!

The electric light has by many been considered especially safe, and it has been confidently expected that the high rates of insurance to which photographers are subject would, if not reduced, at anyrate be not increased; but in places where electricity as an illuminating agent has been in use for some time the number of fires from this "safe" agent have been most remarkable. So far from being reduced the fires have increased in number. Thus, the agent for

Boston underwriters states that in sixty-one mills the fires caused by electricity in about six months have been twenty-two—a far greater number than have been put down to gas. At the same time the aggregate or average loss has been less than from the gas-caused fires. Further: the causes have been discovered and are preventible in the main; and, lastly, no fires at all have been caused by the incandescence light, which the fire insurance companies hold to be the light of the future.

PHOTOGRAPHING THE TRANSIT OF VENUS.

A transit of Venus is such a rare phenomenon, and such elaborate preparations were made at different stations throughout the world for photographing the one that occurred last December, that the readers of The British Journal of Photography may possibly be interested to hear how the said transit was photographed, at a moment's notice, by an amateur, in a very rough and ready way.

Before the eventful 6th of December, 1882, arrived, it had often occurred to me that it would be interesting to get a photograph, however small, as a memento of so rare an event as a transit of Venus; but the chances of fine weather seemed so bad, considering the time of the year, that I had no heart to make any preparations whatsoever. Thus it came to pass that I had observed both the external and internal contacts of the planet with the sun before I had unpacked my camera, and then it was high time to "wake up" if a photograph were to be secured at all.

My telescope is one of Baker's, with a 2¼-inch O.G., of 36-inch focus, but I had been viewing the transit with a spare 2½-inch O.G. by Wray. This objective I determined to use as a camera lens. Seizing the cap of my telescope, I rushed to my lathe and drilled a hole in it for a stop. The size of the drill I did not notice at the time, but it proved to be three-eighths of an inch. Returning to the telescope I found, to my dismay, that I had forgotten that the "Baker" cap did not fit the "Wray" objective, so the "Wray" must instantly be discarded. This was done, the "Baker" objective substituted, and the impromptu stop put on. I then applied an expanding camera to the telescope, but found the sliding tube of the latter was too large for the flange in the camera front. In half-a-second the camera front was off, and the large tube of the telescope applied to the awkward oval aperture that disclosed itself. How could this be made light-tight? Well, a red bag used for dry plates had to serve as packing, and answered the purpose fairly well. Having got so far—or, rather, before having got so far—the camera had to be propped up on books on an inclined plane, parallel with the telescope; and this was a ticklish job, even though the volumes used were those of "*Nature*" itself.

At this stage I found I had a very pretty little image of the sun on the ground glass rather more than five-sixteenths of an inch in diameter, with the planet very visible on it. But how was this to be photographed on instantaneous plates with no snap shutter? Very poorly, I apprehended; but, having nothing but "Hobson's choice," I chose that rather than none. During the summer I had been trying my 'prentice hand with gelatine plates, and had by me a box of Edwards's "XL," and some by another maker. I chose the former as I fancied they were a trifle slower and easier to work, notwithstanding that they had not been too slow on one occasion to catch the sails of my boat flapping in a breeze.

My intention was to expose the dozen as quickly as possible in order to get enough plates to experiment with, as I was in despair when I thought of what would happen on development. I exposed the contents of two double-backs with no little trouble, as the sun kept on escaping, the books tumbling down, and the packing round the telescope coming out. On changing the plates I returned to the charge; but then, on exposing, managed to forget which plate I had exposed, and in the uncertainty only exposed three out of the four. Two of these were exposed whilst clouds were passing, to see what would be the result. Clouds then completely obscured the sun for a a considerable time, and I at once proceeded with the development.

Now, what developer to use was a question of no little perplexity, and in truth I had forgotten the ordinary formula for Edwards's plates. I looked at the instructions and refreshed my memory, but what proportions to use for a photograph of the sun without an instantaneous shutter I had no idea. I thought I would try the ordinary solutions in the proportion of about five of bromide and ammonia to one of pyro. and glycerine. This I applied to one of the plates, and to my satisfaction saw a pretty little cloud picture develope and come up to good intensity. Wishing to check still further the development of the pictures of the unclouded sun, I added a good pinch of crystal of bromide of potassium to the developer, as already described, and I think a little more pyro. solution. With this I developed the remaining six exposed plates. The bromide quite controlled all over-exposure, but the non-intensity was troublesome and required mercury. However, the result was that I found myself with three good negatives, two bad ones, and one useless one, out of seven plates exposed.

I think these plates were all developed before the sun reappeared from behind the clouds, so that, not only were the preparations for photography begun *after* the transit commenced, but the pictures were all secured *before* the phenomenon of the transit was over at four o'clock, when the sun with the dark black spot upon it sank behind a bank of clouds. The first negative developed proved the best. The clouds make it picturesque, and it provides me with exactly what I desired, namely, an interesting memento of the transit of Venus as seen from Torquay. I may add that the negatives bear enlargement some four and a-half diameters very fairly.

Arthur R. Hunt, M.A., F.G.S

ON SOME PRACTICAL METHODS OF INTENSIFYING GELATINE PLATES WITH SILVER, INCLUDING LOCAL INTENSIFICATION.

Prepare a silver solution as follows:—

No. 1.	Silver nitrate	1 ounce.
	Water	12 ounces.
No. 2.	Potassium bromide	¾ ounce.
	Water	2 ounces.
No. 3.	Thiosulphite of soda (hypo.)	2 „
	Water	6 „

Add No. 2 to No. 1, and, after washing the precipitated bromide thoroughly by decantation, dissolve it with agitation in No. 3. The muddy liquid thus obtained is either filtered *perfectly clear* or placed aside for a day and the clear solution syphoned off; it is then made up to sixteen ounces with water and kept for use.

Method No. 1, with Pyrogallic Acid.—To intensify a plate wash pretty thoroughly after fixing, and, taking it on a pneumatic holder, flood with the following mixture:—

Pyrogallic acid	4 grains,
Water	2 ounces,
Silver solution	1 drachm,

to which is added immediately before use about half-a-drachm of dilute (1 to 8) ammonia. It is impossible to give the exact quantity of ammonia, as it appears to vary considerably with the temperature of the solution and other slight differences. If the silver show no tendency to reduction add more ammonia, and if it be thrown down immediately use less; with a little experience the appearance of the liquid shows when sufficient is added. Obviously, the requisite quantity of pyrogallic acid and ammonia can be taken from the ordinary developing solutions. A small quantity of soluble bromide added with the ammonia does no harm; and if glycerine be present, as in Mr. B. J. Edwards' formula, it is a decided advantage. The plate should be gently rocked and fresh solution poured on as the image gradually increases in density. If not sufficiently dense and the solution be muddy rinse the plate and use fresh. When the required density is obtained rinse the plate, place it for a short time in the fixing bath, and finally in the clearing bath.

As might be expected from this mode of procedure the pyro. has a great tendency to stain the film yellow. Now, while this can be removed in the alum bath, "prevention is better than cure;" and by employing pyro. preserved in sulphite of soda, as described by Mr. H. B. Berkeley, a beautiful intensifier is obtained.

Method No. 2, with Ferrous Oxalate.—Immerse the washed plate in the silver solution and leave it there for five minutes; take out, drain, and flood with an ordinary oxalate developer, when the image will rapidly increase in density. Rinse the plate and place in the fixing and clearing baths for a short time, as before. If the plate only require slightly intensifying dilute the silver solution more or less, as desired.

Local Intensification.—This, with a little care, can be readily accomplished by several devices. Thus, in the first method, if a little of the fixing bath be applied with a soft sponge to those parts of the plate which are sufficiently dense, on applying the solution only the remaining portions will be intensified; and by the second method, after soaking the plate in the silver solution allow it to drain, wash off the silver with the hypo.-moistened sponge from the parts desired, as before, and on applying the developer you get local intensification *ad libitum.*

Note.—There is no limit to the amount of density that can be obtained with either method; both are applicable to either pyro. or ferrous oxalate development. A trace of hypo. in the film, instead of causing red fog, as in the ordinary method, *prevents it* in this case, so is an advantage; but if present in any quantity the intensification is also prevented. E. HOWARD FARMER.

PHOTOMICROGRAPHY.

HAVING myself tried photomicrography with fair success I propose to describe the apparatus I have employed, and which appears to me to offer some advantages over all that have yet been described.

The objection I offer to the simple and ingenious apparatus of Mr. J. Charters White is that it requires a darkened room, and, therefore, solitude, or at anyrate only the companionship of a fellow-worker; whereas, if some sort of camera be employed, the whole operation, except developing the plate, can be carried out in an ordinary sitting-room without interrupting the regular vocations, and the proceedings followed with interest by the family circle—a point to which I attach special importance.

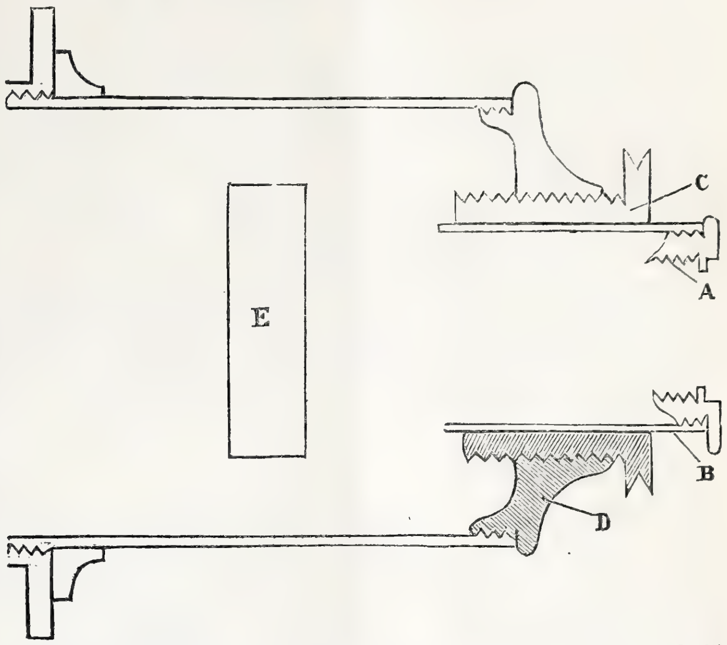
The first thing to be provided, therefore, is an adjustable camera. I happened to possess a couple of boxes with sliding lids about fifteen inches long and some five inches square. Very similar boxes are used for packing cambric handkerchiefs in, and could probably be procured from any linen draper for a few pence; or, if not, would not be an expensive item to have specially made. I then knocked out one end of each box, took a large sheet of millboard, which I folded up so as to fit the inside of the wooden boxes quite loosely, the two edges well overlapping at the bottom. By inserting one end of this millboard tube into each wooden box my sliding camera was made. It was now thoroughly blackened with a good dead black inside. An empty milk tin, half filled with vegetable black mixed up into a thick paste with ordinary spirit varnish, and then diluted with methylated spirit—all to be obtained for a few pence from any oilman—gives an excellent dead black, which dries in a few minutes.

The next thing was to procure a board the full length of the camera when extended to the length of the two wooden boxes *plus* the millboard tube, and to cut it to the exact width of the camera. The box which was to convey the optical arrangement was then screwed down to this board, and on each side of the other box a couple of pieces of wood were fastened projecting over the edge of the base-board, so as to form guides and allow the rear end of the camera to slide. A circular hole in front for the micro-attachment, and a $4\frac{1}{4} \times 3\frac{1}{4}$ hole at the rear end with grooves to take a quarter-plate dark slide, completed the whole camera within a couple of hours.

I preferred to put the whole of my micro-attachment inside the camera, because I consider that too many precautions cannot be taken to keep all extraneous light away. The sliding lid to my camera box renders it easily accessible for adjustment, changing the slide, &c., while, with a cloth thrown over it when once adjusted everything is perfectly light-tight.

I first took an ordinary microscope objective box (which has the standard thread on the lid), cut off the bottom, and turned out an aperture in the lid. This gave me a tube to which I could fit any microscopic objective. I then made another tube, which, when lined with cloth, this objective box tube would fit, and put a screw-thread on it outside for its whole length—about three-quarters of an inch. Thus, the sliding tube gives me a coarse adjustment and the screw-thread a fine adjustment, and with an adapter I could employ any objective. For the sake of clearness I will call this double tube the "lens carrier," which has now to be fitted to the stage or slide carrier. This is a brass tube two and a-quarter inches in diameter, fitted with a flange for screwing to the camera, a slot through which to pass the slide (with springs to hold it in place), a second slot for diaphragms, and a front or cap with a screw-thread on it to fit the lens carrier. The annexed diagram will make all clear.

The focussing is done roughly by the sliding tube of the lens carrier. Both sliding lids are taken off the boxes, the image obtained on a piece of white cardboard at the rear end, and then comes the real difficulty—obtaining the fine focus on the screen. The grooved pulley on the lens carrier carries a cord, which passes once round it, and is then carried through a hole on each side of the camera over a little pulley and back to the rear end of the camera; thus the fine adjustment is effected with the greatest ease and nicety. The real trouble is to decide when the sharpest image is obtained. The finest ground glass is infinitely too coarse. I myself do not use any screen at all but, using the focussing-lens as an eye-piece, and fixing it in the position which the plate will afterwards have, slide the rear end of the camera in and out as a final fine adjustment, and find that I get in my negative exactly the same definition which I have seen.



A standard thread on lid of objective box B. C tube in which B slides fitted with grooved pulley for fine focussing with cord, and screwing into the front D. E slot for slide and diaphragms.

Microphotography is essentially work for young men. After forty everyone is more or less afflicted with old sight. My own sight is still perfect, judged by the ordinary test of being able to define one minute of arc. I find that I not only can do so with ease but far less—I think thirty seconds; still I have old sight coming on. I am beginning to "trombone" my newspaper, and, consequently, can no longer, as in my younger days, focus better on the ground glass without a focussing-lens. I find it, therefore, absolutely impossible to focus microphotographic objects on an opaque screen, because my eyes have lost the power of contracting the crystalline lens so as to see clearly at a short distance. When I said that photomicrography was work for young men I might almost have said children; and, indeed, their wonderful power of contracting their lenses, so as to be able to see distinctly at a very short distance from the eye, might with care and training be utilised with great advantage in this class of work—advantage to the operator in helping him to focus, so, perhaps, saving many a plate—and advantage to themselves in gaining an early insight into the marvels of nature disclosed by that wonder-camera, the microscope.

The form of micro-attachment which I have described above is one that I have had in use for some time in connection with the sciopticon, the lens-carrier being then filled with a double achromatic lens of the gem type. This answers admirably as a demonstrating microscope for the larger objects, particularly if the image be thrown on a transparent screen of fine ground glass or tracing paper, the lens slides in its cloth-lined tube for rough focus is finely adjusted with the screw movement, and the definition is excellent over the whole field—that is, the whole of a very large-sized slide—an inch or more. It must, however, have a special fitting to the lantern, as, if made as in the ordinary way with microscopic lantern attachments to fit into the same flange as the front lens, it is too far removed from the light, with necessary loss of light and definition. With the scioption, however, it is fitted to a separate flange mounted on a block of wood and put on the stage, which, being fitted with a rack and pinion, can be brought forward to its exact *optical* position—that is, the cone of light issuing from the condenser should cross at the optical centre of the compound lens.

With lime light this arrangement is perfect, the only danger—that of injury to the object from heat—being obviated by substituting for the block of wood a tank containing a saturated solution of common alum, which, while allowing the light rays to pass freely, cuts off the greater part of the heat rays.

I have not found this combination effective for photographing minute objects with great amplification, nor have I been successful with a Ross's postage stamp lens at all comparably with the results I have obtained with a common French microscopic triplet. My

experiments, however, were not sufficiently extended for me to say that the failure was due to the lenses. I merely mention the fact that I found it much easier with the microscopic objective.

I ought, perhaps, to say something about the lighting. I employed the duplex sciopticon lamp. Mr. J. Charters White also employs a duplex lamp—both of us, I imagine, because we happened to have them rather than because it was the best form; indeed, my own opinion is that a single-wick lamp would be better, and I should recommend an ordinary flat-wick paraffine lamp, with the flame placed edgewise to the condenser. Here, also, we both used double condensers in the same way, and both of the sort we happened to have—he the ordinary microscopic condenser and I the achromatic. Mine were two single achromatic lenses, which I mounted in sliding tubes outside my camera.

My experiments lead me to the conclusion that the lighting is the most important part of the apparatus, and that perfection of definition is dependent far more upon the due direction of the light on to the optical centre of the objective than the special form or nature of the lens. They have been so limited and are so far short of perfection that I have doubtless much more yet to learn.

George Smith.

ON MEN AND THINGS.

In my last notes, in speaking of the connection betweeen gelatine and silver bromide, I do not appear to have made myself perfectly clear. I do not mean to deny the possibility of the defect arising from the cause alleged, viz., the presence of decomposed gelatine in the emulsion. My contention is rather that the presence of an alkali (preferably ammonia) is also necessary, and that in the case of an emulsion which has an acid reaction throughout the period of its preparation will *not* show green fog, however the gelatine may have been decomposed.

* * *

I find that Mr. C. Ray Woods so far corroborates this opinion, inasmuch as he states that acid boiling gives less tendency to green fog than neutrality or alkalinity. Captain Abney's statement that any emulsion is capable of giving green fog is not incompatible with this view, as the necessary condition—alkalinity—is provided by the developer. Of course we might expect that an emulsion made under the most favourable conditions for avoiding green fog would stand more forcing in development than one which enjoyed the additional inducement to fog conferred by alkalinity in the early stages of its preparation. Hence such processes as Mr. Burton's and Captain Abney's, or Monckhoven's precipitation plans, are less liable to, though by no means absolutely proof against, green fog.

* * *

Here a word with regard to the "Abney" and "Stebbing" methods, the latter of which Mr. Burton has singled out in order to prove I am incorrect. The two are, so far at least as the green fog question affects them, wholly distinct. In Captain Abney's the silver bromide is precipitated in the presence of free nitrate acid, and possibly retains a feeble acid reaction during cooking. It has been placed on record that this free acid is necessary in order to retain the power of prolonged digestion without fog. The pure silver bromide freed from all soluble matter, whether decomposed gelatine or nitrates, is subsequently emulsified with pure gelatine at a low temperature; yet even under these conditions green fog has been developed.

* * *

In the Stebbing process, after freeing the precipitate from soluble matter as in the former case, it is re-emulsified with fresh gelatine *plus* bromide of potassium and ammonia, *both of which are solvents of silver bromide, and one of which has a decomposing action on gelatine.* Here are, I opine, the very conditions required to favour the production of a combination between the bromide of silver and the gelatine under alkaline conditions, and hence the production of green fog.

* * *

The experiment is worth trying whether the rendering of an emulsion of the neutral or alkaline character decidedly acid previous to washing it or depriving it of its decomposed gelatine and soluble constituents would not entirely destroy any tendency to green fog that might then exist. That it would entirely prevent its formation under abnormal conditions of development I do not believe, as I am of the same opinion as Captain Abney, namely, that any plate can be made to show the defect, but not necessarily under such conditions as they are likely to be submitted to.

* * *

The suggestion that the continued action of a soluble silver compound upon the gelatine is one of the most prolific sources of green fog is, I think, a true one; at least, if the conditions either of exact neutrality (if possible) or alkalinity prevail at the time. Under those circumstances an *insoluble*, organic compound will be gradually formed, which remains in the film and produces fog. If, however, free acid be present the gelatino-silver compound remains soluble, and is removed with other soluble matter in the washing, and so the fog is removed. To illustrate that this is the actual result: take two solutions of gelatine, the one perfectly neutral (if that condition can be secured), and the other acidified to the extent usual when acid boiling is adopted. To each of these add the requisite proportions of silver nitrate to form an emulsion, and place the flasks for five minutes in the emulsifying boiler. At the end of that time, if the temperature has been anywhere near boiling point, they will most likely *both* be the colour of the French polish. Now add to each the necessary quantity of soluble bromides and proceed to finish the emulsion, in the ordinary way. The one will ultimately be found to be hopelessly fogged, the other perfectly clear. I have frequently obtained rapid plates with clear glass shadows from an emulsion that has been badly discoloured at one stage of its preparation, but in the presence of acid.

* * *

I do not anticipate that if the discolouration were allowed to take place in the absence of acid the *subsequent* addition of the latter would suppress fog. It would be more difficult to redissolve the insoluble matter once formed than to prevent its formation in the first instance.

* * *

A familiar illustration of this action of acid is found in silver development. If silver nitrate be added to plain—that is, *neutral*—solution of ferrous sulphate, or of pyrogallol or gallic acid, an instantaneous precipitate occurs; but in proportion to the quantity of free acid added so will the precipitation be delayed, especially if the acid used be nitric.

* * *

Another instance which is nearer to the point, and one in which Colonel Stuart Wortley will bear me out, is to be found in the behaviour of a collodion emulsion containing excess of silver. Such an emulsion, if neutral, will rapidly become foggy, for which reason a pretty strong dose of acid was used. A plate coated with such an emulsion—containing as much as five grains of free silver to each ounce and duly acidified—might be plunged, as soon as set, and before washing, into a solution of pyrogallol or of tannin without the production of the faintest suspicion of discolouration or fog.

* * *

As regards the soluble silver compound which may cause the evil we are not, however, confined to the nitrate. Silver bromide is soluble not only in ammonia and bromide of potassium but also in chloride of ammonium, nitrate of ammonia, and many other salts which may exist in the emulsion during the boiling. A small trace of the silver salt so dissolved is quite as likely to enter into combination with the gelatine as the nitrate is, or even more so, as it will have longer time to act; hence the value of the restraining action of the acid.

Argus.

PARLOUR PORTRAITURE.

[A communication to the Dundee and East of Scotland Photographic Association.]

I think it a pity that amateurs confine themselves so much to landscape photography or to the occasional taking of a group out of doors. Portraiture has received very little attention from them.

Amongst those having outdoor accommodation we occasionally meet workers devoting a considerable share of their time and attention to this branch of the subject; but there is still a vast number who attempt nothing unless in the fields or by the seaside. To those who can command time enough landscape photography (especially with a good companion) is undoubtedly the more enjoyable; but there are very many who, taking a deep interest in photography, nevertheless find opportunities of escaping to the country, even for an hour or two, "few and far between." Being myself one of the unfortunate latter class I have derived considerable enjoyment in my spare moments from the practice of portraiture in a small way, and, having no outdoor accommodation, I have been forced to make the best of it in a common room.

To those with little time for field work I can recommend this as a most enjoyable pastime, employing them pleasantly equally when they have minutes to spare as when they have hours. I hope to show in the following short paper that the appliances absolutely required are both few and simple; and, while I have nothing particularly novel to introduce, the remarks which I make may have the effect of starting those who may by and by be able to enlighten us more thoroughly on the subject.

I am confident from the experience I have had that very fine results may be obtained by anyone taking a little trouble and making it a special study. Of course anyone may fail from attempting too much;

and I think it right to state at the outset that, in my opinion, full-length portraits should not be attempted in an ordinary room.

I have tried several times in apartments with the window reaching to within a few inches from the floor, but never succeeded in getting nice, equal illumination all over. The light strikes in with great power upon the feet and lower parts of the picture, and less powerfully upon the upper parts. Again: just where your direct light is strongest below your reflector is almost inoperative. The consequence is that strong high lights and deep shadows give this part of the picture a most objectionable value. It is possible, however, that these difficulties could be overcome by a little experimenting—certainly remedies would suggest themselves to those called upon to work constantly under such circumstances.

The room in which I photograph is not specially suited for the purpose. It has a window of the ordinary size—three feet by six or thereabouts. The light is not directly from the open sky, buildings rising to three stories being opposite and within forty feet. Notwithstanding this very moderate amount of light, quarter plates are fully exposed in five to ten seconds, and half-plates in about double that time. One can work quicker than this, but, I think, less satisfactorily. I see no difficulty, then, in getting a suitable apartment, although, of course, there are some rooms more suitable than others—as, for instance, if with a northern exposure the sun does not then require to be taken into consideration.

The only piece of apparatus which one already prepared for landscapes absolutely requires is a background. I would certainly advise getting a proper one at once. Blankets over screens and other makeshifts are troublesome to set up at the time, and even when up are most unsatisfactory, invariably showing folds, creases, or markings of some kind or other. Upon the suitability of the background depends the entire effect of the picture in my estimation. It certainly is a more important point for the amateur in his room than for the professional in his studio; for, whereas the latter can illuminate his sitter independently of the background, the former depends entirely upon the background to relieve and show up the shadow side of his picture, which is never (especially in the drapery) illuminated enough to assert itself. It follows from this that the tint is the most important point to be attended to. If it be too light the dark side of the figure is objectionably hard and black upon it, and if it be too dark the rather violent lighting of the face is intensified. The object is to select a tint which will balance the light and shade without allowing either to preponderate to the detriment of the picture. A very suitable material, as far as colour goes, is carpet felt—a rough sort of paper put below carpets. It is very cheap, but has the disadvantage of being easily torn. I got up a background of this material thinking it might last a week or two; that was three years ago, and it is still as good as ever. I had a rough frame made, and, after damping the paper very slightly, I put it on with paste. I find five feet by four a convenient size, giving room for half-lengths, with a little to spare.

The reflector which I find best is an ordinary swinging mirror. In the instructions which you find on this subject scattered up and down through photographic literature a dead-white reflector is generally recommended in preference to a mirror. Some have suggested tinted reflectors of paper. I have tried these, but I consider them not so efficacious and much more troublesome than a mirror. In order to get power enough from a flatted reflector it must be placed very near the sitter. This curtails the alterations in its position which the circumstances may demand; for to alter it ever so slightly will bring either the one part or the other of it into the field of the camera. A more serious objection, however, is, I think, the flat appearance that it gives to the side which it illuminates. Even on the shadow side you require light and shade, or you can have no roundness; but a flatted reflector, such as a white sheet, gives such a thoroughly-diffused light as to destroy the delicate shadows which are required to produce this roundness. A mirror is a small article in comparison, and can be lifted from place to place with the greatest ease. Being also a powerful reflector, you can keep it a considerable distance from the sitter, the general position of it being with me just immediately to the left side of the camera. I have tried both pure white and tinted reflectors, but always come back to the mirror. A little experience soon teaches one what is the most suitable position for it in the great majority of cases; so that it takes no time to set it, and requires generally very little alteration.

A portrait lens is by no means necessary—not even a double combination landscape lens. The cabinet portraits shown were taken with a common, cheap single lens, using a large aperture, the exact aperture employed being, in fact, one-tenth the focal length of the lens. A single lens opened to this extent is wonderfully rapid, and gives fine definition.

I have no head-rest, but it would be a decided advantage to have one. The exposures are not, as a rule, such as to make this an absolute necessity; but in a poor light, or with a bad sitter, it is better, of course, to have a head-rest. A good deal can be done in posing to make up for the want of this appliance by giving the head a natural support of some kind, although the inventing of many such positions is a pretty severe tax on one's ingenuity.

I may, perhaps, be allowed a word or two on the operative part. To those who prepare their own plates I can recommend the formula of Mr. W. K. Burton, given in The British Journal of Photography of March 17th, 1882. I get better results with plates so prepared than with bought plates. They give fine, rich, negatives, and they are equally suitable for landscapes. As to exposure: I believe greatly in a full exposure being given. Notwithstanding all your efforts to the contrary you will find a mere black and white picture unless you take advantage of the harmonising effect of a full exposure. After all, in average light this will only amount to fifteen or twenty seconds for a half-plate, which is by no means too long for the majority of sitters.

In developing I used to be annoyed a great deal by the hight lights coming up too dense before the darker parts had time to come out. I get over that difficulty by using half the quantity of pyrogallic acid; and, after development is complete and before fixing, if the negative turn out too thin I flood the plate with a solution of pyrogallic acid in water—about a grain in half-an-ounce. The density which you get in this way is over all the plate, and not specially so on the high lights, which conduces considerably to the harmony of the picture.

I will conclude with what I have found to be two important points in lighting:—First: illuminate your shadows a little more strongly than you wish them to be in the finished picture. The only light they have is reflected light, which is specially poor in chemically-active rays, as you will quickly discover when you see your prints unless you remember this.—Secondly: take care that the light from the window does not strike directly and with full intensity upon any part of the face valuable in detail, such as the eye, the angles of the mouth, or nose. The intensity of the light would infallibly destroy the fine lines and delicate shadows round these parts, and, consequently, the likeness; besides, detail should be located in every picture only on the half-tones, the highest light and deepest shadow being equally free from them. It certainly is so in nature.

These are the remarks which my short experience of parlour portraiture suggests to me. I do not for a moment imagine that I have succeeded in always carrying into practice the principles here stated; but I have noticed that my success has been in proportion to the strictness with which I have observed them. J. K. Tulloch, M.D.

A TOUR IN ITALY WITH THE CAMERA.

It was last year that the idea occurred to me of taking a camera as my companion for a summer tour. I therefore made great preparations for carrying out so worthy a project. The first thing I did was to possess myself with a whole-plate camera, accessories, and some six dozen of whole plates made by a maker who packs in boxes. Now, however convenient this method may be for the studio or at home, the large amount of room required for packing much more than compensates for any other benefit to be derived from it.

I then made a pile of the apparatus I had spent so much time in getting together. The result was certainly not encouraging to one about to travel "*en garçon.*" The bulk of the whole-plate "kit" was not inconsiderable, and when it came to be a question of weight my courage failed me. To have added a courier or assistant to my equipment might have set matters straight, as he would have been useful in many ways, and would have, doubtless, added a charm to many a view. To me this luxury was not possible, and I make it a point of never taking more luggage than I can conveniently carry, having learnt by experience that this is the only safe and comfortable way of travelling, especially in Italy, where I was proposing to make my photographic *debût*. Well knowing the virtues of my Italian friends, I came to the conclusion that "discretion is the better part of valour," and, after hesitating until the last moment, I quietly slipped away, leaving my photographic pile behind.

This year I determined to make another attempt, so I got Mr. George Hare to make me an extremely light 5 × 4 camera, fitted with double swing back, &c., and three double slides. I further got him to make me a very simple yet efficient "finder," consisting of a thin piece of mahogany with a hole, fitted with a flange to carry the lens, screwable on the top of the camera in the same plane as the front. Also another frame fitted with ground glass to be screwed behind in the same plane as the ground glass of the camera, a lens of the same focal length being used in the finder (in my case 5 × 4 rapid rectilinear) as in the camera. When in use the whole arrangement, finder and camera, was covered with a light macintosh focussing-cloth. Nothing could have worked better. It occupied no appreciable room, required only a few seconds to rig it up, and for moving objects it was often invaluable.

For shutters my camera was fitted with an "inside Cadett shutter." This shutter has many *desiderata* for tourists; it practically occupies no room, and, as far as my experience goes, it is not liable to get out of order. Mine has worked some hundreds of times and is as good now as when first in use, and for all ordinary instantaneous work it is perfectly efficient, it being quite easy to get a fifth of a second exposure by a quick pressure on the pneumatic pear; and I found I rarely required much less than this, whilst for slower work nothing could be better. I also took a "Chadwick," fitted pneumatically, which I found useful on a few occasions.

The whole apparatus, including pneumatic shutters, camera, three double backs, three lenses (one whole-plate and two 5 × 4 rapid rectilinears), adapter for using the larger lens, focussing-cloth, finder arrange-

ment, top of camera stand, &c., were all packed in an enamelled leather case $10 \times 5\frac{1}{2} \times 7\frac{1}{2}$ inches. My *multum-in-parvo* arrangement was aptly illustrated when leaving my hotel at Venice, for the hotel-keeper, judging my luggage incomplete, asked whether he should send upstairs for the apparatus belonging to "Signore," and, could scarcely believe me when I told him it was all packed in the small case before him.

My outfit was completed by the addition of about a gross of 5 × 4 plates—a number I found much too large. It is objectionable in many ways to be burdened with a superfluity of plates. In the first place, I found a dozen plates weighed two pounds and a-half; but, besides the disagreeable addition to the weight of one's luggage, one is tempted to waste plates on subjects of little or no artistic merit on the plea of "must take home something," and, although I must confess to having given way to the temptation many times myself, I could not nearly get through my gross in six weeks.

As I decided to develope some of my plates *en route* to see how I was getting on with regard to exposure, &c., I weighed out a number of packets, each containing two, three, or five grains of pyro. I also made concentrated solutions of hypo. and developer, completing this department with a couple of light dishes and a lamp kindly made for me by my ingenious friend, Mr. Cadett, of cardboard and ruby cloth, and which, when folded up, occupied about as much room as a quire of note paper. For illuminant I used a part of the "bougie" the hotel keepers made me pay for whether I used it or not.

Having my apparatus satisfactorily completed the next question to resolve was—where to go with it. First, there is plenty of work for the camera near home, and "why go farther and fare worse" naturally suggests itself to the intending photographic tourist. In this island we have undoubtedly some of the most picturesque scenery in the world and lakes incomparable for their loveliness, which might be deemed worthy to detain the photographic art lover many months, and everywhere through hill and dale we meet those charming little "bits" that the artist photographer revels in. Unfortunately my start this year was a late one; it was not until towards the end of September that I was ready, so that the three fine days of the English summer had long since past, and, inferring from the previous weather this year, the future did not look promising. Gloom, wet, cold, and fog (not necessarily on the plates) might at any moment set in.

Then the idea occurred to me to try Switzerland, so aptly termed the "playground of Europe;" and as I knew it was the home of, at anyrate, more than one English photographer, why should I not make it my playground this year? In one of my Swiss rambles, because it was the proper thing, I, martyr-like, "did" Mont Blanc. Like the Duke of York's famous troops, I went up, then I came down again. "*Experentia docet.*" A month's hard labour at the treadmill could not have been harder than that self-imposed toil. I then read Mark Twain's *Tramp Abroad*, and a happy idea occurred to me which is especially applicable to all those who would "do" Switzerland *à la dolce far niente.* That is, I had resolved in future to see the beauties of the grand Alps *per camerâ*, and to ascend the highest peaks by this means. Then, instead of my alpenstock, I would brand my three camera legs with the names of these *pièces de resistance.* Mark Twain says he used to ascend "*per telescope*"—also a comfortable method; but there is an objection—that by the latter method one's achievements might be more open to contradiction than by the former. In Switzerland this year has been an unfortunate one for the lover of the photographic art as well as for the tourist. According to statistics, from December 1st last year until December 1st this year they had in Switzerland 210 wet days, 100 foggy days, and only fifty-five fine days!—truly photographically disastrous. Besides I already heard of several Englishmen going to Switzerland with their cameras, and returning with their plates comparatively untouched; and, moreover, thinking the season rather advanced, I reluctantly gave up the idea of going there. But the azure skies of Italy, its glorious sunshine, brilliant light, and natural beauty would continue the same during the early autumnal months, whilst its marvels of art ever possess an attraction for the photographer all the year round in spite of weather. So, like the Gauls of old, I decided to cross the Alps, to enjoy the sunny skies and natural beauty of fair "Italia," and with camera to search out the artistic, and when found to make a note thereof on gelatine.

It was, as I have previously stated, towards the end of September that I made my start. It was on the 19th of that month that I was trying to keep my equilibrium on board a steamer crossing the channel in the teeth of a stiff south-wester, most devoutly wishing the passage would come to an end, and with nothing to do but to watch the effects of each heavier lurch on the already wobegone faces of my unfortunate fellow-travellers, who, in spite of all their efforts, were one after another succumbing to *mal de mer*, the "survival of the fittest" being in the minority. Arriving at port does not seem to mend matters; sympathy is scarce, and the sadder one's face is the greater is the amusement of the welcoming crowd.

Arriving at Paris, the weather was, as is usual, but a reflection of that of London, and I was not sorry when I found myself next morning comfortably located in a carriage of the Mediterranean Railway hurrying south. Every hundred miles we made we seemed to be approaching a sunnier and more congenial clime. In the small hours of morning Modane, like a nightmare, sounded in my ears. It is the Italian frontier town and the seat of the Italian and French "*douane*" or customhouse. It was here that I had visions of a tug-of-war with the Italian "*douaniers*" or customhouse officials. The result did not belie my anticipations. My plates were packed in dozens, and also for convenience in packets of odd numbers. In many cases I marked "*sensible à la lumiere*" upon them. As usual, the poor wretches who have to undergo the farce and annoyance of having their baggage rummaged over were ushered into the *douane*, and upon the benches we piled our baggage. At length my turn came. "Has Signore anything to declare"? "Of course not." "Then will Signore open his largest article of luggage?" I did as desired and might have saved myself much annoyance had I known their seemingly invariable rule of always requiring to look into the largest article of baggage and as invariably passing the rest. He had nearly given up his search as fruitless when, unluckily, he came upon my plates, and, selecting some neatly-packed dozens, he quietly stated he wished just to see what was inside of them, and seeing I hesitated he urged his request in a more peremptory manner. I endeavoured to explain in the best French and Tuscan at my command that I could not oblige him, showed him the label that they were sensitive to the light, but with little effect. "*Ouvrez! Ouvrez! vite! vite!*" was his sole reply. I looked aghast. Had I come all that way for nothing? But then I remembered Nihilists were about, so doubtless after all my inquisitive *douanier* might perhaps imagine I belonged to that dreaded society, or I might be a contrabandist, and those harmless-looking packages might contain either dynamite or tobacco—both equally dreadful. I then drew a face as long as my facial muscles would permit—told him that it would be quite impossible to oblige him, that it would be a great pity to spoil my plates, and pointed to my camera-case to show I was *bonâ fide* in my assertions. Alas! all to no purpose. He seemed evidently to have had some grave suspicions aroused; so finding I did not intend to do the opening myself, he seized the first packet he could lay his hands on, and was cutting the string when I remembered they had cost me just five francs in England, and as quickly as the thought struck me I slipped a five-franc piece into the *douanier's* hand. What a change! All his Nihilistic fears were relieved. How could I carry anything so dreadful as tobacco? He only recognised in me the honest *Anglais* slow in doing at Rome what the Romans do, and was at once profuse in his apologies at giving me so much trouble. After helping me to repack and politely wishing me *buon giorno* we parted. So the matter ended entirely satisfactorily—at least as far as one party was concerned.

Of late the weather had been wretched—always wet and unpleasant, and matters did not seem to improve much when we reached the Mont Cenis tunnel, somewhere about five in the morning, with a threatening sky overhead, darkness and general gloom. It took rather more than twenty minutes to pass through the tunnel, but, then, what a change! It was a transformation scene. We emerged in Italy in daylight with a clear vault of Italian azure above us and the ruddy streaks of returning day in the far east. The effect seemed almost magical and bewildering, and must have been more so to those who were making their first visit to the land of Tasso and Dante.

By the time we arrived at Turin it was summer once more. Turin is very much like an American city, with rectangular streets and everything as prosaic as possible. In fact, this town is modern with scarcely a vestige of antiquity about it. It is clean, which is almost equivalent to saying it is un-Italian, so that, as can be imagined, there is little to detain the photographer on the artistic bent. I therefore determined to proceed eastward and reach as soon as possible that city poetically known as the "Queen of the Adriatic," the "Bride of the Doges."

J. J. Acworth., F.I.C., F.C.S.

NOTES ON PHOTOGRAPHY.

Lecture X.—The Gelatine Process (Continued).

Alkaline Development (*continued*).—The practical lessons learnt last week may for the purpose of remembrance be put together briefly thus:—1. That pyrogallic acid is the *developer* proper, since it will produce an image alone, but that a certain quantity of ammonia is required to be present in order to obtain sufficient density. 2. That ammonia, besides giving density, acts as a powerful *accelerator* by increasing the affinity of the pyrogallic acid for oxygen. 3. That potassium bromide acts as a retarder, prevents fog, and produces greater contrast. 4. That sufficient (and no more) ammonia should be present to bring out the requisite details, and that density should be regulated by increasing or diminishing the quantity of pyrogallic acid. 5. That in cases of under-exposure the ammonia should be increased and the potassium bromide diminished as far as possible without producing fog, and in cases of over-exposure the ammonia should be diminished, and, if necessary, the bromide increased. As regards a working formula: to those who are not satisfied with the one they are using, I would recommend Mr. Edwards's developer, which is made as follows:—

No. 1.

Pyrogallic acid	1 ounce.
Glycerine	1 „
Methylated alcohol	6 ounces.

Mix the glycerine and spirit and add to the pyro:—

No. 2.

Potassium bromide	60 grains.
Ammonia, ·880	1 ounce.
Glycerine	1 ,,
Water	6 ounces.

To make the developer: add one part of No. 1 to fifteen parts of water, and label this bottle D (developer). In another bottle mix one ounce of No. 2 with fifteen ounces of water, and label it A (accelerator). To develope a plate: mix equal portions of D and A, and pour them (avoiding bubbles) steadily over the plate placed in a shallow dish. Rock the dish gently, taking care to keep the plate well covered with the solution, when, if the exposure have been correct, all the detail will be out and the development complete in about one minute. If the image flashes out, showing over-exposure, the mixed developer is at once thrown off and the plate flooded with D alone, which will check the development while the image grows in density. Under-exposure can be corrected to a great extent by increasing the proportion of A in the developer. It will be noticed in this developer that the quantity of bromide is very small (one-quarter of a grain to the ounce, nearly), that the density is regulated by the pyrogallic acid and errors in exposure by the ammonia, which methods we found last week to be the best.

It must not be supposed that this developer of the strength here given is suitable for all kinds of plates, which is by no means the case. For instance: in many cases the proportion of pyrogallic acid will be found too large, and to obviate this difficulty either the same kind of plates should always be used or, in using a fresh kind, the proportions of the ingredients should be altered to suit.

Sulphite of Soda.—Some time ago Mr. H. B. Berkeley recommended the addition of this substance to a pyro. developer for preventing the objectionable yellow stain which frequently occurs in negatives. For this purpose he directs that, in making the pyro. solution, four times its weight of sulphite of soda should be dissolved in water, and neutralised with citric acid. In this is dissolved the pyro.; the solution thus formed keeps indefinitely. The reason of its efficiency does not appear to be known with any degree of certainty, but possibly, in oxidising, the pyrogallic acid forms a colourless soluble compound with the sulphite.

Ferrous Oxalate Development.—This consists in treating the plate with a solution of ferrous oxalate in potassium oxalate, a small quantity of potassium or ammonium bromide being usually added, as with pyro. development. It was first introduced by Mr. M. Carey Lea in 1877.

Potassium Oxalate, $K_2\,(C_2\,O_4)$—There are two principal potassium oxalates—one called "neutral oxalate," $K_2\,(C_2\,O_4)$, and the other "salts of sorrel," or acid oxalate, which latter may be considered as a compound of one molecule of the neutral salt in combination with a molecule of oxalic acid, $K_2\,(C_2\,O_4)\,H_2\,(C_2\,O_4)$. The former of these (or what is called "neutral oxalate") is the one employed for development. It is prepared by neutralising oxalic acid with potassium carbonate—

$$K_2\,(C\,O_3) + H_2\,(C_2\,O_4) = K_2\,(C_2\,O_4) + H_2\,O + C\,O_2.$$

The acid oxalate can also be readily converted into the neutral oxalate by neutralising its oxalic acid with potassium carbonate. Neutral potassium oxalate is a white crystalline substance soluble in about three parts of cold water, its solution being slightly *alkaline* to test paper. It should be slightly acidified—preferably with oxalic acid—before use. Its use in development is to dissolve the ferrous oxalate, which it does very readily, forming a double salt. Beyond this it does not appear to have any effect, neither acting as a retarder or accelerator.

Ferrous Oxalate, $Fe\,(C_2\,O_4)$—Forms two series of compounds, called respectively "ferrous" and "ferric." Thus, we have ferrous oxide, $Fe\,O$, ferrous bromide, $Fe\,Br_2$, ferrous oxalate, $Fe\,(C_2\,O_4)$, &c., and with these same substances another series of compounds—ferric oxide $Fe_2\,O_3$, ferric bromide, $Fe\,Br_3$, ferric oxalate, $Fe_2\,(C_2\,O_4)_3$, &c. It will be noticed that all the ferric compounds contain half as much again of the other substance in combination with the same quantity of iron as the ferrous. All the ferrous compounds, and more especially ferrous oxalate, tend to combine with oxygen or other substance to form the ferric series of compounds, and it is in virtue of this property that ferrous oxalate acts as a developer. It is prepared as a yellow powder nearly insoluble in water, by adding ferrous sulphate to oxalic acid and washing by decantation; and in solution either by dissolving the yellow powder in a solution of potassium oxalate or by adding one part of ferrous sulphate to a solution of three parts of potassium oxalate (Eder)

$$Fe\,(S\,O_4) \times K_2\,(C_2\,O_4) = Fe\,(C_2\,O_4) + K_2\,(S\,O_4).$$

The action which takes place in development is very similar to that when pyro. is used—

$$2\,Ag_2\,Br + 2\,Fe\,(C_2\,O_4) + K_2\,(C_2\,O_4) - F_2\,(C_2\,O_4)_3 + 4\,Ag + 2\,K\,Br.$$

The silver sub-bromide is reduced by the ferrous oxalate, the bromine set free combining with some of the potassium oxalate, forming potassium bromide, and the iron forming ferric oxalate. The silver thus reduced combines with fresh silver bromide to form sub-bromide, which again becomes reduced until the image is built up. The ferrous oxalate really exists in solution, in combination with some of the potassium oxalate, as a double salt, $K_2\,(C_2\,O_4)\,Fe\,(C_2\,O_4)$, but this does not affect the change which occurs.

Potassium or Ammonium Bromide.—These have precisely the same effect as in pyro. development.

Hyposulphite of Soda.—A small quantity of this substance added to the oxalate developer acts as a powerful accelerator and promotes density. Although not essential, as is ammonia in pyro. development, its action is very similar.

Formula for Oxalate Development.—Prepare two solutions of the following strengths:—

No. 1.

Ferrous sulphate	1 ounce.
Water	3 ounces.

No. 2.

Potassium oxalate	1 ounce.
Water	3 ounces.

The solutions are best made with hot water, and both should be slightly acidified—preferably the ferrous sulphate with sulphuric and the oxalate with oxalic acid. To develope a plate place three ounces of No. 2 in a measure, add half-an-ounce of No. 1, and pour over the plate as before described. If there be any tendency to fog a small quantity of potassium bromide (say a quarter of a grain to the ounce) should be dissolved in the oxalate solution. To regulate the density increase or diminish the ferrous sulphate, but never add more than one of ferrous sulphate to three of oxalate, or ferrous oxalate will be precipitated. In cases of under-exposure add one or two drops of a dilute solution of hypo., and in cases of over-exposure add potassium bromide or sodium citrate. [Examples shown.] On mixing the two solutions to make a developer it is found that they always become alkaline. This seems rather strange—getting an alkaline liquid by mixing two acid ones together—but the reason is not far to seek. Ferrous oxalate has a great tendency, we know, to combine with any acid it can get and form a ferric salt, while potassium oxalate is naturally an alkaline substance; hence the ferrous oxalate takes up the free acid which was added, forming a small quantity of ferric salt, and leaves the potassium oxalate in its normal alkaline condition.

It may be asked—Why acidify the solutions at all, since on mixing they become alkaline? In the case of the ferrous sulphate it is to keep the solution clear, and in that of the potassium oxalate it is found that if it be alkaline before mixing the resulting developer has a tendency to give thin images, and sometimes fog. After being kept some time, even if well stoppered, the oxalate developer becomes to a great extent inactive, from the formation of a basic salt.

Hydrokinone Developer.—Hydrokinone is an organic substance somewhat similar in properties to pyrogallic acid. Its use as a developer was suggested by Captain Abney in 1880. It requires the addition of ammonia but not bromide, the formula being as follows:—

No. 1.

*Hydrokinone	5 grains.
Water	4 ounces.

No. 2.

Ammonia	1 drachm.
Water	9 drachms.

To every four ounces of No. 1 thirty minims of No. 2 are added to obtain full intensity. As I will now show you this is a most beautiful developer, giving negatives perfectly free from stain or fog and of a good colour, which should make it invaluable for transparencies. At present it is expensive, but should its price diminish it will probably be preferred to either pyro. or ferrous oxalate. E. H. Farmer.

THE SOUTH LONDON PHOTOGRAPHIC SOCIETY'S POPULAR LANTERN MEETING AND ITS LESSONS.

[A communication to the South London Photographic Society.]

I must apologise for bringing this subject up again; but I think a practical explanation of certain matters may be of service as a guide for contributors in the future.

I think you will all agree with me when I say that the recent lantern meeting was by far the best we have ever had as regards the quality of the slides; for you must be aware that many of our members who contribute do all in their power to ensure its being a successful gathering by preparing slides specially for the occasion. Some of those members know very little about making slides, but I am sure they do their best. This year we had fewer bad slides than in years gone by; but I think there is still room for a little improvement. Several, I have no doubt, have seen their weak points, and have made an improvement in this year's productions, which is a good lesson for them; for I believe there is nothing to equal a good untouched photograph when exhibited on a large screen.

I may direct attention to one or two points which some do not seem to quite understand. One is as regards the size. The *best* size for a slide is $3\frac{1}{4} \times 3\frac{1}{4}$, but they must not be more than $3\frac{1}{4}$ high. They may be a little longer—say $4\frac{1}{4}$ inches—but the former size is the best. I regretted the case of one gentleman who brought me some slides of excellent quality, but they were mostly about seven inches in length. I was quite unprepared for this size, so had to pass them over, which I regretted very much. One gentleman asked me if I had one of the push-through carriers. I had not, and never will use them, for with

* *Instruction in Photography.* Fifth edition.

slides of unknown lengths it would be impossible to get them to register, which would not be a credit to the Society.

I am aware that at these meetings we have a very critical audience, some present being lantern experts; and as you entrust me with the exhibition of the slides, for my own credit's sake as well as that of the Society I take great pains to have the manipulation as perfect as possible under the circumstances, which I need not tell you are very trying, having never seen the slides before.

Another point is that many of the slides are sent up unmounted—just simply a quarter-plate. Now this is very wrong, and such slides cannot be expected to look well on the screen. All slides should have a mask giving a marginal boundary line. The outside of the mask is three and a-quarter inches square, and the opening about two and three-quarters inches, with the corners slightly rounded—"cushion-shaped," as it is called. If the slides are not masked, there is the overplus sprawling over and beyond the limits of the sheet. The disc of light I gave was about twenty-five feet, the screen was about eighteen feet square, and the pictures when properly masked just about filled the screen.

I think if the uninitiated in lantern matters will carefully read over these hints they will learn a lesson and profit by it; for it is very annoying to find a good picture spoiled through not being properly mounted.

We apparently had slides made by all the processes which are practised at the present day. I was informed that some of the slides were made on gelatine plates and toned with mercury. Now, I think these slides if used many times will be found to fade. When first made a slide by this process may be "a thing of beauty;" but I question very much whether it will be "a joy for ever." I make all my slides by the collodio-emulsion process, and I think there is no process to equal it, both as regards tone and quality.

Among the slides exhibited were some by Mr. Short, of Lyndhurst, tinted, I think, and I believe some of those of the New Forest were gems of their kind. It is a very difficult thing to colour a slide well, as the details are so fine, and any little overlap of the colours shows very badly when enlarged on the screen. It makes me think of Charles Dickens, in "Pickwick," when Sam Weller, speaking of some one not being able to see, says to be able to see they ought to have a pair of eyes like a double-horse power oxyhydrogen gas microscope. The same might, perhaps, be applied to the painting of lantern slides.

The two microscopic slides, by Dr. C. White, of the teeth of the blow-fly were very interesting. If I remember rightly, he said that his enlargement was 5,000 times. I consider that every slide I put on the screen was enlarged on the average about 6,300 times, and that added to the 5,000 makes the total about 11,300 times the original size. I believe a very great deal might be learned by using the lantern in conjunction with the microscope; but of course the subjects would require to be fully explained.

Mr. Ayres brought two anatomical specimens, but they were not understood for want of proper explanation. The astronomical slides brought by Mr. Ayres—and which were from negatives kindly lent for the occasion by Dr. Huggins, F.R.S.—and those by Mr. Connon, we should have appreciated if we had had a full explanation of them; but I need not say that that was out of the question, considering the large number I had to pass through the lantern, being not far short of 350.

I think the weak point in such an exhibition is that we have too large a number of slides, and by that means justice cannot be done to them. We might, with considerable advantage to all parties, reduce the number of slides. As I have said in the commencement of this communication, several of our contributors are not professed slide makers. I could name several, but I think it best to avoid names when speaking of certain little deficiencies. For example: I will presume that a certain member brings (say) twenty slides, and when they are put on the screen perhaps one-half do not come up to the expectation of the contributor. Now, would it not be better that a meeting should be convened (say) a month beforehand, or as might be arranged, and for myself, or any other person considered competent, to select the slides which are considered the best, and reject the faulty ones? I believe that by this means contributors would be placed in a far stronger position—for two or three bad slides would mar the rest—and it would save time.

I shall be happy, if the Society and the committee see fit to allow me, to act as referee in this matter next year; for with my experience in lantern matters I can tell at a glance what will show well on the screen and what will not better than those who only occasionally make a slide. I think this worth the consideration of the Society before our next display takes place.

There is also another point which requires consideration; and that is that many make their slides perhaps only a few days before the meeting takes place, which, I need not tell you, is the worst time of the year as regards light. I seldom make a slide in the winter months. I generally make mine about October, and I am then not bothered with the light and have no difficulty.

One more little matter I must also mention, and that is the way the slides are sent in for exhibition. It is best to put them in a grooved box. Boxes are made expressly for lantern slides, and they can be obtained at a cheap rate from Messrs. W. H. Oakley and Co., of Bermondsey. The slides ought to be well dusted before being placed in the box, which should be done in their proper order, marking the end of the box where No. 1 commences. Mr. Beasley forwarded his slides this year in this way, and if other members would do the same it would save the manipulator of the lantern a great deal of trouble.

Members on the recent occasion were kind enough to hand their slides in before the gas was turned down. At these entertainments it is not an uncommon thing for a packet of slides to be brought to the lantern while the exhibition is going on, with a request something like this:—"I wish you would kindly put these through the lantern for me, but I must ask you to polish them well first." Now I leave you to guess the difficulty this involves. Generally these slides from non-professional members are in a paper parcel, accompanied with a list written in pencil. You are not informed which end is No. 1, no distinctive mark being given as to which is the right side; and with all this, if the slides were put on the screen the wrong way about, the person sending them in in such a way is indignant if he be blamed, but such is often the case.

All slides should have a distinctive mark in some way on the side that has to go to the light. For example, supposing we have a map to show with lettering: either hold the slide up to the light or place it down flat on the table with a piece of white paper under, and attach a white label (which is the best) on the side where the letters read in the right order; it is then an understood thing that that is the proper side to go to the light. One gentleman handed me up some slides in blocks with a label on. I took for granted that that was the proper side, and put it next the light accordingly. He directly said to me—"You have that slide the wrong way about." I just mention these trifling facts to show you the difficulties which occur in an exhibition like our last. I believe it is the wish of every member that the Society should provide as good an entertainment for themselves and friends as is possible; and it is possible, if members will do all in their power to remove these little defects, giving the exhibitor as little fumbling in the dark as possible.

The success that attends these annual meetings may be estimated by the crowded state of the hall on the last occasion. Several of my friends who came a little late told me that it was impossible to get in, much less obtain a seat. It is a great pity we cannot stretch the hall and accommodate all our friends. I will not trespass longer on your time, but I thought it my duty to notice the several points to which I have called attention for our future guidance; and I think if we limited our exhibition to two hours it would be far better than to extend it to three and a-half hours. WM. BROOKS.

FOREIGN NOTES AND NEWS.

DECORATIONS BESTOWED UPON PHOTOGRAPHERS.—FORTHCOMING PHOTOGRAPHIC EXHIBITION AT BRUSSELS.—PHOTO-ELECTRICITY OF ROCK CRYSTALS.—INTERIOR OBJECTIVE SHUTTER.

MAJOR O. VOLKMER, who has charge of the State and Military Photographic Department at Vienna, has just been made a commander, and received the cross of the Russian order of Stanislaus and of the Servian order of Takowa. Another German photographer, Herr Fr. Fink, has been decorated with the Cross of the Roumanian order of the Star and of the Servian order of Takowa.

The Belgian Photographic Association intends to have a photographic exhibition at Brussels, in the *Palais des Beaux Arts*, in August and September of the current year. All branches of photography, its applications and apparatus, will be represented. Medals and honourable mentions will be awarded by a jury to be chosen from amongst the exhibitors. The price charged for space will be five francs per square metre, and applications stating the amount of space desired by intending exhibitors should be lodged, before the 1st June, with the General Secretary of the Association, from whom further information may be obtained. His name and address is—M. A. Geruzet, Rue de l'Ecuyer, 27bis, Brussels.

Herr Henkel, says the *Mittheilungen*, has observed that rock crystal becomes electric when exposed to light, so that its conjugate axes alternately form positive and negative poles.

In the *Wochenblatt*, Herr G. Braun writes to say that he thinks he has overcome the objections made to a shutter which opens and closes inside the camera.

The closure consists of a frame screwed to the inner side of the board which carries the objective, and which is closed by a roll of light-tight webbing that can be unwound from the roller by means of an elastic band. A brass shell is screwed outside the board carrying the objective, and this contains an elastic bag which, when filled with air by pressure on the pneumatic pear, pushes forward a mallet and a rod attached to it. At the end of this rod a piece of catgut (which is wound several times round a small wheel placed upon the same axle with the larger wheel) is fixed by a small pin. When the india-rubber pear is pressed the roll of webbing is unwound, and, consequently, the aperture of the objective is opened and closed. By the roll opening from above downwards and closing the reverse way the most actinic part of the picture gets the shortest and the less actinic part longest exposure. Besides this, the end of the roll is shaped so that the middle of the

lens is covered a shorter time than the sides. When a longer exposure is required an arrangement is adjusted to the brass shell which prevents the rod from moving back again, or a valve is inserted between the india-rubber pear and the tube which prevents the return of the air until it is opened by pressure whenever it is desired to terminate the exposure. The apparatus works so smoothly that there is no vibration.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 13....	Great Britain (Annual Meet.) ..	5A, Pall Mall East.
" 13....	Newcastle-on-Tyne	College of Science.
" 14....	Cheltenham Amateur..........	
" 15....	London and Provincial	Mason's Hall, Basinghall-st.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of the above Society was held in the House of the Society of Arts, John-street, Adelphi, on Thursday evening, the 1st instant,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the ordinary meeting in December and of the lantern meeting in January having been read and confirmed, the following members were elected:—Messrs. W. Radcliffe, C. G. Cutchey, A. Harding, Godfrey Lawford, H. Compton, Mrs. H. Compton, and Messrs. George S. Pinching and Charles Stevens.

The CHAIRMAN then called the attention of the meeting to some remarks in the annual report, which had just been read, regarding the prize competitions, in which regret was expressed that the competition of the past year had not proved a success. He did not himself think it had not been a success; but perhaps it had not quite fulfilled their expectations, nor been such a success as similar competitions are amongst artists generally. Whether it was that the novelty had passed off or the rewards offered were not sufficiently enticing he could not say. However, the committee had decided that it was desirable to continue these competitions, with some slight alterations by way of change. It had been proposed that each month the members themselves should be invited to suggest titles for subjects for competition. These titles would be written on pieces of paper, and collected in a hat. One paper would then be drawn from the hat at random, and if considered an appropriate subject by the majority of those present it would be fixed upon as the subject for competition. There would be two pieces of paper given to each member—one for a landscape subject and one for figures—which would be collected in separate hats.

This arrangement was then carried out for the first monthly competition of the present season, and the subjects chosen were, for landscape pictures, *A Rural Spot*, and for figures, *The Gardener*. It was announced that pictures for competition must be sent in before the next monthly meeting, addressed to the Secretary of the South London Photographic Society, at the House of the Society of Arts.

A paper was read by Mr. William Brooks, entitled *The South London Photographic Society's Popular Lantern Meeting and its Lessons* [see page 79], at the conclusion of which

The CHAIRMAN said he looked upon the contribution of this paper as a particularly kind and valuable act on Mr. Brooks's part. Mr. Brooks, he said, modestly put forward his paper as "a little report" only of what took place at the lantern meeting, and of some of the difficulties experienced in conducting the exhibition. The lantern meeting was a most valuable one both to the Society itself and the public at large, and afforded a vast amount of amusement to all. Mr. Brooks had given them some very useful rules with regard to these meetings as to what would be advisable in the preparation of slides, the order in which they should be exhibited, and also (a very important point) the marking of the right face of the slide for exhibition. Mr. Brooks had referred to another most important matter, and that was the excessive number of slides sent in and the necessity of weeding them out. They all knew there were slides *and* slides, but he thought this was a matter which merited a most careful discussion indeed; for slides were received from all parts of the country, and he thought it would be the lesser evil of the two to have some slides which did not come up to the mark rather than offend people. Mr. Brooks had also made some remarks about the characters of the slides sent in, and he (the Chairman) thought this was the most important point of all. He referred to the great advantages afforded by the oxyhydrogen lantern in connection with the microscope in showing the distinction between the liver, tissues, &c., in health and in disease. He was pleased to see other societies were following in the footsteps of the South London Photographic Society in establishing lantern meetings of their own, as he felt sure such exhibitions not only afforded a considerable amount of amusement, but could be made of great utility also in the interests of science, besides furnishing to photographers a fund of amusement in the preparation of slides. He was quite sure Mr. Brooks's paper would prove both interesting and instructive.

Mr. BROOKS said he had had the honour of illustrating two lectures in that room by Professor Mosley, of Oxford, the subject being *The Cruise of the "Challenger,"* and he would have liked some of the members to have been present to witness the combined effect of the lantern and microscope. He thought the Chairman had taken his remarks about rejecting some of the many slides sent in in a wrong light He did not wish to give the "cold shoulder" to anyone who might make slides; but it had occurred to him that, about a fortnight before the meeting, a committee of selection might be appointed to decide what pictures were not suitable for exhibition. He (Mr. Brooks) also referred to a matter of very frequent occurrence at the lantern meetings, namely, that some of the slides were only handed to him after the lights had been turned down, and in such cases it was almost a matter of impossibility for him to do them justice. He would like to hear the opinion of the members respecting the matter of selection of slides.

Mr. HOWARD said that the question of lantern slides had always been one of much interest to him. He agreed with Mr. Brooks that it was an important matter, as they must remember that each slide separately had to pass the test of four or five hundred pairs of eyes. With regard to the processes used in their preparation, he thought that one hundred slides prepared by collodio-bromide would be much more likely to be successful than the same number by gelatine. With regard to the selection of slides, he thought that twenty-four hours before the exhibition would be ample time.

Mr. LEON WARNERKE asked, with regard to some coloured slides exhibited at the lantern meeting, if Mr. Brooks could tell him by what process they were coloured.

Mr. BROOKS did not know. The slides were by Mr. Short, of Lyndhurst, and he thought if he asked Mr. Short that gentleman would be happy to contribute a paper to the Society on his process.

Mr. WILLIAMS agreed with Mr. Brooks that many people who sent in slides knew very little about making them. He was of opinion that if Mr. Brooks would contribute a paper on the subject it would be of much more practical use than all the talking they could do. There were certainly many good slides sent and also many bad ones, and he thought if the bad ones were eliminated the meeting would be a great success, as some of the slides were as near perfection as possible. If the committee of selection met on the afternoon or evening of the exhibition he thought it would give sufficient time to throw out what pictures were not suitable.

Mr. C. HUSSEY, Jun., thought a hint from Mr. Brooks with regard to the thickness of the slides would be acceptable. In his experience they were often of such a thickness that they would not go into the lantern.

Mr. BROOKS said he thought it would be useless to devote an evening to instruction in the preparation of lantern slides, as it would take at least half-a-dozen evenings to do it justice. Some of his friends had suggested that he should write a pamphlet on the subject; but that was rather a long job, and if he were to publish anything in the journals it would probably be crowded out or cut down.

Mr. JOHN NESBIT thought he had observed one point with regard to the slides in which great carelessness was shown, and that was that some people had omitted to put on the masks. He also considered it very important to see that the proper-shaped mask was adapted to each slide, as it made a very great difference in the effect. He himself had two different-shaped apertures cut out of card, which he made use of in order to see which would form the best shape to put on the mask.

Mr. POIRSON was of opinion that some one might render Mr. Brooks assistance when at the lantern, and also afterwards in packing and sending away the slides and apparatus. He thought it was too much to expect Mr. Brooks to do everything unaided.

Mr. BROOKS said it would certainly be a help to him to have some one to hand up the slides. He did not mind how much work he did for the South London Photographic Society if he could only stand it; but in this instance, having to do everything single-handed, it had been almost too much for him.

The CHAIRMAN quite agreed with Mr. Poirson that some efforts ought to be made to relieve Mr. Brooks. He would also like to say that he did not consider it absolutely necessary they should have the oxyhydrogen lantern. In his experience in his own parish he had used the ordinary lantern with much success in exhibiting views of the Holy Land, &c. He had remarked at the lantern meeting that there was one use to which these transparencies had not been applied, namely, the portraying of old valuable engravings and woodcuts, which were often very interesting.

A vote of thanks was passed to Mr. Brooks for his paper, and the meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on Thursday, the 1st instant, Mr. W. H. Hazard occupied the chair.

Mr. A. J. BROWN showed a loose frame to be dropped into a box for storing dry plates. This frame consisted of upright posts attached to a board of the size of the bottom of the box, and these posts acted in the same manner as those fixed to the sides of the store-boxes previously described by Mr. Schwartz and shown by Mr. Cowan. Mr. Brown also exhibited a packing-box made of millboard, but with corner posts of wood on the same plan, to hold three dozen. He thought dry-plate manufacturers might supply boxes of this kind with their plates at no greater cost than those now given.

Mr. E. J. GOLDING said that he used a storing-box with lids at both ends. The box was internally just of the width and length of the plates, which were placed all with their faces in one direction, and, with a sheet of paper on each, a piece of card was laid on the last plate put into the box and the plates used from the other end. The exposed plates were replaced at the end opposite to that from which they were taken, and when the card presented itself it was known that all the plates had been exposed. The box was made light, for travelling, of thin wood covered with bookbinders' cloth, which kept out light well, and of depth to contain three dozen plates.

Mr. A. L. HENDERSON stated, in reply to an observation made by the chairman of the previous meeting, that leucine would pass through a dialysing membrane. He had made the experiment and found it to be as he stated. He also said that he added one part of alcohol to twenty of finished emulsion, and two minims of ammonia to each ounce. He had found emulsion so treated to keep good for several months.

Mr. W. E. DEBENHAM protested against the adoption of the name "leucine" for the solution prepared according to Mr. Henderson's formula before it was ascertained to what extent the gelatine employed was converted into that body, and whether the emulsifying agent was not some other of the decomposition products of gelatine.

A New Member said he was an artist and employed photography to secure copies of his paintings. He had not succeeded in getting details in the shadows. If it was in order he should like the opinion of the members as to the cause of this failing in the negative, which he produced.

Mr. Debenham said that, in starting the Association, it was part of the programme that amateurs and others should be encouraged to lay their photographic difficulties before the members, one or other of whom would probably be able to assist with information or advice.

The general opinion was that longer development was required in the negative shown, whilst Mr. Henderson and Mr. Golding recommended collodion in preference to gelatine for copying pictures.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The fifth ordinary meeting of this Association was held in Lamb's Hotel on Thursday evening, the 1st instant,—Mr. W. D. Valentine, Vice-President (in the absence of Mr. J. C. Cox, President), occupying the chair.

The Honorary Secretary having read the minutes of the previous meeting, which were duly confirmed, Mr. John McCall and Mr. William Millar were admitted members of the Association.

The report of the last lantern exhibition was read by the Secretary and approved, and a vote of thanks was cordially voted to Mr. David Ireland, Jun., for his *Notes on Norway.* The lecture delivered by him and the illustrations thrown on the screen, also his own photographs taken during the tour, gave ample evidence of his power of observation and manipulative skill.

Dr. Tulloch's paper on *Parlour Portraiture* [see page 76] was very interesting. The results shown by Dr. Tulloch were much admired, and a hearty vote of thanks was awarded to him.

The next section of business was a display of plates, as transparencies for lantern exhibition. Those of Mr. J. Robertson and a series of bromide of potassium plates developed with ferrous oxalate (including a plate developed by washing soda and pyro.), by Bailie Ogilvie, together with prints shown by Mr. G. F. Rodger, were much admired, and a vote of thanks was awarded to the exhibitors.

The Chairman exhibited a plate taken about three years ago, which had been intensified by bichloride of mercury, the plate being discoloured, the image disappearing, and the film frilled, this being one of a particular batch of plates, and a warning as to the use of bichloride of mercury.

The question-box afforded another opportunity for discussion, and several young members and amateurs gave evidence of thought and research in their answers.

A vote of thanks to the Chairman closed an interesting meeting.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 15th ult., on which occasion the chair was taken by the President, Professor Vogel. The minutes of the previous meeting having been approved and one new member admitted,

The Chairman showed some platinum pictures by Herren Siemens and Halske, which show how well suited this process is for the reproduction of writings and drawings. He (the Chairman) also remarked that in the reproducing room at Herren Siemens and Halske's factory the work is almost all done by electric light, the production of which occasioned but little trouble there.

Herr Schulz remarked that it was difficult for photographic dealers to deal in prepared platinum paper, because it had to be both stored and sold in boxes with calcic chloride, on account of its extremely hygroscopic character.

Herr Martini remarked that he also supplied paper for the Prussian blue process, and that it was much used by architects for lichtpaus. Of course the drawings got with it were negative—that is, white upon blue.

Mr. Wight remarked that he had succeeded in preparing positive Prussian blue pictures, from negative silverpaus paper; but, on account of the insensitiveness of the iron paper, for this purpose the negative drawing must be rendered transparent.

A number of artotype lichtdrucks, sent as a present to the Society by Herr Bennecke, of St. Louis, were unanimously declared to be the best lichtdrucks ever laid before the Association.

Herr Harth forwarded a number of Tyrolese landscapes.

Herr Kiewning, of Posen, sent a number of cabinet portraits, all taken with Vogel's emulsion, of which he regretted that no more was to be had.

The Chairman explained that his emulsion could not be so cheaply prepared as pure gelatine emulsion, and that the price of gelatine plates was now so low that it seemed hopeless to compete with them. Several persons had asked him to publish his formula, but he could not do so at present on account of the contract he had entered into for the preparation of the emulsion.

Some questions regarding Herr Obernetter's formula having been raised,

Herr Reichard said it was like Columbus' egg—very simple when once you know it.

The Chairman then introduced the subject of the use of electric light for portraiture. Technically, for portraiture it is still pretty much in the old position; the arc light and the white reflector are still used, though some improvements had been introduced in the regulation of the light, the dynamo-electric machine, &c. The flame light had been much improved and lamps of 100 candle power had been produced; but for portraiture forty such lamps would need to be used, as a light of 4,000 candle power is required. The experiments made at Munich with an arc light of 2,000 candle power turned out very unsatisfactorily, and the flame lamp was too yellow for portraiture. For ordinary lighting purposes this was an advantage rather than a drawback, as making it more like gas or petroleum light, so that what were usually considered evening colours suited it. The white arc light, on the contrary, seemed to us blue and cold, and its general introduction must lead to a complete revolution in the choice of evening colours. In his (the Chairman's) opinion the flame would be well suited for lighting the dark room, particularly in summer, because it did not cause much heat. It was also not expensive, though at present rendered more costly by requiring a greater driving power than the arc light, and then every flame lamp, after it had burnt under favourable circumstances for 700 hours, must be replaced by another, as the carbon thread would be given off as dust and form a yellow film upon the shade, which would absorb much light and so lessen the illuminating power of the whole. This replacement costs rather under three shillings.

Herr Quidde inquired which construction of dynamo-electric machine would be best for such a purpose.

The Chairman replied that there were about fifty different constructions, so that it would be very difficult to decide.

Herr Lindner inquired how many electro-photographic portrait studios there were in Germany and Austria.

The Chairman replied that the one started at Vienna having been given up, that of Herr van Ronzelen was now the only one in Germany or Austria, but that there were several attached to technical establishments, as that of Herren Siemens and Halske, those of Herren Winter, Graff, and Dr. Friedländer, and of the general staff.

The meeting was shortly afterwards adjourned.

Correspondence.

Meeting of the Photographic Society of France:—A New Printing Process.—Reports of the Experimental Committee.—A New Portable Stand.—Non-Actinic Glass.—Cold Emulsification.—Measurements of the Exposures Made with Different Shutters.

The monthly meeting of the Photographic Society of France was held on Friday last, the 2nd inst.,—M. Davanne in the chair. After the re-election of M. Peligot and other members of the bureau,

The Secretary called the attention of the members to the advisability of having the Society acknowledged by the Government as an establishment "*d'utilité publique.*" In France many advantages are to be derived when such a title can be obtained.

The Chairman informed the members that a letter had been received from MM. Ch. Cross and Verger concerning a photographic process which these gentlemen had presented at the last meeting of the Académie des Sciences. The inventors of this process obtain direct positives by the following means:—Paper properly starched is floated on a bath composed of—

Water	100 parts.
Bichromate of ammonia	2 ,,
Glucose	15 ,,

When dry it is exposed to light under an image forming a positive. As soon as those parts of the paper unprotected by the *cliché* have changed their colour from a yellow hue to a greyish tint the exposure is deemed to be sufficient. The paper is then floated upon the following solution:—

Distilled water	100 parts.
Nitrate of silver	1 part.
Acetic acid	10 parts.

The image will appear immediately of a blood-red colour, being composed of silver chromate, which, being insoluble in water, permits the paper to be well washed in order to eliminate all the bichromate unacted upon by light.

On every part of the paper upon which the chemical influence of light has acted the bichromate has become reduced, accelerated by the presence of the glucose; therefore, every part or shade of the *cliché* will be faithfully represented. If the paper be dried before a fire and in the dark the image will be of a blood-red colour; if dried in the open air the light will change the colour to a dark brown tint; if exposed to the emanations of hydrosulphuric acid, or plunged into a solution of sulphite of copper and potash, the image will turn to a brownish-black hue.

The proofs exhibited were examined with great attention, and duly commented upon by the learned members of the Académie des Sciences. MM. Cross and Verger did not send any specimens to the Society.

M. Franck de Villechole, in the name of the experimental commission, made a report on the magnesium lamp of M. Loiseau, brought forward at the last meeting. The report was to its disadvantage; nevertheless all were of opinion that if the inventor would make a slight change in its form and in the clockwork it would become a very useful instrument in photography. The same commission had tried the paper impregnated with rosin, which was recommended as suitable for trays when travelling. They found that even a hyposulphite of soda solution would filter through in less than half-an-hour, and that such trays could only be used once with safety. The report was favourable for the perchloride of iron paper as manufactured by M. Colas. This paper can now be kept months without losing its sensitiveness.

M. Deroche offered to the Society three very fine enamels, representing Daguerre, Niepce, and Poitevin.

M. Bretaique presented to the Society a new camera stand, which can be folded up in the shape of a stout walking-cane. One thing new in it is that each leg can be lengthened or shortened at will.

M. Martin presented some panes of yellow glass flashed with red, which he mentioned could now be obtained in Paris. These panes, he said, would pass the spectroscopic examination, absorbing all the blue, yellow, and green rays of the solar spectrum, and therefore absolutely fit for the glazing of windows behind which gelatino-bromide plates were being manufactured or developed.

A Member warned his colleagues against setting too much faith in the spectroscopic examination of red glass. It very often occurred to him that by spectroscopic examination alone a piece of red glass appeared quite fit for the service required of it, but when experimented upon, by placing a bromide plate behind it for a very short time, even by gaslight, an image could be obtained by contact, whereas another piece of red glass under almost the same conditions would keep the bromide plate faultless.

M. Bardy said he did not agree with that, as he had always found that when glass could stand the spectroscopic test no other was necessary.

M. Audra made a communication on the value of Mr. A. L. Henderson's cold emulsifying formula, very much in the praise of the latter.

Colonel Sebert gave a theoretical as well as a practical demonstration as to the rapidity attained by the instantaneous shutter of MM. Thury and Amey (described in a former communication). The rapidity was measured by the aid of a diapason making one thousand vibrations a second. The general opinion was that an instantaneous shutter with movable diaphragms was not to be recommended in practice. What was required was a shutter which could be opened with its full working opening in a $\frac{1}{1000}$ part of a second; that it could be kept open the required time for the exposure no matter how long, and then to shut in the $\frac{1}{1000}$ part of a second, or even shorter, if possible, and that without the least vibration.

Les cours de reproduction industrielles of M. Vidal will commence next Sunday, at l'Ecole Nationale des Arts Decoratifs.

The examination of photographic operators, in order to obtain a diploma, will begin on the 19th of March next. Foreigners are admitted. E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, February* 5, 1883.

PAPIER-MACHÉ DISHES.

To the Editors.

Gentlemen,—Some few weeks since you referred to a funnel made of papier maché, and I believe mentioned that material as likely to answer for developing dishes; but you said that you thought the process of manufacture was a secret.

About thirty years since the same notion occurred to me. I went to Jennings and Betteridge's manufactory, in Birmingham, witnessed the process of manufacture, and at the same time gave an order for several dishes from 16 x 14 downwards. I have had them in use ever since, and they are now perfectly good. I tried the effects of powerful acids and alkalies on them, and the result was in every way most satisfactory. Concentrated cyanide was the only thing I could discover which had the slightest effect on them, and that liquid merely dulled the polish of the varnish.

There was no secret whatever as to the manufacture. I saw the whole process. The paper model was saturated with oil and burned black in an oven, then successive coats of varnish given (either shellac or copal), and stoved between each application, of which there were three, four, or six, according to the quality required, and then polished with fine emery and rotten stone.—I am, yours, &c.,

Cheltenham February 5, 1883. Baynham Jones.

GREEN FOG.

To the Editors.

Gentlemen,—Your weekly issue generally records the conversations or discussions which take place at the meetings of the photographic societies, many of whose members seem terribly troubled with "green fog." Visitors, also, are not free from infection. Judged by their own words they cannot find any remedy, and are unable either to make a plate or develope one without green fog. If they can, it is by accident only. Looking over their proceedings produces a feeling of some alarm, especially as it is hinted that the demon is getting worse and attacking legitimate plate-making, until future prospects are very bad.

At one time, a speaker recently hinted, this was not so—all went well; but now a melancholy change has come on. This induced in me a feeling of wanting to know whether it was only these particular individuals, or whether those who supply what journalists call "ordinary commercial plates," are afflicted similarly. So I called on an enterprising dealer and, as calmly as might be, asked him to recommend me some good plates. He named several—all well known in your advertising columns. "Now," said I, "do any of these give green fog?" "Of course not," was the reply. "Well, but do you not find your customers complain very much of green fog?" "Only 'duffers,'" was the answer; "just the same people who always got bad collodion, and had their bath out of order."

I purchased a box of quarter-plates from eight different makers, and carefully tried them. All gave good, clean pictures of varying qualities, but no kind of fog. I then bethought me of trying to get a box of undoubted green-fogged plates if I could, and I obtained one from a dealer, returned as giving hopeless green fog. Curiously enough, this box gave the best pictures of any of the lot I had bought—quite bright all over, and no trace of fog.

Let your readers reassure themselves. The making of dry plates produces naturally unsuccessful men, who air their failures and think that everybody else is equally unsuccessful; but, just as in collodion times we all supplied ourselves from Mawson or Thomas, and recognised that the making of collodion was, by natural selection, in very few hands, so it may very reasonably be now concluded that all evidence leads us to believe that the various makers supplying the world with plates succeed perfectly in doing so, and that their methods of avoiding failure are not likely to be published.—I am, yours, &c.,

February 6, 1883. An Old Bird.

"FREE LANCE" AND IODIDE IN EMULSIONS.

To the Editors.

Gentlemen.—"Free Lance" has called my attention, in his article *On Things in General,* to two mistakes which have occurred in the reports of my lectures, and for which I beg to send you corrections. On page 719 (vol. xxix.) the following equation occurs:—

$$Ag\,(NO_3) + 3\,Cl = Ag\,Cl + 2\,H\,Cl\,O + NO_2.$$

This should be—

$$2\,Ag\,(NO_3) + 2\,Cl = 2\,Ag\,Cl + N_2O_5 + O;$$

or—

$$Ag\,(NO_3) + 3\,Cl + H_2O = Ag\,Cl + 2\,H\,Cl\,O + NO_2.$$

And again, on page 733, there occurs—

$$2\,Ag\,Cl + Na_2\,(S_2O_3) = Ag_2\,(S_2O_3),\,2\,Na_2\,(S_2O_3) + 2\,Na\,Cl.$$

This should be—

$$2\,Ag\,Cl + 3\,Na_2\,(S_2O_3) = Ag_2\,(S_2O_3),\,2\,Na_2\,(S_2O_3) + 2\,Na\,Cl.$$

I should have certainly sent corrections before had I seen them, and am obliged to "Free Lance."

I beg also to acknowledge Mr. G. S. Penny's correction respecting iodide in emulsions.—I am, yours, &c., E. Howard Farmer.

Polytechnic Institute, Regent-street, W.,
February 5, 1883.

Solar Photography.—M. A. Crova brought before the Académie des Sciences, on the 18th of December, a note *On Solar Photography.* He proposes to obtain the measure of the relative intensities of two lights of different tints by photometric comparison of one and the same simple radiation chosen in each. The sun and the light of a standard Carcel lamp being adopted, and the yellowish-green radiations obtained by passing the rays from each source through a mixture of solutions of ferric and nickel chlorides, the solar light and the lamp light seen through this medium appear to be of exactly the same colour. M. Crova finds by this method of comparison that the light of the sun in a clear sky is equal to 60,000 Carcel lamps.

Photography in Connection with Cycling.—At a very largely-attended meeting of the Temple Bicycle Club on Monday evening last, the 5th inst., a lecture was given by Messrs. H. St. J. H. Bashall and J. B. Wellington on *Photography.* After dealing with the earlier days of the art as practised by Daguerre and Fox Talbot—of whose process some excellent specimens were shown, taken thirty years ago by the father of one of the lecturers—and illustrating the difficulties and troubles of the old processes, the humorous aspect of which were depicted in some large coloured cartoons with which the walls were hung, the lecturers proceeded to show how, by the modern processes and appliances, the *impedimenta* were reduced to such a limit as to bring photography well within the carrying capacity of a bicycle, and still more easily carried on a tricycle. The results obtained—a series of *Popular Cycling Haunts and Well-known Faces*—were then shown on the screen in the shape of lantern slides. It was particularly pointed out that all had been taken with single lenses; that the angle of view included was sufficiently wide; that, notably in the case of the interior of the Church of St. Mary Aldermary, in the City, there was no appreciable distortion; and that as the range of subjects successfully taken with this lens included breaking waves, portraits, and groups, it was quite rapid enough for all practical purposes. An exhibition of apparatus lent for the occasion by Messrs. W. Watson and Son, Newton, Lawley, and the Scioption Company—whose scenograph and light brattice stand were particularly admired—brought a very successful meeting to a close. It was held at Anderton's Hotel, Fleet-street.

Photographs of the Vocal Organs.—At a meeting of the Photographic Club, on Wednesday, the 31st ult., a most interesting series of photographs was shown of the vocal organs in the act of producing musical tones. This result—long desired by physiologists—has at last by an extraordinary combination of care and skill been most successfully accomplished. The difficulties in the way have caused all previous attempts to fail. The first and greatest difficulty lies in the fact that the vocal chords are situated at some distance down the throat, that they

can only be seen by reflected light obtained from a mirror which has to be thrust to the back of the mouth, and that this portion of the human frame is so extremely sensitive that the slightest touch causes an involuntary spasm. The mirror, therefore, can only be used with the greatest skill and must be instantly withdrawn. To arrange, then, at this moment not only to convey the amount of light down the throat necessary to produce a photographic image, but to hold the mirror in such an exact position that it shall at the same time convey the light to the vocal chords and the reflected image to the camera, is a task beyond that of ordinary skill and patience. What, then, must it be to obtain at the same time the correct musical note without choking the patient? Never was word more expressive. All these difficulties were overcome. Mr. Bencke was the patient—a thorough musician and a good laryngoscopist. The study and patience of years of experience enables him to bear the infliction of this mirror with comparative ease. Dr. Lennox Browne as the professional director, and Mr. Cadett as the photographer, together brought about this great triumph of photography.

EXCHANGE COLUMN.

Various backgrounds, head and body rest, imitation rock, large size grass mat, &c. What offers in exchange?—Address, T., 126, Bold-street, Liverpool.

I will exchange the ticket of a photographic half-plate Lerebours' lens, pledged for £2 15s., for a roller or anything of value.—Address, J. B., 76, Holden-street, Liverpool.

I will exchange a new interior background, by Bull, for a useful studio table. Photographs exchanged. Difference adjusted. — Address, D. Bordley, Newport-road, Stafford.

Cameo embossing-press, for *cartes* and cabinets, quite new, also six new printing-frames, 5 × 4, will be exchanged for anything useful.—Address, White, 102, Bayson-road, Camberwell, S.E.

Wanted, a half-plate camera and lens, for groups or views, in exchange for a lady's silver watch and treadle sewing-machine, both in perfect working order.—Address, Arthur, 1, Cotton-buildings, Exeter.

Wanted, a studio stand, in exchange for eleven volumes of *Barnes' Commentary on the New Testament*, never been used, perfectly new; difference in cash.—Address, E. Everitt, 83, Upper Kent-street, Leicester.

I will exchange a Victoria camera, for taking four, eight, twelve, and sixteen on a plate (no lenses), by Dallmeyer, for a cabinet rolling-press or retouching desk.—Address, H. Normington, 31, Acland-street, Limehouse, London, E.

Wanted, a whole-plate camera, with half- and quarter-plate carriers, in exchange for a studio camera stand with screw adjustment, nearly new. Photographs exchanged. — Address, Photographer, Holly-terrace, Lansdowne-road, Worcester.

For exchange, interior background, sea view ditto, both in good condition; very rapid 4¼-inch diameter lens; ditto 4¾-inch focus *carte* lens. What offers in backgrounds, furniture, or symmetrical lenses?—Address, J. E. and C. Ireland, photographers, 14, Methven-street, Perth.

I will exchange seven volumes of The British Journal of Photography, from 1875 to 1881, for a quarter-plate portrait lens and camera. The lens must have good definition and have a back focus about four and a-half inches.—Address, R. Eaton, 18, Charlotte-terrace, Barking-road, Plaistow, Essex.

I will exchange a Lancaster *mervielleux*, quarter-plate camera and stand, lens and two double-backs, complete, nearly new, for a good waterproof or leather case, with straps, to carry a whole plate portable camera and backs.—Address, Harold Senier, 5, Romola-terrace, Norwood-road, Herne-hill, S.E.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered—

Edgar Gael, Berkeley Vale, Falmouth.—*Two Photographs of Dr. Benson, Bishop of Truro and Archbishop-Designate of Canterbury.*

Melbourne.—Too late for reply this week.

H. H. B.—Messrs. Lechertier, Barbe and Co.'s address is 60, Regent-street, W.

Wm. Graham.—Bleach the negative with ferric chloride and redevelope it with ferrous oxalate.

A New Reader.—Any chemist will supply you with a "Winchester quart" bottle. Its capacity is from eighty to ninety ounces.

Learner asks if any of our readers can inform him how to make "flash varnish" for ferrotype pictures, and which he has seen used in some travellers' booths.

A. J. Simmons.—Evidently you have allowed the paper to become damp; hence the cause of the mouldiness. It is doubtless now spoilt for any photographic purpose.

A. G. P.—You cannot do better than take a few practical lessons from some one who teaches the method of colouring you are so anxious to learn. You will learn more from a practical demonstration or two than we can teach you in this column.

Ferro.—1. The correct size for quarter-plates is four and a-quarter inches by three and a-quarter; half-plates, six and a-half by four and three-quarters; whole plates, eight and a-half by six and a-half.—2. We believe ferrotypes have been as much worked in France as in England.

A. Z.—1. We imagine that an ordinary emulsion developed with the ferrous oxalate developer will answer the purpose. We have had no experience in this direction ourselves.—2. Perhaps the material will require to be treated with a solution of common soda to remove the greasiness from the snrface.

J. C. (Worcester).—If you send us an example of your work we shall then be better able to judge if it be likely to meet with success if introduced commercially. The idea seems to be good and ingenious, if it can be carried out successfully. Certainly it has the advantage of novelty, which is something nowadays.

C. W. Crosby.—The process is a secret one, and has never been published. It is generally supposed to closely resemble the Woodburytype. A gelatine relief being made containing some gritty matter, this is afterwards pressed into metal and an electrotype taken from that, which is printed from in the copperplate press—at least, so it is said.

A. Michell.—Unless you have an elongating cone to your camera we doubt if you will be able to employ the lens in question, as it will be too long in focus. It will certainly be advisable to have one made, as the advantage of a long-focus lens on a trip such as you are about to take will be very great indeed, and will well repay the outlay as well as the little extra encumbrance.

Hammerstein.—The gelatine mentioned is supplied by the Autotype Company, and you will have to get it direct from them, as they have no agent for its supply. It is quite possible that other gelatines of the same character will answer the purpose; but that is the one given by the author of the paper. We have not forgotten the subject, but this is scarcely the proper season for outdoor operations.

G. H. Weatherley.—For the size of transparencies you propose employing you will require four and a-half-inch condensers; three and a-half will be of no use whatever. If the subject be the full size of the slide nothing less than five inches or five and a-quarter will give you even illumination. We should have thought it would have been more convenient for you to use the standard size of slide than to get up a special one for yourself; but, of course, you know best.

Beginner.—Both the lenses you mention have, according to your note, the same diameter; but one is two and a-half inches shorter in focus than the other. Of course the shorter of the two will be the quicker in action and better for your purpose; that is, supposing it will give good definition and cover the size of plate your require. As you do not mention this, we can offer no suggestion as to which of the two instruments it will be better for you to select.

Received.—W. T. Wilkinson; W. Horseman Kirkby; George Smith; Archer Clarke.

The late Mr. Fredrick Southwell.—We regret to announce the death, after a short but painful illness, of Mr. Fredrick Southwell, the last surviving partner of the late well-known firm of Southwell Brothers, of 22, Baker-street, W.

Photographic Club, Ashley's Hotel, Henrietta-street.—At the next meeting of this Club, on Wednesday next, the 14th inst., the subject for discussion will be *On Extemporising Apparatus in Case of Loss or Breakdown when Away from Home.*

Outdoor Photographic Note-Book.—We have received from Mr. R. Keene, of All Saints, Derby, a handy little memorandum book bearing the above title. With plenty of room for recording all necessary remarks, this will be found of great use to landscape workers.

Stolen Negatives.—We take the opportunity of calling the attention of our readers to an advertisement in another column announcing the theft of a number of valuable negatives, and put them on their guard should any such, answering the description given, be offered for sale. It is sadly to be feared that they have fallen into the hands of persons who, ignorant of their value, may destroy them.

Photographic Society of Great Britain.—The annual meeting of this Society will take place on Tuesday next, the 13th inst., at 8 p.m., at the Gallery, 5a, Pall Mall East, when the report of the Council, the Hon. Treasurer's financial statement, the election of officers, and other business will be transacted. A paper on *Silver Flashed Glass for Dark Rooms* will be read by Captain Abney, R.E., F.R.S.

Mr. C. Ferranti.—It will be seen from our advertising columns that this well-known artist is about to remove from Liverpool, and Messrs. Thomas Whitehead and Son have been commissioned to sell by auction, on Tuesday, Wednesday, and Thursday next, on the premises, Bold-street, the goodwill, with immediate possession, of the establishment, together with the apparatus, art furniture, proof engravings, drawings and oil paintings, and furnishing appointments of the residential portion of the extensive premises. The announcement of this important sale may prove interesting to many of our professional readers.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

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COMBINED CHEMICAL AND PHYSICAL DEVELOPMENT.

In our last number we published an article, by Mr. E. Howard Farmer, describing a novel method of intensifying gelatino-bromide negatives with silver, though the metal is not employed in the ordinary manner. The system may, in fact, be described as a combination of the two forms of development to which the terms "chemical" and "physical" have been respectively applied, for the solution consists of the ordinary alkaline pyro. or ferrous oxalate developer holding a salt of silver in solution. Such, at least, it would be were it used as a "developer" proper, or for intensification before fixing (and if it works successfully *after* fixing there appears no reason why it should not do so before); but, as employed by Mr. Farmer, it is questionable whether any action occurs beyond the reduction and deposition of the silver in solution, in which case it belongs solely to the physical class.

It is not the first time that such a combination has been proposed, though hitherto but little practical value has attached to any of the suggestions. So far back as 1863 or 1864, Major Russell proposed that the ammon ia employed in conjunction with pyro. for the development of his rapid tannin or other dry plates should be saturated with bromide of silver. The only result of this in our own experience was that the developer discoloured more rapidly, and with the large proportion of ammonia employed with modern dry plates, as compared with those of twenty years ago, this discolouration would only be the more rapid and complete.

Some five or six years ago, if we remember rightly, Captain Abney pointed out that in order to secure greater density with alkaline pyro., if it should be required, it was only necessary to add to it a salt of silver in solution, though, so far as we recollect, no mention was made of the precise plan adopted. We ourselves tried some experiments at the time in that direction, employing for the purpose haloid salts of silver dissolved either in the ammonia or the bromide solutions used in developing, or else in a specially-prepared solution of hypo. Speaking from memory, not having our notes at hand, we found that when the silver salt was present in any quantity the developer became instantaneously black upon the addition of the pyro. to the ammonia-bromide solution, while, if it were sufficiently reduced in quantity to allow the mixture to remain clear for a reasonable time, the effect of the silver salt was quite inappreciable.

In a series of articles on new developing agents, published in 1880, Mr. M. Carey Lea made the first direct suggestion of a combined chemical and physical developer, though at the time he wrote his experiments had not led him to any practical issue. The salt he proposed to use was ferrous tartrate, which possesses the property not only of reducing the haloids after exposure to light, as does ferrous oxalate in chemical development, but also of being miscible with solution of siver nitrate, and therefore capable of application to a wet plate in the performance of physical development.

But this is an entirely different developer, both in constitution and intention, to that proposed by Mr. Farmer, which is, in fact, only put forward as a means of adding to the deposit already formed by the application of any of the ordinary forms of development. It is quite possible that it might be used for the purpose of originating the image on a *dry* plate as well as for increasing its strength when formed; but it is very certain that it would be quite inapplicable to a *wet* plate, owing to its reducing action upon the silver nitrate on the surface of the film. Indeed, from our own previous experiments, we are at a loss to comprehend how the quantity of silver bromide mentioned in Mr. Farmer's formula (nearly two grains to each ounce of pyro. solution) is kept clear of the reducing action of the pyro. for a sufficiently long time in the absence of a restrainer. Then, again, it is difficult to understand how, after soaking a plate for five minutes in the solution of silver bromide in hypo., there is no immediate and general reduction on the application of the ferrous oxalate developer. In the case of a fixed and imperfectly-washed gelatine negative, which may be considered to be in a somewhat similar condition to one to which the "silver solution" has been applied, the application of the developing solution—especially ferrous oxalate—would produce an instant and marked discolouration from reduction of the soluble silver salt in and on the film. Why, then, does not the same change proceed in the case of Mr. Farmer's silver solution when mixed with either ferrous oxalate or pyro.?

We have not yet had an opportunity of fairly trying the new mode of intensification in its entirety, but trust to be able to do so in a day or two. If it present any advantage over the acid silver method it will prove a welcome relief from mercurial and similar evanescent processes; but up to the present time its merits require proof, and our own past experience is, as we have said, unfavourable to its reliability. We are, however, open to conviction.

Before leaving the subject of combined development, we may recall attention to Mr. Carey Lea's suggestions contained in an article on page 351 of our volume for 1880. Pointing out that in using either chemical or physical development "we call into action only one half of the means at our command," inasmuch as a sensitive film is capable of itself suffering reduction by the developer as well as of attracting to the impressed portions the minute particles of silver thrown down by and from the developer, he goes on to say:—"But that which we should have is not a separate application of two developers to utilise these two capacities separately, but some new developer which may act on both together." The writer then gives the formula upon which he had based his first experiments, and which he hopes may prove a starting-point for others. Here it is:—

Rochelle salts (tartrate of soda and potash)...	200 grains.
Borax	50 „
Ferrous sulphate..................................	50 „
Water	4 ounces.

The first-named salts are to be dissolved completely in the water, and then the ferrous sulphate added. When used the solution is to be sufficiently acidified with tartaric acid.

As Mr. Lea shows, this solution will in the acid state develope a dry-plate image in the same manner as ferrous oxalate. Unlike the latter, however, it may be applied to a wet plate, and will upon that produce an image at the expense of the silver on the surface of the plate—a combination of properties never hitherto found in one developer.

In consequence of continued ill-health Mr. Carey Lea has been unable yet to follow up his researches in this direction; but he has given such definite instructions regarding the lines he proposes to follow that it will not be difficult for some of our experimental readers to take up the thread where he has dropped it. The subject is one well worth investigating, and we hope to have the assistance of others in working it up.

OUTDOOR APPARATUS.

At the Photographic Club, last week, an interesting subject at the present period, when so many are considering their arrangements for the coming season, formed the topic of discussion, namely, the best and least fatiguing method of carrying the photographic *impedimenta* when in the field. This is an old and somewhat vexed question, inasmuch as opinions appear to differ as much as ever they did as to whether the kit should be carried in one package or be divided into two or even three separate ones; and also, if it be in one parcel, how that should be arranged—whether on the back, after the manner of a knapsack, or slung with a strap diagonally across the shoulder, somewhat as fishing-baskets are usually carried.

Everyone, even with limited experience, will agree with us that, however portable the apparatus may be made, its weight is quite sufficient to cause at least some inconvenience when a fifteen- or twenty-mile walk is taken on a hot summer's day, even with plates of moderate dimensions—say, for example, the popular size, seven and a-half by five; therefore any means by which it can be reduced to a minimum is a desideratum.

During the discussion Captain Abney gave it as his opinion that a weight of fourteen pounds is about the maximum that can be carried for a day in a mountainous district without causing considerable fatigue. This weight would fairly represent an average outfit, without the stand, for the size of plate just alluded to, presuming that three double dark slides only be taken. If in place of the three slides a changing-box with a dozen plates be employed, that weight will be somewhat increased. At first sight, in these days of extremely portable apparatus, fourteen pounds may appear an excessive weight; but if anyone will take the trouble to weigh his kit when fully equipped he will find that it is by no means over-estimated.

Here are the figures for an outfit, embracing a bellows-body camera seven and a-half by five, with three slides containing six plates:—Camera, with extra front, three lenses, and focussing eye-glass, six pounds and a-quarter; three double backs, containing six plates of average thickness, five pounds and a-quarter; tripod head and focussing-cloth, three-quarters of a pound; leather case, two and three-quarter pounds. Total, fifteen pounds. Somewhat lighter apparatus than the one here given, which does not contain all the latest improvements as regards lightness, may be obtained; but, unless rigidity be sacrificed to a considerable extent, the weight cannot be reduced much beyond a couple of pounds or so.

Now, seeing that some such weight as this has to be taken, which is the most convenient and least fatiguing mode of carrying it? Captain Abney—who, by the way, is no mean authority on the subject, as he in his military capacity has served on several committees of inquiry as to the best method of arranging the soldier's kit *en route*—gives as his opinion that, in mountain expeditions, the apparatus should always be in one package, and carried, not as a knapsack on the shoulders, but so that the weight is arranged lower down, more on the loins, as then the fatigue is found to be far less on a long journey than if it were supported in the old-fashioned way. When the load is carried in this manner the hands are left free for the use of the alpenstock. With regard to the so-called alpenstock stand, Captain Abney said that in Alpine districts he had not found that form of stand sufficiently rigid; hence he preferred a folding one, and carried it strapped to the other apparatus.

In the course of the discussion Mr. W. Bedford said he often took two cameras into the field with him, and he invariably found the men he engaged as porters preferred to carry them with a strap across the shoulders, one hanging in front and the other behind, so that they in a manner balanced each other, pannier fashion. As far as our experience goes, we consider it advantageous to arrange the apparatus in different ways according to the journey to be undertaken. Thus, in a mountainous district, or when traversing a rocky shore, it is very desirable that the hands should be unencumbered; then the whole of the apparatus should be contained in one bulk, as in the usual leather case, and carried either as a knapsack or in the manner advocated by Captain Abney.

For a level road, however, many—no doubt with advantage—prefer to divide the kit, carrying the camera, lenses, &c., in one parcel and the slides in another—the former slung with a strap over the shoulder like a fishing-basket, the latter being carried in one hand and the stand in the other. Then, by way of a change and rest, the two parcels may be attached by the strap and carried across the shoulder *a la* pannier. In this way a long journey across country may be performed with less fatigue than with one heavy package.

Very convenient cases for carrying the divided kit are the brown, leather-bound, waterproof canvas "schoolboy satchels," which may be purchased for about two shillings each. They are strong, well made, neat in appearance, and are generally large enough to hold a seven and a-half by five camera, with the lenses packed inside, and a second one will take the dark slides, tripod-head, &c. In this manner the apparatus may be pretty evenly divided into two parcels of convenient size.

We would suggest to those who may be going on a photographic tour to be provided with both systems—the usual leather case, to carry the whole in one package, for some trips, and the satchels for others. The latter, being light and folding quite flat, will occupy but little space in the main bulk of *impedimenta*.

During the discussion at the Club the question was raised as to the advantage or otherwise of changing-boxes over dark slides for taking plates into the field. The general impression appeared to be in favour of the latter, and it was mentioned that, with some of the extra-light double slides now made, the weight of six is no more than that of a changing-box when both are filled with plates, and also that when two or three plates only are required the same *impedimenta* must be taken as for a dozen, which places the box at a considerable disadvantage.

Another practical disadvantage of the changing-box was specially alluded to, namely, that commercial plates are frequently so badly cut that they are very liable to get fixed in transferring to the slide through being too large, or getting out of the grooves in consequence of being too small. In all cases, when a changing-box is employed, the plates should always be carefully examined as to size, and the corners rounded off with a pair of pliers before they are put into the box, in order to avoid difficulty in the field where it cannot be remedied.

During the evening it was incidently mentioned that most of the dry plates supplied on the continent have their edges ground and the corners rounded off. What a boon to workers with the changing-box it would be if they could be obtained thus finished in this country!

ACETATE OF SODA AND ITS LATEST USES.

Acetate of soda in printing and toning operations plays almost as important a *rôle* as does "pyro." or "iron" in negative work. Carbonate, phosphate, citrate, tungstate, borate, and other salts of soda have, and have had, their advocates; but acetate is about as greatly in demand as all the others put together, or we much mistake. *A priori*, it is difficult to see why there should be such differences in the toning action of the various salts as it is alleged there are; yet it is true that many uphold acetate of soda as before everything for evenness and perfection of results. Certainly it has the advantage, as we have proved over and over again in our own practice, of great uniformity—a uniformity not only in the results in tone in a single batch, but in the tone obtainable from day to day and week to week with one and the same stock solution. We have put a toning bath away and never touched it for a month, and upon returning it to use again have found its toning action precisely similar to what it had been on the previous occasion of our using it. That this is no inconsiderable advantage none of our readers will dispute.

In using acetate with gold solution for toning it is always better to previously neutralise the latter—with chalk is the readiest means, perhaps—for it is essential to the best rendering of the tones of which an "acetate toning" is capable that the toning bath be neutral or alkaline. Although acetate of soda possesses a little alkalinity of reaction to litmus paper, it has not much power of neutralising the effect of acidity in any solution it may be mixed with, and to use any considerable amount of carbonate of soda with it at once reduces a toning solution to a carbonate instead of an acetate bath.

To preserve its uniformity of action it is desirable to keep it in a bottle, as it effloresces slightly in the dry air, and at a moderate heat completely. It is a very soluble salt, one part dissolving in four of water at the ordinary temperature of the atmosphere. At 80° Fahr. about two and a-half parts of water are required, and 1·7 parts at 120° Fahr. Acetate of soda crystals contain three molecules of water, which, when heated to a temperature even below 212° Fahr., will suffice to liquefy them.

This salt as found in commerce is usually fairly pure, though the fineness of the crystals renders it more difficult to free them from their mother liquor. We never met with more than one sample which did not act efficiently, but this behaved in a most singular way, gold toning solution made with it utterly declining to become paler in colour, as a well-made toning solution should do; in fact, it became, after standing unused for two or three weeks, much darker. The sample was obtained direct from a large dealer, and was not contaminated while in our care, otherwise it might have been supposed that hypo. had been accidentally splashed into it; but all the crystals acted in the same manner from whatever portion of the bulk we took them.

A new interest now attaches to the substance we are speaking of, in this case purity being matter of no consequence. We have on a previous occasion referred to the use of acetate of soda for the foot-warmers of railway carriages, and the substance possesses such exceptional properties that it may become of great service to photographers for imparting heat to drying-boxes, heating small rooms, and, indeed, for a variety of purposes where a portable heating apparatus without fire on a small scale is needed.

The employment of hot-water bottles for such purposes is well known, and from the great capacity of water for heat—which is greater than that of any other liquid—a considerable amount of heat can be stored up in a small space. The objection to the use of water, however, is the quickness with which (unless protected by a good non-conductor) it parts with its heat, a large bottleful becoming cool in a very short time. With acetate of soda, however, in place of water, a given bulk, after having been heated to fusion, will give off more heat and remain at a high temperature for a far greater time than water; so that a drying-cupboard with a gentle draught through it, supplied with an acetate warmer over night, would, when inspected in the morning, still show plenty of heat after the lapse of twelve hours—a property of a most useful character where gas is unavailable and continuous attention cannot be given.

Some incredulity may be felt at this account of the property of the salt; but it should be borne in mind that at the moment when bodies in a state of fusion or solution become solid a very large amount of heat is given off. A very familiar instance of this is seen in the behaviour of hypo. A few crystals placed in a small flask and gently heated will soon fuse, and if the flask be left till quite cold its contents will remain perfectly fluid. Let, however, one small crystal of hypo. be dropped in and the whole will become solid in a second or two, and so much heat will be disengaged that the cold flask will become so hot that the hand can only just bear it. The heat that had been absorbed and rendered latent so long as a state of fluidity was maintained became unnecessary when the solid form was assumed, and so was set free, as it were.

It will be obvious from this that the heat is not produced from nothing, as before the acetate or any substance can be utilised to give heat it must in the first instance be imparted to it. The acetate requires a great quantity of heat—not necessarily a high temperature—to liquefy it, and, in consequence, can give off a great quantity when it has been liquefied.

M. Ancelin—the inventor of the system of using this salt for the purpose—has been making a series of experiments which may be briefly epitomised for our purpose:—Filling a railway "foot-warmer" of about two gallons' capacity with hot water, and another with acetate, and rendering it liquid by heat, he compared the action of the two. In about four and a-half hours the former, starting at a temperature of about 180° Fahr., became reduced to 104°—a temperature below which it would be useless for the purpose. The cooling, too, though quick, was at an even rate.

When acetate of soda was used (the same-sized pan, it must be observed, held four or five times the weight of acetate as it did of water) a lower initial temperature was given, and up to a certain point—about 120° Fahr.—the fall in temperature coincided with that of water. At that point, however, instead of, as in the case of water, continuing to fall in temperature at the same rate the cooling was very gradual—only about one degree per hour. The point at which this sudden decrease in rate of cooling took place corresponds with that at which crystallisation begins; but, instead of the heat of solidification being disengaged at once, as in the experiment with hypo. we described, the crystallisation is gradual, and the disengagement of heat also gradual.

It will thus be seen that acetate of soda promises to be a still more useful servant to the photographer than ever, and we feel quite assured that in the direction we have described it may perform many most useful functions.

"Coming events cast their shadows before," and, though the shadow of the moon is cast for a very brief space upon our globe, looking upon it as a "coming event" the eclipse on May 6th next is already being prepared for. Tomorrow it is arranged that Mr. Charles Ray Woods and Mr. H. A. Lawrance, who assisted Dr. Schuster and Mr. Lockyer in Egypt last year, sail from Southampton for Panama to join the members of the American expedition, with whom they will proceed to the selected site in the Caroline Islands, the success fortunately attendant upon the Egyptian eclipse expedition last May having justified the despatch of this additional expedition.

Sir John Pope Hennessey is, as everyone knows, a celebrated man, and the Nemesis in the shape of detraction and envy cannot but clog his footsteps, as those of all great men. We need not, therefore, be surprised that invidious comment should follow his photographic arrangements in connection with the visits of the sons of the Prince of Wales to the colony over whose interests he presides. They visited Hong Kong simply as officers of H.M.S. "Bacchante." They did not go as the sons of the Heir Apparent—all the more reason to do them honour, where possible. Accordingly, exploits of photography on a gigantic scale were prepared. At least we presume the scale was gigantic, the results so far having been hidden from public gaze. Her Majesty's grandchildren arrived and departed, and the loyal colony have to pay a little account, which foots up to 3,795·67 dollars. Happy photographers to have a commission for a day's work, amounting to seven or eight hundred pounds!

An interesting Cantor lecture was delivered the week before last, by Mr. Leopold Field, upon solid and liquid illuminating agents, in which he contrasted the slow progress in artificial lighting, made during almost countless centuries, compared with that of the last hundred years, which had served to revolutionise the art of lighting apart from the use of electricity—lighting which, as our readers are aware, has enabled photographs to be taken with no more aid than that given by a number of lights, such as those with which the humblest house in the land is supplied.

Our readers will have observed the great increment of attention that has been bestowed upon microscopic photography of late, and the contribution by Mr. George Smith in our issue last week to the descriptions of the manipulation necessary to carry out the work is especially valuable. We have received from that gentlemen a

photograph of the proboscis of the blow-fly, taken, we presume, from a balsam-mounted specimen, in which the proboscis is usually split open and flattened out, thus leaving a very perceptible amount of thickness in the object, and requiring "depth of focus" in the lens to enable a good view to be taken. Yet in the microphotograph received, although it is only taken with a common French microscopic triplet, the optical and illuminating difficulties have been overcome in a surprising manner, the definition of the most minute parts being excellent—indeed, showing better and looking sharper with a small hand magnifier than with the unaided eye.

The use of india-rubber paste for mounting photographs, highly praised as it once was, is little recommended nowadays, for it has been found that through the action of time its properties become lost, and the adhesive material is converted into so much dry powder. Mr. H. McLeod has been subjecting various pieces of rubber tubing to the action of light at the same time that other corresponding pieces were kept in the dark. He found after the lapse of two years that the pieces in the dark sealed from air and also those left open were unaltered, while the piece exposed in an unsealed tube to the light became brittle on its surface. A sealed piece exposed to light was unacted upon in any way. Some experiments of our own have a somewhat similar bearing. We laid small pieces of thin sheet rubber on a shelf, where they were fully exposed to the air, but received little light. After three years' exposure we examined them and found them quite brittle, and upon shredding them very finely and placing them in benzole they were quite unacted on by it.

Professor Boltzmann has lately achieved the direct photographing of sound vibrations. He threw an image of a vibrating platinum plate upon a screen by the aid of a solar microscope, and rapidly moved a sensitive plate across the field, which was found to be impressed with curves of certain shape according to the utterances conveyed to the platinum plate. Pretty simple curves represented vowel sounds, while the consonants gave very multifarious curves.

Some considerable interest has attached to a paper presented by MM. Cros and Vorzerand to the Academy of Sciences in Paris on the 22nd ult., on the direct production of photographic positives, the process consisting of coating paper with a chrome salt, exposing to light, and then dipping into a solution of nitrate of silver, a red picture drying to dark brown being produced. So far from there being any novelty in it the process is just forty years' old, and was described by Mr. R. Hunt in 1843, the process being termed by him "chromatype." It will be interesting to compare the following extract from Hunt's *Researches on Light* (page 175, second edition, 1853) with MM. Cros and Vorzerand's recent announcement:—

"*The Chromatype.*—The first announcement of this process was made by the author in August, 1843. The process is so exceedingly simple, and the resulting pictures of so very pleasing a character, that, although it is not sufficiently sensitive for use in the camera obscura, it will be found of the greatest value for copying botanical specimens, engravings, or the like. Good writing-paper is washed over with sulphate of copper in solution, the strength of which is not of much importance; about one drachm to an ounce of water is preferred. When dry it is washed over with a moderately-strong, but not a saturated, solution of the bichromate of potash. The paper, when dry, is fit for use, and it may be kept for a considerable time in a portfolio without its sensibility being impaired. When exposed to the sunshine the first change is to a dull brown, and if checked in this stage of the process we have a *negative* picture; but if the action of light is continued the browning gives way, and we have a *positive* yellow picture on a white ground. In either case, if the paper when removed from the sunshine is washed over with a solution of nitrate of silver, a very beautiful positive picture results."

An interesting note was presented to the Royal Society last month by Captain Abney and Lieut.-Col. Festing upon the absorption spectrum of iodine in solution in carbon bisulphide. They refer to the common belief that the absorption begins to take place in the green, and, as the thickness of the solution increases, extends in both directions till all the visible rays are extinguished, leaving the invisible ones absorbed. One of the investigators, indeed, so far believed this to be the case that he gave up some experiments he was engaged in on account of the falsifying effect he considered this absorption to be producing. So far, however, is this from being the case, that (the experiments being checked by using both collodion and gelatine plates) they found that the last visible ray to disappear visually and photographically, when using solutions of increasing density, was the blue, the ultra violet having been extinguished before that time, while, when all the rest had been filtered out, there still remained the infra-red rays. They say, in conclusion, that "by the use of this solution in a rock salt cell and a grating the infra-red spectrum, from $\lambda 7600$ to $\lambda 15200$, may be photographed without the instrumental separation of the different order of spectra."

A NOTE ON EMULSION MAKING.

To a certain extent an outsider, and at the risk of being thought to rush in where, doubtless, experienced hands have already failed, I make the following suggestions for preparing an emulsion.

Take the weighed nitrate of silver or measured standard solution sufficient (say) for six ounces of emulsion, precipitate with pure carbonate of soda, and wash twice by decantation, draining closely each time. Next add to this the full amount of gelatine dissolved in two and a-half ounces of water and mix well by agitation, keeping the jar or bottle at a temperature of 100° Fahr. Now dissolve the bromide and iodide of potassium in one ounce of water, to which add a *very* slight excess of acetic acid over and above that which calculation shows is required to combine with the silver carbonate. The above is to be added by degrees to the emulsified carbonate with constant stirring, the jar during this operation being still kept at the same temperature. When the froth has entirely subsided the emulsion, after standing, is poured into a dish, allowed to set, and washed as usual.

This "new departure," if it can claim novelty, is designed to form the bromide and iodide of silver slowly so as to ensure fineness, as well as to gain any advantage there may be in the use of an organic salt of silver in place of the nitrate. It will be seen, too, that in this scheme the acetic acid acts as a carrier of the silver, and that at no time is the silver salt in contact with the gelatine unaccompanied by a sufficiency of the haloids to decompose it.

Now comes the question of imparting sensitiveness. Many operators heat the unwashed emulsion in a water bath—some at 212° Fahr. for an hour and others at a lower temperature, with addition of ammonia. Heating gelatine we know alters its physical as well as its chemical properties. It first loses its setting power, and when the heating is indefinitely prolonged other more complex changes come about.

Experiments that I have now in progress show me that most, if not all, nitrogenous bodies give ammonia, and possibly small quantities of the "compound ammonias" also, when they are heated with water in sealed tubes at 300° F. I mention this merely to show that when a gelatine emulsion is heated for an hour only at 212° Fahr. traces of ammonia may still be formed. Should this be so the fact will explain to some extent the observed increase in sensitiveness, knowing, as we do, that an addition of ammonia to an unboiled emulsion will confer the same quality.

In view of what I have said it seems to me that a preferable plan to boiling an emulsion is to make up (say) a seventy-grain solution of gelatine in water, and heat it, *per se*, in a loosely-closed bottle at 212° Fahr. until the setting power is destroyed, and then to add portions of this solution to an emulsion either when the argentic bromide is being precipitated or at the melting up of the finished product when the extra water is added. My reason for saying "a loosely-closed bottle" in preference to an open vessel is to make the conditions of the heating similar to those in emulsion boiling, as set forth in the manuals.

From a few roughly-executed experiments I made a few weeks ago I learned sufficient to show me that the line of research here indicated seems hopeful. Philip Holland, F.C.S.,
Public Analyst for Southport.

TRANSPARENCIES ON GELATINE PLATES.

That a gelatine transparency, when properly made, is a very good substitute for a carbon transparency cannot be denied, especially when the carbon print is made by a photographer not perfectly *au fait* with the process. This being so, the question that now arises is—What is the best way to produce a suitable transparency upon a gelatine dry plate?

First of all, the greatest care must be taken to guard the sensitive plate from even the slightest touch of light, as it is a *sine quâ non* that the extreme high lights of the transparency must be absolutely free from the slightest veil; therefore the slowest possible plates ought to be selected for this purpose, and the operations of transferring from plate-box or packet to contact with the negative should be conducted in absolute darkness or by the faintest possible light. Place the negative in the dark slide face upwards, put a sensitive plate upon the negative face downwards, close the door, and proceed to expose.

The light to which the plate is exposed must be as actinic as possible, as this has a great influence upon the vigour of the resulting transparency—the stronger the better the transparency, and *vice versâ*. In my experience no amount of forcing in development can make a passable transparency if a feeble light be used, no matter how long the exposure. I use the "albo-carbon" gaslight, and can get any required range of gradation or density, the exposure through a negative of ordinary density with a plate of the rapidity of a Paget "ten times" being about five seconds at a distance of six feet from the gas jet.

The development of a transparency requires to be conducted in a slightly-different manner to a negative, and the ferrous oxalate developer gives about the best results, only the proportions are different, namely, six of oxalate solution to one of iron and ten drops of a sixty-grain solution of bromide of ammonium. With the ferrous oxalate developer, however, the time occupied in the operation is very long, from twenty to thirty minutes being the average; but, as there ought to be no need for hurry, this cannot be any serious drawback.

For those who would prefer to use the pyro. it is necessary that the usual proportion of bromide be doubled. By this means the desired end of clear lights will be attained with any desired amount of density.

Although with care, and after the expenditure of a few plates in acquiring proficiency, excellent transparencies may be obtained upon bromide plates, the acme of perfection will only be attained by the use of chloride plates developed by the ferrous citro-oxalate, as an image in chloride of silver is blacker by reflected light, and, whilst still retaining all its vigour, is more transparent by transmitted light than one in either bromide or brom-iodide; and there is little doubt that gelatine chloride of silver plates, if placed upon the market, would command a ready sale for transparency making.

Allusion has been made above to the albo-carbon gas burner. Having had some in use for over three months I can thoroughly recommend them to the notice of photographers. The light given by these burners is from five to ten times more than when the ordinary form of burner is used, besides being a steady, white light very suitable for all kinds of night work. With two burners I get more light than from four ordinary ones, and that with a saving of seventy-five per cent. in gas. W. T. Wilkinson.

TRANSATLANTIC JOTTINGS.

In the *Photographic Times* (New York) an illustration of our old friend, the zoetrope, is given *àpropos* of the Muybridge series, the publishers of that journal being the American agents for the pictures as adapted for the instrument. The various animals selected look amazingly natural, but only when the zoetrope is revolved at a rate such as is almost beyond the powers of human fingers and arms to impart.

The editor gives some good hints upon sunning the bath and freeing it from organic matter, this latter term being a phrase of most elastic signification; for ether and alcohol would be included under the designation, and they would not be got rid of by the permanganate process. But as the wise recommendation is given to use a dish in preference to a bottle for exposing the bath to the sun the same end is attained, as, after a day or two in the full heat of the sun's rays, there would be very little ether and alcohol left unevaporated. We speak in favour of a dish for the purpose for sunning alone on account of the sun's rays not being retarded by the deposit which so quickly forms upon its sides when a bath is sunned in a bottle.

Americans are well-known adepts at cutting up and altering—not to say spoiling—our comprehensive language by re-spelling old words and introducing new ones; hence we should not be surprised to see an attempt to introduce a new word and to relegate an old one to the home for incurable cripples. From an analogy to *exposure*, the uncovering of the plate, and to exposer, the person who performs that act, it is proposed to banish "*instantaneous shutter*" in favour of "exposer," the thing that permits the uncovering. Apart from the liability to confusion in the use of the last two names, we think there is not much chance of the amended version being employed by "Britishers."

Among other objects of interest and instruction for which the camera has lately been brought into requisition in order to secure pictures, may be mentioned Mr. Barraud's successful photographs of singers, actors, pianists, and other musicians secured in the very act of performance. He has altogether produced over a hundred negatives since his first essay in August, 1882, and they are said to be all successful. This adds still another to the teaching powers of the products of photographic agencies.

We lately alluded to the establishing of the first photographic gallery in New York for the production of photographs by electricity, and at a meeting of the Association of Operative Photographers of New York the plan adopted was the subject of discussion. Mr. Roche described Mr. Kurtz's method, and explained that he had both sitter and camera on a movable platform, which was slightly rotated during the taking of the negative. The pertinent question that would naturally occur to most people was put by a member present —"Why not move the light instead?" he asked. Why not, indeed, for a platform would be an expensive affair, and, as everyone knows, Mr. Vanderweyde in this country adopts the plan when required. We were a little enlightened by the advertising columns of the *Photographic Times*, Mr. Kurtz there advertising a "posing apparatus," price thirty-five dollars, and a licence to use it for seventeen years—price three hundred dollars (in first-class towns)!

At the Photographic Section of the American Institute a very singular fact, confirmatory of previous results obtained by other gentlemen, was stated by Mr. Bierstadt to have occurred under his own observation. The inside of porcelain dishes has been often reported to have been pulled away by the contraction of gelatine after drying in it, and this gentleman stated that he had known in his autotype process the surface of glass plates to be torn up by the contraction.

Anthony's Bulletin is adorned in its December number by a frontispiece of a pretty baby, well photographed, execution and subject being alike in their attractiveness. The proprietors, who *ought* to know something of the plates they sell, say the negatives were taken on "Eastman's unrivalled *special* plates, with an extremely-limited exposure (something like three or four seconds we believe)." We think if the photographers on this side of the Atlantic were asked to use a plate requiring three or four seconds for a baby picture they would "smile aloud."

NOTES ON COMMERCIAL PHOTOGRAPHY IN THE UNITED STATES.

[A communication to the Edinburgh Photographic Society.]

It is with no little diffidence that I appear tonight before a Society standing the first in most branches of photographic art. In the United States photography has attained an important place as an adjunct to various industries, exclusive of its own branches, which may really be termed separate industries themselves. It is of the offshoots from the parent stem that I shall speak under the name of "Commercial Photography," and shall endeavour to note some of the most interesting of them.

By far the larger portion of commercial photography is devoted to photo-mechanical reproduction, and this may be divided into three branches:—1st. That class depending upon the copperplate press for multiplication of copies, of which the photo-gravure may be regarded as an excellent illustration. 2nd. The class which is reproduced lithographically, depending upon the repellent and absorbent chemical qualities of a sensitised film for the result. The Albertype is the best example of this class. 3rd. The numerous typographic class, which, although indirectly covering a larger range or field than any of the previous classes, is valued more from a practical than an artistic point of view. The zincotype belongs to this order.

Of the first class I shall simply say that the photo-gravure is carried on in the United States under various names, the methods, however, being essentially the same as on this side of the water, except that perhaps we do not produce such good work.

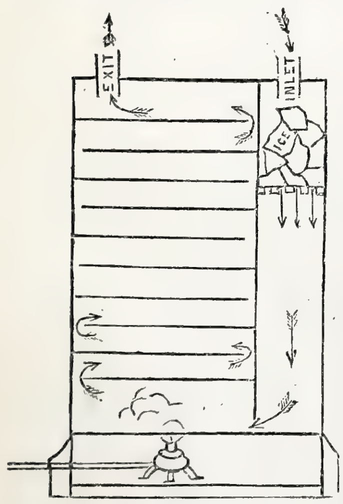
In the second class we find many important establishments, the Albertype being produced with singular beauty; the heliotype and various modifications of both these methods are in a flourishing condition. One of these methods is worthy of note. A negative is taken (we will say) of a rose, leaving out all the colour but the red, a second is taken of the green, and a third of the shades and shadows. These are reproduced by the Albertype method, and printed in register with each other in links as near as possible the original colour. The result is a soft, pleasing, and lifelike print, depending, however, greatly upon the chemical manipulation of the operator, and also upon the proper choice

of colours by the printer. Just here I hope you will pardon a slight digression. It has struck me very forcibly that the reason you have attained such eminence, especially in the matter of quick-working plates, is because you have such formidable natural obstacles to overcome—non-actinic light, and sometimes a scarcity of *that*, being one of the first to engage an American eye. I have actually seen people in Glasgow going into a photographer's to "get taken" on a day when the light was such that an American photographer would have shut up shop. But to revert to my subject: we enjoy plenty of sunlight, and though that tends to make us rather slow in the use of dry plates it is a great assistance to commercial photography; so that in New York alone the number of firms engaged in my third or typographic class may be counted by dozens. The photolithographers are also numerous, and one large daily newspaper has been illustrated by this method for some years. It is, if I am not mistaken, the only illustrated daily newspaper in the world.

In the third, or typographic class, to which I now refer, two methods are commonly in vogue—first, the zincotype class, which simply depends on photography for the image and upon the action of a corrodent for the relief; and, second, those which, like the gelatinotype, depend for relief upon either the swelling or dissolution of a sensitised film of gelatine or gum. In the zincotype and the swelled gelatinotype the negative is of the ordinary opaque description, such as is made use of in photolithography, and is usually intensified with lead or copper. In the case of the dissolved gelatinotype the negative that is used must be a reversible film, which is made in this way:—The glass is very thinly albumenised, and, after the negative is obtained and dried, it is treated to a coat of india-rubber dissolved in sulphuric ether; this is, when dry, coated with collodion. The glass is then immersed in water or dilute acetic acid, when the impressed film comes away quite easily, is quite strong, and can thus be readily reversed; and, after use, instead of being scraped into the cleaning trough, it is taken off its support and put away for further reference.

Zincotyping, as commonly practised, consists in transferring an inky image to a suitable piece of metal by the well-known photolithographic method. This transfer is dusted with resin flour, which serves the double purpose of further protecting it from the encroachment of the corrodent, and also of protecting the sides of the slightly-etched lines from undermining from the same cause. This is done after the first application of the acid by slightly warming the plate, causing the resin to melt and run down on the sides of the lines, which are thus shielded from the subsequent applications of the corroding agent. I may say that the zincotype has given way to the gelatinotype almost universally; and I will close with the three most usual forms of the latter process, the first and second depending on the expansion of portions of the film, and the third upon its melting or dissolution.

The chief difficulty with us is drying the film in our hot summer weather, and to this end a drier has been invented, which is used with universal success. The "drier" is similar to the ordinary dry-plate cupboard, with shelves arranged so that the air passes from side to side over each shelf in succession, the air being admitted through a zinc-lined chamber attached to one side, which in its upper part contains ice. From this chamber the air falls on the bottom of the drier, which is metal plate, beneath which a Bunsen burner is arranged. The exit pipe at the top of the drier is conveyed into a chimney.



To return to the swelled gelatinotype No. 1: an ordinary glass is coated with the sensitised solution of gelatine, giving a film the thickness of a very thin card. This is printed under a negative, which is carefully masked to prevent over-printing in the shadows. When printed the plate is immersed in a solution of tannin or alum, where it remains till the unprinted portions are sufficiently swelled. The printed film, of course, retaining its normal condition and thickness, assumes the appearance of small but regular depressions all over the surface of the plate. A wax cast is taken from this, which in turn gives the matrix for the stereotype.

In the second swelled gelatine method any thin sheet metal is used instead of glasses; but the metal must be protected from the action of the bichromate, otherwise the plate will soon become corroded and useless. The plate, after printing in a screw-back frame, is placed in a chrome alum bath, and when sufficiently raised is cast direct in plaster and electrotyped, which makes the process somewhat shorter than the foregoing one.

The last gelatine method or dissolving process is done in this way:—The melted solution is poured into large plate-glass trays with a raised lip or edge. These trays have previously been flowed with a thin solution of bees'-wax in ether to prevent the film, which is nearly one-sixteenth of an inch in thickness, from adhering to them. They are then levelled up in the drier, and when chilled are placed face downward until dry, when the large sheets of gelatine are easily stripped from the trays. With a pair of shears a piece of the size wanted is cut off these sheets and placed under the negative in an ordinary frame. After a short exposure it is taken into the dark room and temporarily fastened to a glass with shellac; an ordinary brush, such as is used by silversmiths, is then immersed in warm water and rubbed over its surface, and the unprinted portions dissolve at once, leaving the printed parts intact. When sufficiently dissolved the plate is placed in alcohol for a few seconds to free it from water, and is then dried, when it is ready for the electrotyper at once. A word upon the intractability of gelatine films of appreciable thickness may not be out of place. The addition of glycerine hardly helps matters much, as in the swelled gelatine process we find that, when sufficient glycerine has been added to prevent the cracking of the film, the entire film after soaking becomes flaccid and easily displaced.

The peculiar way in which gelatine films will crack off the plates—flying into numberless pieces, frequently taking the glass with them—is annoying, to say the least; and I find that even here the phenomenon is not unknown. I have seen a piece of plate glass three-quarters of an inch thick coated with a film hardly thicker than this paper, which, when subjected to a change of temperature, cracked with a sound like tearing strong cloth. Upon examination the surface of the glass in places was found torn out to the depth of one-eighth of an inch, and adhering to the gelatine fragments which strewed the floor. A mere accident led to the discovery of a remedy. An experimenter having mixed up his gelatine to soak was suddenly called away. At the end of three days he returned, and was assailed by the odour that greeted him from his gelatine, which had taken advantage of his absence to decompose thoroughly. He was about to throw it away, when the idea struck him that perhaps it might act differently from ordinary gelatine; so he cooked it, made up his plates, and, after testing them in every possible way, found they would neither crack off, swell off, bubble, frill, nor act in any of the inconvenient ways with which gelatine workers used to be so familiar, and perhaps are not entirely free from yet.

J. P. Suverkrop.

ON THE ROWLAND DIFFRACTION GRATING.

[A communication to the Photographic Society of Great Britain.]

It may be interesting to the Photographic Society that I should show them, not a new instrument, but an instrument that has been so improved as to be increased in value at least 100 per cent. The members may be aware that when studying the spectrum, whether for the analysis of vapours or for researches in photography, the spectrum is ordinarily produced either by passing a beam of white or other light through a slit of the width of perhaps $\frac{1}{1000}$th of an inch and then through one or more prisms, or else by allowing it to fall through what are called "gratings" (*i.e.*, flat surfaces ruled with very close lines), which give rise to the phenomenon of diffraction. Each method has its advantages. The prism compresses the red end of the spectrum, and extends the violet; whilst the grating widens out the red end, and, compared with the prismatic spectrum, condenses the violet end. For measurement the grating is to be preferred; but, till recently, the brilliancy of spectrum as furnished by prisms was considered so important that prisms were generally used. Under some circumstances this is, no doubt, still the case; but I should like to point out what these circumstances are.

If you make a beam of light impinge on a prism, besides the spectrum, you will find that there is a reflection of white light from one surface, and also a reflected spectrum. Roughly speaking, only eighty-five per cent. of the light falling on a prism of 60° at the angle of minimum deviation finds its way to the second surface, and the same percentage of that percentage only finds its way out. If you increase the number of prisms to two, this last percentage must be multiplied by itself, to find the light coming through the second prism, and so on. I give a table which shows with greater accuracy how much of the light of the refrangibility for which the prism is set, to give the minimum deviation, penetrates:—

No. of prisms.	Intensity of light passing through prisms.	Intensity of spectrum at the angle of minimum deviation.
1	·825	1
2	·677	·401
3	·561	·169
4	·467	·070
5	·391	·029
10	·105	·00025

The second column was calculated by Fresnel's formula—

$$\left\{ \left\{1 - \frac{\sin^2(i-r)}{\sin^2(i+r)}\right\}^{2n} + \left\{1 - \frac{\tan^2(i-r)}{\tan^2(i+r)}\right\}^{2n} \right\} \times \tfrac{1}{2}$$

where i is the angle of incidence on the prism, and r of refraction, and n the number of prisms.

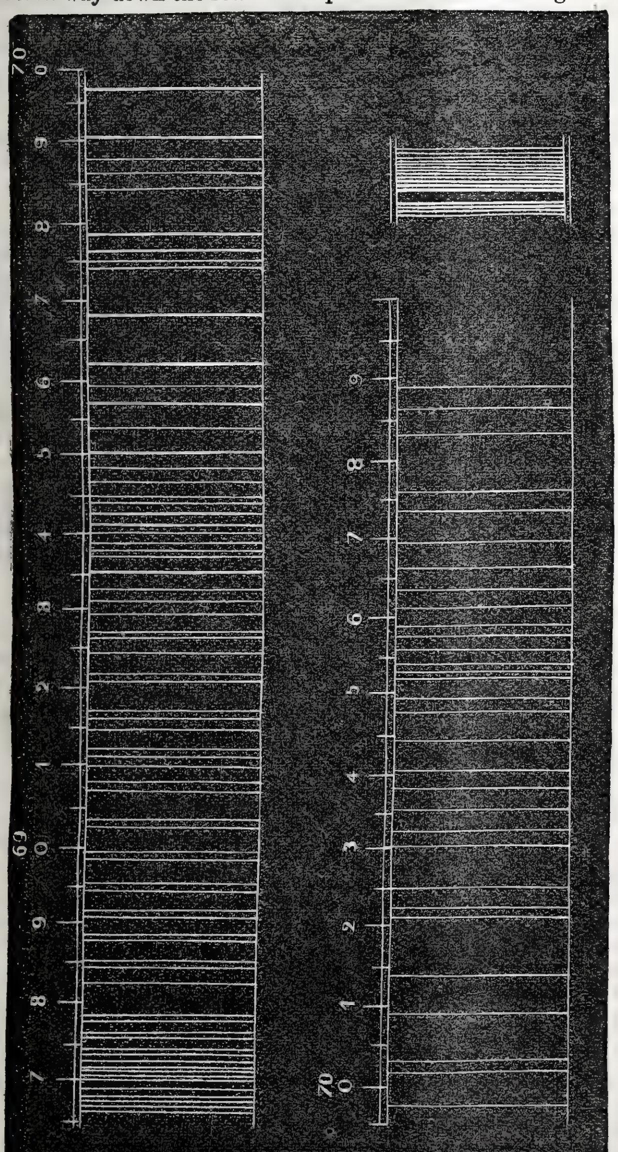
The third column was obtained by dividing the intensities by the relative dispersions.

So you see that with ten prisms the intensity of spectrum is very mall. With compound prisms this intensity may be increased for the ame dispersion; but, in my own experience, the definition is never so ood as with simple prisms. Now the intensity of the resulting pectrum is evidently proportional to the face of the prism; that is, vithout taking into consideration the slit. Now a prism of two inches rojected face is a large prism, and thus four square inches may be aken as the section of the beam of light forming the spectrum; and his beam of light, when arriving at the last of the ten prisms, may be neasured by $4 \times \cdot 1 = \cdot 4$, calling the original beam 4.

Let us take this intensity of light, and compare it with a one and a-half inch square face diffraction grating of 17,200 lines to the inch. A grating gives a number of spectra on each side of a central image. For practical purposes we may take it that the central image reflects one-third the light, while the other two-thirds is distributed amongst the different spectra. The first pair of spectra on each side of the central image takes up about half of that which remains; so that one spectrum of the first order has in it about $\frac{1}{6}$ of the original light, the next spectrum to it about $\frac{1}{24}$, and the third about $\frac{1}{50}$, the remainder being distributed amongst the spectra of higher orders (fourth, fifth, &c.), being the same intensity of light. We find, then, that the intensity of light for the third $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{50} = \frac{3}{2} + \frac{3}{2} \times \frac{1}{50} = \frac{9}{200}$, or about $\cdot 045$.

Now the third order corresponds as nearly as possible for the blue, or ten prisms of 60°; so you see that by using the grating there is a very apparent loss of light. Mr. Christie has found, however, that the loss of light in passing through prisms is more than half that penetrating; so that in reality the lights are more nearly equal. I have said that the dispersion for the blue is equal to about ten prisms, but for the red part it is equal to about forty prisms, so that here we have an *enormous gain* in light in using the grating.

The diagram here given is a wave-length map of the B line, which is about half way down the red of the spectrum. The small figure on the



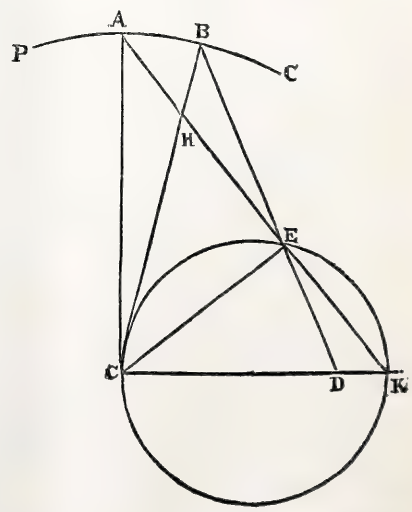
bottom right-hand side shows it as obtained by prisms. The map was made from photographs taken with the Rutherfurd grating, with the second-order spectrum. The prismatic photograph was taken with three prisms. It will thus be seen what a gain in resolving power there is in using a grating for rays of low refrangibility.

I would call to your recollection the plan adopted in using a spectroscope—1st, we have a slit, and a collimating lens to give parallel rays; 2nd, the dispersion apparatus; and, 3rd, a camera or telescope with one lens or two respectively; in other words, glass intervenes. Now glass will cut off rays at each end of the spectrum—in the ultra-violet and infra-red; therefore in delicate research in these regions the aim of physicists has been to do away with glass as much as possible, or to substitute something for glass which would allow all rays to pass through. Unfortunately no medium allows all rays to pass. Iceland spar and quartz, for instance, allow the visible spectrum and the extreme ultra-violet to pass, but not the infra-red; whilst rock salt allows, besides the visible spectrum, the latter, but not the former, to be transmitted. Can glass, rock salt, &c., be done away with? I have shown in my Bakerian lecture how by a system of three reflections from silvered surfaces it may be avoided, but the practical difficulties of the plan are such that a man must be *trained* in patience to meet with success. Three months ago I received a paper from Professor Rowland, describing a grating ruled on a concave surface, and entering into details of what such gratings would do. I must confess I was sceptical, and imagined that perhaps the sketch was too rosily coloured by the inventor of these gratings. One day in October Professor Rowland walked into my laboratory, and told me he had come from America, and had brought me a grating exhibiting a certain peculiarity, which was that it had only one bright spectrum and all the others dull, and said that this one spectrum should be useful in my particular work. He came again, and brought other gratings, with the result that he left me three—two concave gratings and one flat. When I tried them I was perfectly amazed. With the concave gratings nothing is required but a slit and a sensitive plate, or an eyepiece if visual observations are required; the concave gives a focus without the aid of any lens. The patience required by my plan now is reduced to ordinary patience, and is less than that required for working with a lens. But this is not everything. An easy means of focussing does not mean of necessity good definition; far from it. Well, I can only say that the definition is equal to the ease of focussing. I will show you a few photographs—some by Professor Rowland and others by myself—in which are lines that when seen with an ordinary grating are single, but when seen with this grating are each resolved into two lines, *i.e.*, are split up into two. Now the ordinary length of camera and collimator I use for my old grating is twenty inches for each. With this large grating, which is very nearly six inches long and two inches high, the plate has to be placed about twelve feet from it to get a direct image of the slit in the line of the axis. Using the same width of slit as in the previous calculations, the beam of light forming the first spectrum may be measured by

$$6 \times 2 \times \frac{20}{144} \times \frac{1}{6} = \frac{3}{18}$$

where $\frac{20}{144}$ represents the ratio of the distance of the slit from the gratings in the two cases, and $\frac{1}{6}$ the brightness of the beam of light, which is greater in this grating than in the other, forming the first spectrum, the 6×2 being the dimensions of the ruled surface. Now the length of the third spectrum with the old grating corresponds with the length of the first spectrum of the new grating, making allowance for the different focal lengths. In the one case the brightness of the white light forming it is certainly not more than $\frac{2}{100}$, and the other $\frac{28}{100}$; so, to get the same length of spectrum, the concave grating has at least seven times as much light, and, in fact, practically gives a spectrum twice as bright as the second spectrum of the old grating, with which I have taken a great many photographs. It is, however, only half as bright as the first spectrum of the old grating. Nevertheless we have a decided gain by its use when good dispersion is required. I have purposely put the concave grating at its lowest value, and the old grating at its highest. For definition, as I have said, the new grating is far superior to the old. I have no doubt that, when we have any sun, I shall be able to get much more in spectrum photography than I have hitherto.

FIG. 1.



W. DE W. ABNEY, R.E., F.R.S.

(To be concluded in our next.)

ON POPULAR BUT ERRONEOUS IDEAS.

I was much interested as well as amused with the article on *Instantaneous Photography* in the issue of the Journal of the 9th inst., showing up so well as it did many popular but erroneous ideas of the capabilities of the photographic art. Much of this misconception is, I think, attributable to the inaccurate statements which so often appear in the public press. Really some have been so ridiculous that I cannot imagine how anyone can be foolish enough to originate them —at all events, those who do, show their utter ignorance of the subject, which, unfortunately, is perceptible only to those who have some knowledge of the "black art."

I lately saw in one of the evening papers a statement that in some experiments in balloon photography—at, I think it said, Woolwich—very satisfactory results had been obtained in consequence of the use of some new process which enabled exposures of as short as "one second" to be given. Now, the merest tyro in photography would consider a plate requiring one second decidedly slow; for, of course, it must be understood that lenses of a rapid class would be used

In a late number of *Engineering* there occurs a most erroneous statement. After speaking of the new process of "photo-filigrane" and its adaptations, the writer goes on to say:—

"While upon this subject we may mention that very pretty photographs are *now taken by moonlight with a few seconds' exposure.* Scenic effects of wood and water have a peculiar softness which render them more artistic than daylight photographs."

Now, if this be true, photographers generally can know nothing of the recent advances in their art, or, perhaps, someone has got a secret process with which to astonish us. If there be such a process I hope it may be published without further delay; but until this is done I must class this paragraph amongst those misleading the public, for do not the public argue that what is in print *must* be true? Fancy a photographer's feelings on being requested to take a group at midnight, and, on his declining, being told—"Oh! you are behind the times; if you have not got the new moonlight process we must try Mr. Blank over the way, for tonight there is a full moon," &c., &c. *Engineering* speaks of a "peculiar softness." I fear this "*peculiar softness*" exists only with those who believe in moonlight photographs being taken in a few seconds; in fact, the whole thing to me seems "moonshine."

W. Horseman Kirkby.

NOTES ON PHOTOGRAPHY.

Lecture XI.—The Gelatine Process (Continued).

Thiosulphate of soda (hypo.) $Na_2S_2O_3$, 5 H_2O.—Having developed the latent image by either of the methods shown, the next operation is to dissolve out the unreduced silver bromide and iodide from the film, which answers the double purpose of preventing any further action of light and of rendering the film transparent except at those parts containing the reduced silver. This operation is technically called "fixing."

As we already know, there are several solvents of these substances, but the one universally employed with gelatine plates is thiosulphate of soda (hypo.). This substance is manufactured in large quantities from pentasulphide of calcium—a substance obtained as refuse in the manufacture of common washing soda and in the purification of coal gas. It may be prepared by passing the fumes of burning sulphur (sulphurous anhydride) through a solution of soda, and subsequently digesting the solution thus obtained with sulphur.

It occurs in commerce as large translucent crystals, which contain five equivalents, or forty-two per cent., of water. The crystals can be fused in this water of crystallisation, or are soluble in water to almost any extent, and in the act of dissolving absorb a considerable amount of heat, so that the solution becomes very cold; they have a bitter, disagreeable taste. The solution gradually undergoes oxidation by exposure to the air, the hypo. becoming converted into bisulphate of soda—

$$Na_2\,(S_2\,O_3) + 4\,O + H_2\,O = 2\,Na\,H\,(S\,O_4)$$

When nitrate, bromide, or other salt of silver is added to a solution of hypo. in equivalent proportions a white substance is formed, which consists of thiosulphate of silver. This thiosulphate of silver rapidly darkens in colour until it becomes black, at the same time splitting up into silver sulphide and sulphuric acid. If, however, a silver salt be added to hypo., so that the latter remains in considerable excess of the equivalent proportions, the silver thiosulphate, as soon as it is formed, combines with two more equivalents of hypo., forming what is called "a double salt," which substance is readily soluble in water, thus—

$$\underset{\text{Silver Bromide}}{2\,Ag\,Br} + \underset{\text{Thiosulphate of Soda}}{3\,Na_2\,(S_2\,O_3)} = \underset{\text{Double Thiosulphate of Silver and Soda}}{Ag_2\,(S_2O_3),\,2\,Na_2\,(S_2\,O_3)} + 2\,Na\,Br.$$

It is this property of forming a soluble double salt with silver compounds which renders hypo. so valuable as a fixing agent. Its use for the purpose was first pointed out by Sir John Herschel. If an acid be added to hypo. the latter is immediately decomposed, giving off an odour of burning brimstone, and a yellow substance (sulphur) separating out. This fact may be used as a test for the substance, and, obviously, the addition of acids or substances of an acid character to a hypo. solution should be carefully avoided.

Fixing.—As soon as the image is fully developed the plate is first rinsed and immersed in a saturated solution of common alum (alum one part, water fifteen parts), the object of which is to harden the film and prevent its frilling in the fixing bath. It also, in the case of oxalate development, dissolves out any oxalate of lime which has been precipitated in the film by double decomposition between the lime salts usually contained in ordinary hard water and the oxalate of potash in the developer. After remaining in the alum for five minutes it is again rinsed and then placed in the fixing bath—which should consist of hypo. one part and water five parts—until the whole of the unreduced silver salts are dissolved out. The time taken for this may vary from one to fifteen minutes or more, according to the thickness and hardness of the film and whether it contains silver iodide, in which case the fixing always takes longer. It also depends on the temperature of the bath, and whether it be at all saturated through fixing previous plates. As soon as the fixing is complete—which is known by the total disappearance of the yellow silver salts from the back of the plate—it is taken out and thoroughly washed, either in running or frequent changes of water, until the whole of the hypo. has been removed. To ascertain when this is the case sufficient tincture of iodine should be added to some water to give it a light sherry-wine colour, and to this a little starch paste (made by dissolving a few grains of powdered starch in some hot water). The two will combine together and form a blue compound (iodide of starch). Taking a plate and holding it over a white ground, pour on a little of the blue compound, when, after rocking for a short time, if the blue colour remain the plate and similar ones washed in the same manner may be taken as thoroughly free from hypo.; but if the blue colour be destroyed there is still hypo. in the film and the washing must be continued.

After washing, the plate should be allowed to dry and a proof printed from it to ascertain if the density and character of the image be satisfactory. Supposing this to be the case, the plate is made hot over a ring gas burner or other suitable source of heat and coated with varnish, the heat being maintained until the varnish is dry to ensure a transparent film. There are many formulæ employed for varnishes. The solution of pure shellac in alcohol supplied by Hopkin and Williams, if diluted with an equal bulk of alcohol, answers very well.

E. H. Farmer.

ON THINGS IN GENERAL.

One of the most interesting papers I have heard for some time was that by Mr. W. Brooks, read at the recent meeting of the South London Photographic Society. The hints he gave were all thoroughly useful, and, *en passant*, showed the straits to which an exhibitor was put by the thoughtlessness (not to use a harsher term) of those whose slides or photographs were given to him to put through the lantern. Those only who have had much to do with lantern work know the trouble and worry caused by want of regularity and system in the arrangement of slides. It is easy enough to make a slip when all is arranged beforehand by an old hand; far more so, therefore, is it when the exhibitor has to receive all sorts—and all qualities—of work, and to arrange, select, and, *horribile dictu!* to be asked to polish them. I consider the suggestion that he should be assisted in future magic-lantern evenings by having someone detailed to hand him the slides, and so on to be nothing but what is proper. The old proverb of the "willing horse" comes to mind forcibly. By the way, when the lecturer spoke of a slide that was magnified 5,000 times being put in the lantern, and then magnified 6,500 times, he makes a slip in giving the final amplification as the *sum* of the two amounts. It should be their *product*—over thirty millions—though, as I expect, one set of figures refers really to diameter and the other to squares. This amount would require to be still further increased if "times" is to be taken in its usual sense—diameter, however, being the more common mode of speaking of amplification, though, perhaps, "less understanded of the people."

Another very capital communication was that from this Journal's well-known correspondent, Mr. W. J. Stillman, a fortnight ago. I agree with his remarks about the tripod (the Kennett), and, altered as he suggests, it would be still more useful than it is. Double and single slides, too, and swing-backs are treated by him in a manner to impart a fund of information. I think I am right in saying that the unknown author of the modification he pictures is Mr. W. B. Bolton. Dark slides have not yet taken part in the revolution photography is passing through, but the time cannot be far distant when they will. The reason is not far to seek. The best makers cannot get sufficient first-class workmen, and, owing to the present remarkable demand by amateurs, every camera-maker has far more work in hand than the can get through, and he is not likely to take up any new thing that may be uncertain as regards demand. Camera-makers, I expect, make cameras to live; if they lived to make cameras it would be a different thing.

It was rather an amusing thing to read the Editor of New York *Photographic Times* and Dr. J. Nicol's articles on studios at the same time. The latter gentleman described a "sumptuous studio" built upon the ruins of a conflagration—the former a studio that was brought to ruin by a fire directly after it was visited. Nevertheless, the Editors did not destroy

is description, and herein I think they were right, for the account was ritten not to attract but to instruct other photographers. It did read roll, though, after running through the account of a gorgeous palace, o see in a foot-note, "just burnt down."

Mr. C. Ray Woods has been standing up for the efficiency of oxalate n regard to the power of latitude of exposure, and he has been able to give one plate eighty times the exposure given to another fully-exposed one, and yet make the negative not only equally good but almost identical in character. He has been very fortunate, and if he can do this by the mere extra use of bromide alone with the oxalate it would be useless trouble on his part to ascertain, as he intends, what pyro. would do in comparison. Pyro. would be nowhere with an eighty times overplus of exposure, with no help but bromide to counteract it.

Dr. Stolze's experiments, recorded in the number of THE BRITISH JOURNAL OF PHOTOGRAPHY for January 9, promise to show a mode of bringing a far greater amount of certainty into the sensitiveness of emulsion plates, and the Plener process will seem to be quite superseded, unless it were on a very grand scale, which must necessarily be both cumbrous and costly. I wait with a great deal of interest the further account of his experiments, which, I trust, will not be appropriated by other workers in the same field.

What a pother has been raised about a jar of zinc, &c., for keeping hypo. residues in! My view of the matter is that the jar of zinc must be a marvellously thick one, or that the hypo. put in must have been of very modest quantity, otherwise there would soon have been many more ways of letting fluid in or out than through the mouth of the jar.

I see that at a meeting of the London and Provincial Photographic Association the other day there was considerable uncertainty as to the *modus operandi* of the filigrane process. There is nothing novel in its principle. I saw a dozen years ago, in the editorial sanctum at York-street, paper impressed in an identical manner (as to appearance) by Mr. Woodbury. One often learns a good deal at those lively discussions. The last addition to my store was Mr. A. J. Brown's information that castor oil was used to adulterate glycerine with! FREE LANCE.

NOTES FROM ITALY.

FERROUS OXALATE DEVELOPMENT.

I HAVE received a communication from Mr. Pricam concerning some of his methods of procedure, in reply to a request that he would give the readers of the Journal the benefit of his experience; and in reference to one point in his development I have a comment to add. A large interior, of an unusual quality of excellence, having struck my attention in Mr. Pricam's show-room, I inquired as to the method employed in producing. He replied that it was with the oxalate of iron, as it is described in this communication, and that, if I remember correctly, he made only one exposure for it. I translate his letter entire:—

I have been a long time in replying to you, but the numerous occupations of a photographer at this season must be my excuse. I shall, as you request, give you my manner of employing the iron development:—

1st. Having pulverised the oxalate I dissolve 300 grammes in one litre of hot water. This solution will keep indefinitely.

2nd. I pulverise also the sulphate of iron, and dissolve in the same proportion—that is, thirty per cent.—in cold water, adding the iron little by little until all is dissolved. I never use hot water for this operation, the heat favouring oxidation of the sulphate.

3rd. I dissolve one gramme of hyposulphite of soda in 200 grammes of water.

To develope: I mix three parts of No. 1 with one of No. 2, pouring the iron little by little into the oxalate, the reverse producing precipitation at once. Then I add for each 100 c.c. of the mixture from one to two of solution No. 3. This addition of hyposulphite (of which, if I mistake not, the use has been indicated by Captain Abney) helps in a very remarkable manner the development of the half-tints and detail in the shadows. Too much, however, produces fog.

The plate is plunged dry into the liquid, and in the course of some seconds the image begins to appear. If at about the end of a minute of immersion I take out the plate and expose it to the air, the details appear much more rapidly then when it is constantly immersed in the developer. When all the details are out, and the white passages begin to take a tint, the development is finished. With some plates the image appears at the back, but with thick films it is not so; and experience alone can guide us to the degree of intensity at which we cannot stop.

After carefully washing fix in hyposulphite at twelve per cent.; wash anew, then put in alum solution, and wash thoroughly.

When I have an interior, or a subject feebly lighted, I give an excessive exposure [four or five times in the interior I speak of] to be sure of the details, and meet the excess by a retarded development. This is effected by adding at first the fourth of the iron, and sometimes even less, to the oxalate. If at the end of a minute the image does not appear I withdraw the plate and add more iron until the image appears, which it will sometimes do with a third of the iron solution. This means is infallible, and much preferable to the use of bromide of potassium, because when an over-exposed plate is plunged into the developing solution of normal strength the image appears so quickly that, be as quick as you may, it is too late when you add the bromide to save the negative.

The intensification by means of uranium which I employ is this:—I make two solutions—

I.

Nitrate of uranium	2 grammes.
Water	100 ,,

II.

Red cyanide of potash	2 grammes.
Water	100 ,,

The negative, after having the alum bath, is washed and dried. It is now placed in water for a few seconds; then covered with solution No. 1. Now drop into the developing glass several drops of No. 2, and pour back over the negative. Flow to and fro on the film until the requisite density is obtained. It is necessary to remember that the red-brown colour of the film is extremely adiactinic, and the negative may prove more intense than it seems. It is necessary to wash thoroughly in order to remove every trace of uranium.

I generally collodionise my negatives with a collodion containing one per cent. of cotton, before varnishing.

With 500 grammes of solution of oxalate of iron I easily develope twenty-five negatives 13 × 18 centimetres, and I believe the process to be cheaper than some people assert. As the price at which we now get the oxalate of potash (about three francs the kilogramme) the 500 c. c. of the developer do not cost more than thirty to thirty-five centimes (3d. to 3½d.), which is about one and a-half centimes each negative (about ⅐d.), besides which those who have few negatives to develope may by the method Audra add a little tartaric acid and keep the bath in the light, which enables them to preserve it a long time.—Truly yours, &c., E. PRICAM.

As soon as we are blessed with a spell of fixed sunshine that will enable me to make exposures of certainly-known relative value—which has lately been impossible, even in sunny Italy—I intend to test Mr. Pricam's method of iron development systematically, side by side with graduated pyrogallic-ammonia development, to determine in an absolute manner the relative power of development and restraint of the two.

Florence, February 4, 1882. W. J. STILLMAN.

FREEING EMULSION FROM SOLUBLE COLLOIDS.

[A communication to the London and Provincial Photographic Association.]

AT a recent meeting, when we had the pleasure of hearing Mr. W. K. Burton's communication on his improved method of preparing gelatino-bromide emulsion by the precipitation method, I said from the chair, in answer to some remarks made by Mr. A. L. Henderson, that the difference he had observed between the precipitation method and the ordinary washing method, when the two emulsions were prepared in exactly the same way, might perhaps be due to the fact that in the case of washing the emulsion in shreds none of the decomposed gelatine was able to get out, whilst in the precipitation method the whole, or nearly the whole, was got rid of by decantation.

Mr. Henderson has since then, I think, been making some experiments with "leucine," and has come to the conclusion that I was wrong in my statement that "leucine" will not pass through a gelatine or vegetable parchment septum. With a view, therefore, of settling this matter, once for all, I began some experiments on Monday last, and the results of my experiments fully bear out what I said on the occasion referred to. Last week, Mr. Henderson presented me with a bottle of "leucine,"* and I have carried on my experiments with his own material, so there can be no doubt as to the kind of "leucine," metagelatine, or soluble gelatine that I have used.

In order to make my experiments resemble as closely as possible what happens in an ordinary set emulsion, I took a short piece of glass tubing about an inch in diameter, ground one end flat, and covered it with a piece of blotting-paper which had been soaked in a tolerably-strong solution of Nelson's No. 1 photographic gelatine, the paper being cemented to the glass by means of gelatine. Five cubic centimetres of "leucine" were placed inside this small glass vessel, the whole supported in seventy-five c. c. of distilled water, and left in this state for forty-five hours. At the end of that time the contents of the tube, and the water in which the tube was suspended, were evaporated to dryness over a water bath. The residue from the evaporation of the contents of the tube weighed ·0925 grammes. The residue from the distilled water weighed ·0378. Adding these two together we get the solid residue, at 100° C., as ·1303 grammes. On evaporating five c. c. of the "leucine" without any previous treatment the residue weighed ·1217 grammes. The increase in weight where the dialysing has been going on can, I think, be accounted for by taking into account the prolonged action of the ammonia contained in the "leucine" on the soft gelatine of which the septum was made.

I hoped to have been able to lay before you the results of some other experiments I have been making with vegatable parchment, but just at the last moment I spilt the contents of the glass tube after it had been dialysing for forty-two hours.

From the result I have obtained I think you will agree with me that simply washing set emulsion in water is not the proper way to remove the decomposed gelatine; in fact, I doubt whether more than two or three per cent. of the decomposed gelatine can be removed in that way. You may naturally ask—What is it that has passed through, and

* By "leucine" Mr. Henderson means gelatine, whose setting power has been destroyed by boiling with ammonia.

whose weight amounted to about twenty-five per cent. of the whole residue? Perhaps Mr. Henderson will be able to enlighten us on one point—that is, does he add anything else besides ammonia to the gelatine so as to alter in any way the emulsion prepared from "leucine?" Gelatines are usually acid, so when that acid is neutralised by the ammonia a salt is found which will pass through the septum.

In conclusion: if green fog, frilling, or any other drawback in gelatino-bromide emulsion be due to decomposed gelatine, do not imagine you will remove it by simply washing; but if you use either the precipitation method by means of alcohol, or adopt Mr. Burton's efficient method of allowing the precipitate to subside and then decant the useless gelatine, you will conquer your difficulty. A. Haddon.

IODIDE OF SILVER IN THE EMULSION.*

Respecting a series of photographs of the spectrum, Herr V. Schumann writes as follows to Dr. F. Stolze, the editor of the *Photographisches Wochenblatt*:—

"When, on the 29th July, I received a copy of Dr. H. W. Vogel's new book on *The Progress of Photography Since 1879*, and read the remarks on page 93 upon my researches with gelatino-bromide of silver, my peace was gone. In spite of having gout in both feet and hands, the old dispute drove me to the dark room to set agoing some spectral experiments, which I carried out as well as I could by means of two parallel rows of plates nine months' old. Dr. Vogel's remarks impelled me to seek new proofs of my statement, and no less so did the remarks on *Iodide of Silver in Emulsions*, on page 147, No. 231, 1882, of the *Photo. Mittheilungen*. As well as the sunlight permitted I tested some plates which had lain, well stored in a box, since Christmas, 1881, and which were really intended to serve for another experiment.

"I send herewith the results of my experiments, which were carried out by sun, magnesium, and petroleum light. Though the behaviour of the iodide was, on the whole, the same as before, yet I got a new surprise when using magnesium light. There, where in my bromine spectra no further action is to be found, in the bromo-iodine there lies a band of great intensity. These dark stripes I always obtained whenever the emulsion contained iodine. I send herewith two magnesium spectra, Nos. 84 and 85. The neighbouring lighter band does not arise from solarisation; at least I did not remark it as such when developing. With regard to the preparations used I may remark that—

No. 70 was boiled 45 minutes, then digested 60 minutes with NH_3.
,, 75 ,, ,, 45 ,, ,, 30 ,, ,,
,, 77 ,, ,, 45 ,, ,, 90 ,, ,,
,, 66 ,, ,, 15 ,, —
,, 72 ,, ,, 15 ,, —

Nos. 70, 75, and 77 were developed by Stolze's developer; Nos. 66 and 72 by Stolze's and Eder's developer.

"The plates developed with potassic oxalate (Nos. 66 and 72) undeceived me somewhat, especially as long as they lay in the developer. The pale spectrum of the iodine plates was for the most part invisible under the dark developer, and only after the development could the sensitiveness be estimated with certainty. It was otherwise when I used Dr. Stolze's developer. The fifteen-seconds' plates, however dirty they might otherwise be, furnished a sufficient testimony to the greater sensibility of iodised bromine. The green clouds came out by forced development, namely, by the addition of anneon, while the plates lay in the dish. Even though some of these iodine plates are not perceptibly more sensitive than those containing bromine, yet the greater sensitiveness to colour is so evident that it is almost absurd for any one still to wish to contest the point. Can you tell me how it is possible for men like Dr. Vogel to find no explanation of this phenomenon by a simple experiment? Why will these gentlemen not expose two plates of this sort to the spectrum? A fact cannot be done away with by denying it! Perhaps they suspect me of deception with my continually-recurring negatives! Perhaps the conclusion is that I have quite mistaken the plates, and given out that the bromide were the iodo-bromide plates! With respect to that point I hope you will not take it amiss; but, along with the plates, I send you corners cut off the plates before they were fixed. By the colour of the glass and of the emulsion film the iodo-bromised plates may easily be recognised, and the irregularities of the cut edge, upon which the cut-off corners fit, furnish another sign by which they may be identified."

To the foregoing Dr. Stolze says he has little to add except that, though the plates had suffered by keeping, yet to anyone who will look at them they prove the question of sensitiveness to colour no less clearly than the former plates did, and that the accompanying cut-off pieces also completely remove the objection which Herr Schumann supposes might be raised on the score of one set having been confounded with another—an objection which Dr. Stolze is sure no one will venture to raise.

On the 3rd October, 1882, Herr Schumann wrote again to Dr. Stolze as follows:—

"Yesterday morning I sent you news of the first favourable result I had obtained in the investigation of silver oxide and ammonia emulsion containing iodine. At *midday* I found that the iodo-bromide surpassed the pure gelatino-bromide in sensitiveness. I am delighted with this result, and hope you will impart it to my friends as soon as you have examined the series of documents I send you today. I may assume that today you will be satisfied with my productions, and that in the accompanying plates you will receive the best of materials for your purpose.

"It is superfluous to add a fundamental explanation of the twenty-two plates of which today's consignment consists. It will be enough to say simply that No. 118 is pure bromide of silver gelatine emulsion, and No. 119 contains iodine, in order that you may form a judgment of the value of iodide of silver in oxide of silver and ammonia emulsion. The difference between my plates is so distinct that really no practised eye is required to distinguish between them. But there are some considerations which I cannot leave unmentioned, especially since I found the conclusions drawn from them experimentally confirmed.

"In the *Photo. Correspondenz*, No. 229, page 148, section 2, Dr. Eder found that an iodo-bromide emulsion—which was prepared by heating silver oxide and ammonia for half-an-hour at 35° to 40° C—was less sensitive and gave thinner pictures than a similarly-prepared bromide emulsion. This unpropitious effect of iodide of silver always occurred in Dr. Eder's hands when it amounted to one-twelfth or one-twenty-fifth. This behaviour on the part of the iodo-bromide emulsion was the more interesting to me, because I had always found that ammonia increased the sensitiveness of bromo-iodised emulsion after boiling more than that of the analogously-prepared bromide emulsion; and, much as I had worked with bromo-iodised gelatine, its behaviour during preparation from silver oxide and ammonia was unknown to me from my own observation. I was, therefore, induced to prepare two analogous emulsions, one of which contained five per cent. of K I to the K Br. I digested it for thirty minutes at a temperature of 37½° to 38° C., washed the emulsion for thirty hours in running water, and took care that both preparations should experience exactly similar treatment. The sensitiveness to colour of the plates was then tested by sunlight, daylight, magnesium light, and petroleum light. The plates were also used—together in pairs in the stereoscopic camera, and singly in an ordinary camera—for taking a variety of objects (which I had collected upon a table a meter and a-half long, the background for the plants being velvet). The small table was illuminated by five petroleum lamps provided with reflectors. Plates were also exposed upon it by daylight at 8 a.m. and 1 p.m. My windows look towards the south-west.

"For developing with I used Dr. Eder's normal developer, and fixed with a concentrated 1:2 solution. The stereoscopic plates, and also the spectrographs, which were exposed in pairs, were simultaneously developed in the same flat dish, and the developer was freshly mixed for each plate. Only on one occasion did I develope two plates one after the other in the same bath, and regarding these plates I shall have more to say hereafter.

"The unfavourable conditions of our autumnal sky only allowed me to take two spectra in partly clear sunlight; for the others I used the diffused light of the sky without the sun. Every time the plates were exposed to spectra the slit remained the same distance open. The only exception is plate No. 117 (iodo-bromide gelatine, prepared like No. 119), and in this case the slit was widened to about one-third of a millimetre.

"I burnt the magnesium ribbon about three centimetres from the front of the slit; to kindle it in front of the opened slit I used a spirit lamp the flame of which was coloured with sodium. The band was rubbed as blank as possible with sand-paper in order to remove the slight oxide film. The petroleum light was furnished by a common parlour lamp, the flame of which was about 70 m.m. from the slit. No lens was employed to concentrate the light. I used my small spectrograph for spectrographing. The stereoscopic camera carried two small aplanatics of seven lines diameter. Under these conditions I obtained the twenty-two negatives which I now send you in order that you may yourself form a judgment respecting the value of the bromide of silver emulsion containing iodine, prepared from silver oxide and ammonia. When one has worked for upwards of a year with iodide emulsion, and has prepared, exposed, and developed hundreds of plates, one acquires, even though not a professional man, some practice, and gets to almost know intuitively when iodine would be advantageous or not. So it was with me in the foregoing cases. From the first day on which I read Dr. Eder's statement No. 2 I never believed that bromo-iodo silver oxide and ammonia emulsion was less sensitive to colour than pure bromo-gelatine. Since iodine with other methods already gives more harmonious negatives, and since, along with the treatment with ammonia, it imparts a higher sensitiveness to the preparation and a greater capacity for the representation of details in the shadows, while at the same time keeping the lights opener, and therefore not allowing them to be so easily degraded, I thought, even before beginning my experiments, to be able to consider it as one of those variations which have so often been remarked in the modern emulsion process.

"You see, my dear *confrère*, that I am today in the same unpleasant situation as at the beginning of this year, when I published my results respecting the behaviour of iodine. The results I have latterly been getting daily are still certainly opposed to Dr. Eder's assertions, but by no means to my own earlier experiments. You will see from my negatives that my suppositions and conjectures are fully substantiated. I am, however, more rejoiced than over all that by the behaviour of the plates when taking coloured objects by daylight. Examine the negatives in any way you please, and you will always admit that I am right when I say that *iodo-bromide greatly exceeds pure bromide in sensitiveness.* It was not without a purpose that I posed the colour-table extracted from Dr. Vogel's *Handbook of Photography* in the centre of my small table. I have also arranged the small palms *(Cocos wodelliana, Chamaedorea geononeaf. Coripha tinct.)*, and the muse partly visible at the side in order to bring out the green of the leaves in the bright mixture. Just look at the *Chamaedorea geonomaeformis!* How glassy it looks on the bromide film, and how rich in details upon the iodo-bromide! It is the same with the *Cocos wodelliana.* With regard to the before-mentioned colour-table, I will leave you to ascertain for yourself whether your verdict would be for or against iodine, but to ascertain this should not be difficult.

"Of the plates exposed by petroleum, the pair in particular which had had a ten minutes' exposure was much degraded in the lights. Probably I have brought some fixing solution into the potassic oxalate; but, as the stereoscopic plates were developed in the same solution, I add them also

* Continued from vol. xxix., page 748.

to the consignment, and do so the more willing that that pair furnishes an excellent illustration of the high sensitiveness of iodo-bromide by lamp-light."

To the foregoing Dr. Stolze adds :—

"We give the full text of this letter because it contains all that there is to be said about the plates. The spectral views and, still more so, the composite groups are in the highest degree surprising, and had an almost over-powering effect when, along with the picture previously sent, they were laid before the members of the Photographic Society of Berlin at its first meeting for the season. Though many experienced emulsionists have for long employed the addition of iodide of silver, none of them had ever had the unusual superiority of this admixture, especially in regard to sensitiveness to colour, so distinctly placed before their eyes. On every side it was exclaimed that the evidence was convincing, and that further doubt would be ridiculous.

"All the groups were taken by daylight, so that no conclusion can be drawn from the kind of the light, especially as, having been taken with a proper pair of stereoscopic lenses, one may be certain that the exposures were actually of equal length. Generally the difference between the bromo-iodised plates and the pure bromide plates of equal exposure is so considerable that one might suppose the former to have been exposed at least twice as long as the latter. This proportion increases enormously when petroleum light is used. Then exposures of twenty to thirty minutes give scarcely any trace of a picture upon pure bromide plates, while bromo-iodised plates furnished negatives which were certainly under-exposed, but which could yet be made use of in case of need. The superiority of the latter, when exposed to a light which is far richer than daylight in yellow and red rays, must, therefore, be considered to be not merely double but as at least from five to eight times that of the former.

"Similarly surprising are the photographs of the spectra. When photographing the spectrum furnished by the west, over-clouded horizon at five minutes past four, even with an exposure of ten minutes, pure bromine scarcely showed a trace of action, while bromo-iodide showed a rich spectrum. 0·173 of a gramme of magnesium burnt 25 m.m. in front of the narrow slit of the spectroscope produced upon pure bromide a very weak, and upon bromo-iodide an unusually powerful, spectrum, in which the characteristic band in the green appears extremely intense, while there is not the slightest trace of it upon the pure bromide. In a word: the superiority of the addition of iodide is much greater in emulsion prepared according to this method than by the boiling method."

(To be continued)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 22....	London and Provincial	Mason's Hall, Basinghall-st.
,, 22....	Liverpool Amateur	Free Library, William Brown-st.
,, 22....	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The ordinary monthly meeting of the above Society was held at 5a, Pall Mall East, on Tuesday evening, the 13th instant,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. Leslie, W. Robertson, Edwin Bell, and Alfred Isenberg were duly elected members of the Society.

The Secretary's and Treasurer's reports for the past year were read and adopted.

The Chairman then proposed a hearty vote of thanks to Mr. W. S. Bird, the Treasurer, for his untiring exertions for the good of the Society.

Mr. John Spiller, in seconding the motion, said that, speaking from an experience of five years, he could heartily appreciate the duties which Mr. Bird had performed, and he congratulated that gentleman on being able to show so satisfactory a balance sheet. He thought it was a matter for congratulation that the affairs of the Society were so well administered.

The motion was carried with acclamation.

Votes of thanks were also passed to Messrs. Ackland and Addenbrooke for their services as auditors.

The Chairman then alluded to the great services rendered to the Society by Captain Abney as editor of the journal, remarking that that gentleman was like a sponge—you had only to squeeze it and you got what you wanted out of it. He asked for a cordial vote of thanks to Captain Abney, which was heartily responded to.

Colonel Stuart Wortley said he thought the thanks of the members were also due to their Chairman for his exertions in their behalf. He (Colonel Wortley) had now attained his maiority as a member of the Society; and, though during a great part of that time he had been a member of the Council, he only once remembered the President to have been absent from his place. He begged to propose that a very warm vote of thanks be passed to that gentleman, and expressed a wish that he might long continue amongst them to hold the office of President.

Captain Abney said that after the eloquent speech they had had from Colonel Wortley he would not attempt to add anything to what that gentleman had said. He (Captain Abney) had only been fifteen or sixteen years in the Society, but during that time he had seen how ably their President had conducted the meetings, and he thought that had they had a less worthy Chairman the Society would not be in the position it now held. He begged most heartily to second the vote of thanks, which was responded to with acclamation.

In returning thanks,

The Chairman assured the meeting he had always done his best to forward the interests of the Society, and should continue to do so in future years, although, perhaps, at his age he could scarcely look forward to very many years amongst them. While he was spared he should, however, always feel a very deep interest in the welfare of the Photographic Society of Great Britain.

The result of the election of officers of the Society for the current year, to fill the places of those retiring, was then announced as follows :—*Vice-President :* Mr. H. Baden Pritchard—*Members of Council :* Messrs. W. Ackland, V. Blanchard, T. Sebastian Davis, Payne Jennings, H. P. Robinson, and J. W. Swan.

The Chairman said the task of scrutineer required a great deal of order, arrangement, and care, and asked for a vote of thanks to Messrs. Cowan, Burton, Woods, and England for acting in this capacity. This being carried, he (the Chairman) announced that the progress medal for 1883 had been awarded to Mr. W. B. Woodbury for improvements comprehended under the name of the "stannotype" process. In presenting Mr. Woodbury with the silver medal of the Society, he expressed the pleasure it afforded him to do so, and said he thought he remembered the occasion of Mr. Woodbury receiving his first medal some twenty-nine years ago at Melbourne. The present medal was the outcome of Mr. Woodbury's labours during the past thirty years, and in presenting it to him he (the Chairman) thought it was the highest honour the Society had in its power to confer upon Mr. Woodbury.

Mr. Woodbury having briefly responded,

Captain Abney then read a paper entitled *Silver-Flashed Glass for Dark Rooms*, in the course of which he remarked that some short time ago Mr. Bolton had kindly given him a specimen of soaked silver glass for use in the dark room, which he believed was at the time considered to be an excellent medium. It occurred to him, however, that it might not be all that was necessary. Its appearance by transmitted light was similar to what was known as "stained orange." He found the speculum reflected every ray up to very high limits. Having placed the piece of glass in front of the speculum, he took three photographs—one by electric light, with the diffraction grating, a second with a pair of prisms, and a third by solar light, from which he found that one of the carbon bands in the ultra violet passed through. On comparing these with bichromate of potash they had very much the same appearance in the spectrum. From the green upwards he found bichromate cut off everything, and was, therefore, very much safer. He thought it might interest some of the members to see really what action ordinary glass had upon the spectrum, and for that purpose he handed round two photographs for inspection. He said it happened that where the glass cuts off the ultra-violet light there the solar spectrum practically ceased. It was useless to use quartz lenses for solar light; the same ending of the spectrum could be got, up to whatever height you go. One more point he wished to mention: they had lately been introduced to a material known as "cherry fabric," which, they were told, would stand either solar or electric light. He had a piece, however, which would stand neither, and from the specimen he showed it would be seen that the whole of the blue and violet were printed right through; so that it was not safe to trust to that fabric. By combining it, however, with orange paper a certain amount of safety was obtainable; but still not sufficient, as even then there was too much green light. Red bookbinders' cloth let some green light through, though not so much as the cherry fabric. With regard to the soaked silver glass: he found it was only to be trusted for collodion, as it was possible to print right through it.

Mr. Spiller said he had had some experience with the cherry fabric, and it struck him they should have a double layer in order to use that material safely. There should be no direct light passing through the interstices.

Mr. T. Sebastian Davis thought the point was, through what medium the largest amount of light could be obtained.

Mr. Leon Warnerke had had some experience of bookbinders' cloth and found that six thicknesses were necessary.

Captain Abney scarcely thought that two thicknesses were insufficient. It must be remembered that a very small quantity of light was being dealt with. The slit he used was one-five-hundredth part of an inch broad, and that was spread over three inches, so that the amount of light was very small compared with direct sunlight. Mr. Davis had said you must get the largest amount of light with the smallest amount of actinic action. He (Captain Abney) quite agreed with that gentleman in this. He thought Mr. Warnerke's experience was very interesting; also, that if the bookbinders' cloth were used combined with orange paper, he thought the most perfect protection possible was obtained.

Mr. Warnerke said, from several experiments he had made, he found that nothing was better than picric acid for these fabrics.

A vote of thanks was passed to Captain Abney.

It was announced that the next monthly technical meeting would be held on Tuesday, the 27th instant.

The meeting was then adjourned to Tuesday, March 13th.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 8th instant, the chair was taken by Mr. A. Mackie.

Mr. A. L Henderson showed some prints produced, similarly to the "filigrane" photographs of Mr. Woodbury, by pressure upon paper, the work of Braun, of Augoulême. He said that these pressure pictures could be destroyed by soaking the paper in water. If, however, the print was coated with a thin solution of paraffine wax in benzoline (one per cent.) it was waterproofed, and would stand immersion in water without injury. The coating of paraffine also made the transparent image a little more vivid.

Mr. A. Haddon read a paper on *Freeing Emulsion from Soluble Colloids* [See page 93]. Having found that a small proportion of the solid contained

in the colloid solution with which he had experimented had passed through the dialyser, he inquired of Mr. Henderson, who had prepared the solution, whether it contained anything besides the decomposition products of gelatine, water, and ammonia.

Mr. Henderson replied that it did contain iodide of potassium in the proportion of three grains to the ounce. He was still of opinion that the substances referred to by Mr. Haddon were removable by dialysis, and would repeat the experiments which had led him to this conclusion. The manner in which he got rid of them was by precipitating the emulsion with alcohol and leaving the decomposition products in solution.

Mr. A. J. Brown believed that some of the decomposed gelatine would be precipitated with the emulsion.

Mr. W. E. Debenham said that in any case the liquid contained in the precipitated emulsion would hold its share of soluble matter. He questioned, however, the desirability of removing this soluble form of gelatine, or whatever it might be, by precipitation.

Mr. Brown and Mr. J. Barker were strongly of opinion that the quality of emulsion from which the soluble matter had not been removed by precipitation was superior to that obtained when precipitation was employed. Mr. Barker also expressed an opinion that alcohol was injurious at any stage of the manufacture of emulsion.

Mr. W. Coles asked what was the best method of intensifying a negative originally too dense, but the image of which had been converted into chloride in a solution of ozone bleach and chrome alum.

Mr. Henderson had some time before shown a negative which had been treated after such excessive reduction with bichloride of mercury, followed by lime water, with perfect success.

The Chairman said that the proper thing to do was to reduce the image to the metallic state by redeveloping in ferrous oxalate or citrate.

Mr. Brown remarked that Mr. Warnerke had stated that the developed image was not metallic silver, but a salt of the metal.

Mr. Haddon said that the action of bichloride of mercury was to convert the image into chloride of silver and calomel. The subsequent action of the lime water on the latter converted it in turn into oxychloride. If the whole of the silver had been changed into chloride by the bleach there would be nothing for the bichloride of mercury to act upon. Referring to the discussion on the dialysis of colloids, he added that it was laid down in Watts's *Dictionary* that colloids in the soluble form would not pass through those in the insoluble one, and these were the conditions existing in the fragments of emulsion whilst being washed.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Board of Management of this Association held its usual monthly meeting at 181, Aldersgate-street, on Wednesday, the 7th instant.

The minutes of the previous meeting having been read and confirmed, an application for assistance was submitted to the meeting. The Board, after carefully considering the matter, passed the following resolution as being the most suitable under the circumstances:—"That the maximum sum of £6 be granted to the applicant as follows:—One pound ten shillings at once, and an equal amount each week until a situation be obtained for him by the Association, and that, in the event of a situation being found, the Secretary to give him sufficient to pay railway fare (unless forwarded by employer) and other necessary expenses, provided that the same does not exceed the maximum quoted above."

The Board, after dealing with some other minor matters, adjourned until 8 p.m., on March 7th.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The fourth ordinary meeting of the current session was held in 5, St. Andrew-square, on the evening of Wednesday, the 7th instant,—Mr. A. Craig-Christie, F.L.S., Vice-President, in the chair.

The minutes of last meeting having been read, approved, and signed, the following gentlemen were unanimously elected ordinary members of the Society:—Messrs. John Simmonds, James Wilkes, David Hunter, James H. Smith, James Gourlay, and Alex. M. Low, L.A.,—all of Edinburgh; Robert Chambers, Londonderry; Thomas C. Johnston, Trinity; and Thomas Blake, Ross, Herefordshire.

Before proceeding to the business of the evening,

The Chairman drew attention to the very successful "popular meeting" recently held in Queen-street Hall, and said the Society had reason to congratulate itself that, without extraneous aid, it was able to produce such a capital exhibition.

A vote of thanks, proposed by Mr. Wm. Neilson, was accorded Mr. W. T. Bashford for the very satisfactory manner in which he carried through his portion of the programme.

The Secretary read a letter from the President, directing the attention of members to the exhibition to be held in the Fine Art Galleries, Brussels, which will open on the 15th August and close on 15th October. Intending exhibitors are requested to intimate to the Secretary-General, M. A. Geruzet, Galleries des Beaux Arts, Bruxelles, by the 1st June, the wall space they will require. For each square metre (39 inches) a charge of 4s. 2d. will be made; every exhibit must be protected by glass, or *passe-partout;* and ten per cent. on the price will be charged on all articles sold. Medals and other awards of merit are to be given in all the different departments, and a special medal for the largest and finest collection of exhibits.

The paper of the evening was by Mr. John P. Suverkrop, entitled *Notes on Commercial Photography in the United States* [see page 89], and was illustrated by a number of phototype prints.

In the discussion which followed,

Mr. Norman Macbeth, R.S.A., said it was a well-known fact that American wood engraving was far ahead of what was produced in this country, and he would like to know if any of the processes alluded to by Mr. Suverkrop were capable of producing such fine work as is found in *Scribner's* or *Harper's* magazines. He would also like to know the limit of the style of drawing fitted to the modes of reproduction described? and whether the degree of fineness would compare satisfactorily with the choice woodcuts for which America is so famous?

To these and other questions asked by various members,

Mr. Suvercrop replied:—As to the "limit of the style of drawing," the answer is, there is no limit to the fineness or coarseness of the drawing so long as the desired artistic effect is produced in pure black lines or dots on white paper. The limitation is in the finished plate and the purpose for which it is to be used. Thus, it is evident that a drawing nine inches square, embodying a tint of lines one-thirtieth of an inch apart, may be reproduced the same size, and will print clearly in a newspaper, with the necessarily-unfavourable conditions of rapid press-work, cheap ink, and paper. The same drawing, in order to appear favourably in a magazine illustrated with fine cuts and printed with the highest typographical skill upon the best paper with the finest ink, must obviously be reduced to a fineness commensurate with its surroundings—say to one-third diameter, which will result in a plate three inches square, embodying a tint of lines only one-ninetieth of an inch apart. We must, however, draw a practical line at that point, beyond which the printer cannot go with the finest materials at his command. Both Scribner's and Harper's magazines of the current month have illustrations produced in this manner, and it requires the eye of an expert to detect them from fine wood engravings. It must be remembered that the drawings must in every case consist of pure black lines or dots free from half-tones or washes. It is the introduction of photo-engraving that has made the wood engravers of America what they are; but with all their skill the immense labour and time required to produce the woodcut gives the photo-engraver an immense advantage. At the present time one firm turns out in one day as much as all the wood engravers of America in a week. In the first successful experiments Nelson's amber gelatine was imported from England, but the heavy duty bringing the price up to four and a-half dollars per pound made it necessary to find a cheap home product, and now a quality of glue costing twenty-five cents per pound was found to answer if a portion of decomposed gelatine were added to it. Decomposed gelatine is soluble in cold water, but the bichromate of potass renders it when exposed to light insoluble. Usually but ten per cent. of decomposed is added to the good gelatine. The ink employed to form the drawing over the silver print which it is intended to reproduce was originally Indian ink, but now lampblack ground up with a small quantity of gum and glycerine is used. In order that this ink drawing should remain uninjured by the process of bleaching out the silver image the bichloride of mercury is dissolved in alcohol. The object attained by conveying the outside air to the drier through ice is to lower its temperature sufficiently to enable the operator more readily to get the 65° Fahr., and, at the same time, deprive the air of a large portion of suspended moisture. Much of the moisture condenses on the zinc lining of the chamber, and provision is made for draining this away. A temperature thus introduced at 60° or lower is raised by the lamp to the required 65°, for without the lamp there would be no circulation of air.

A number of remarkably-beautiful instantaneous prints by Mr. Reid were greatly admired, as also were some platinum prints produced by the Hon. A. U. Erskine.

The following query was found in the question-box:—What is the best movable arrangement for a stretched studio background—allowing its use in any required position and angle?

Mr. Crooke, by means of the black board, illustrated the plan he had found very satisfactory. The bottom of each end of the framework dropped into a groove formed in two pieces of wood about eighteen inches long and three inches thick. These blocks were fastened to the frames by what he believed were called "bed-screws," and each block was then supplied with two castors. By means of these feet the background was supported, and could easily be moved to any position required.

Two framed pictures were exhibited and presented to the Society by Mr. Pettit.

A vote of thanks to the Chairman terminated the proceedings.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Association was held on Wednesday, the 24th ult., at the Association studio,—Mr. W. Radcliffe in the chair. It being purely a business meeting the attendance was not large.

The minutes having been confirmed, the various matters of business pertaining to an annual meeting were gone through.

The Treasurer (Mr. E. Brightman) was pleased to be able to state that the funds of the Association were in a satisfactory condition.

The Hon. Secretary (Mr. H. A. Hood Daniel) announced the resignation, through ill health, of Mr. A. Levy, a member of the Association, and stated that the good circumstances which had always attended them namely, that they had never yet had a resignation without the addition of a new member, still came to their aid, inasmuch as there would be one member, if not more, to be balloted for at the next meeting, and he considered that it was a subject for great congratulation that their members had not only always kept up but had steadily increased. He felt sure that the advent of the gelatine process would bring a large number of additional members to their ranks—men who would be earnest workers, and yet did not care for the exertion the wet process entailed upon them.

It was decided to postpone the report and election of officers till the February meeting, on account of the smallness of the attendance (caused not only by the nature of the meeting but also by the exceedingly bad weather).

The meeting was then adjourned.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of this Society was held on Tuesday evening, the 6th inst., at Freemasons' Hall,—Dr. Thos. H. Morton, President, in the chair. There was a large attendance.

The CHAIRMAN (who had only recently arrived from India) expressed the pleasure he felt at meeting the members after so long an absence from home, and thanked them for the honour of re-election, which was to him quite unexpected. He hoped that the present season would be productive of good photographic work.

Mr. J. TAYLOR (Hon. Sec.) brought a fine selection of prints for presentation to the members. Amongst them were, notably, Mr. H. P. Robinson's well-known studies, *A Merry Tale, The Fern Gatherers*, &c.; also specimens by Mr. A. Lewis and Mr. M'Liesh.

Mr. YEOMANS exhibited a solid brass tripod top plate which, with the material of an ordinary bamboo fishing rod, made a good telescopic stand for a light camera.

It was proposed by Mr. RAWSON, and seconded by Mr. T. FIRTH, that the thanks of the Society be given to the proprietor of THE BRITISH JOURNAL OF PHOTOGRAPHY for a copy of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, and to Messrs. Cussons, Southport, for the gift of pocket books.

It was also unanimously voted that the Chairman read a paper respecting his tour in the East.

The CHAIRMAN said he had secured a few negatives, and would be able to contribute a short account of them.

A discussion on future summer excursions was postponed, and the meeting was then adjourned.

BURY PHOTOGRAPHIC AND ART CLUB.

THE above Club held its first annual exhibition of photographs and drawings in monochrome at the Co-operative Hall, Bury, on the 24th, 25th, 26th, and 27th ult. There were 150 exhibits, fifteen being in black and white, and 135 photographs.

Mr. F. Cooper was well represented, having a choice collection of views taken by himself in North Wales.

Mr. E. Eccles exhibited several nice opal pictures, also a variety of portraits of local celebrities.

Mr. F. W. Livsey had a number of portrait groups, architectural views, and landscapes. His snow scene was much admired. He also exhibited several paintings in black and white, and a view of *Conway Castle* in sepia.

Mr. W. S. Barlow had one case of cabinet landscapes, and one case entitled *Home Scenes*. He also exhibited two paintings in black and white —*A Lonely Tramp* and *Ramsey Bay*—which attracted much attention.

Mr. C. H. Wood and Mr. R. Smith were also contributors in monochrome, and Mr. John Nelson had eighteen views taken at Bolton Abbey and other places. Mr. Edwin Eccles showed two choice views of Haddon Hall, and Whalley Abbey.

Mr. W. Palmer exhibited a case of *plaques* painted in sepia, being very unique.

Mr. John Holding, the veteran artist, was represented by four oil paintings in black and white, which attracted much attention, being very soft and having all the appearance of porcelain.

There was a lantern exhibition each night, conducted by Messrs. Walmsley, Eccles, and Cooper, which the public duly appreciated, the views thrown upon the screen being principally local and the production of the members.

Correspondence.

IODIDE IN GELATINE EMULSION.

To the EDITORS.

GENTLEMEN,—I have just seen Mr. G. S. Penny's communication of the 26th of January regarding the introduction of iodide into gelatine emulsion. I wish to offer one or two remarks regarding the question.

In 1877-78, when Mr. Penny's article in the ALMANAC was written, gelatine emulsions had not got out of their infancy. They could toddle and not run. The rapid processes, by aid of digestion, boiling, and ammonia had yet to be developed, and it was for the slow process that Mr. Penny recommended the use of iodide. The advantages of the addition are much more pronounced and more numerous in the rapid processes than in the last-named one, in which it has about the same value as in a collodion emulsion, as Mr. M. Carey Lea has shown.

From the time of the article in the ALMANAC (1st January, 1878) till the 26th January, 1883, Mr. Penny has, I think, been silent regarding the matter. In the interval I have borne the brunt of the battle of "iodide" *versus* "no iodide" in rapid gelatine emulsion; and now that the "value" of the addition "is being recognised" he comes forward and wishes to father the child I have endeavoured to bring up so properly. His help when "it was not duly appreciated" would have been most welcome.—I am, yours, &c.,

February 10, 1883. W. DE W. ABNEY.

PHOTOGRAPHY AND ART.

To the EDITORS.

GENTLEMEN,—I was thinking this morning—on opening your valued Journal and seeing the picture of the week—on the amount of the talk about photography as an art and as a handmaid to the artist, and as to the way in which the photographic artist should be and should not be called an artist. I thought it might at least cause a trifle of amusement to hear of a few points in which the pretty picture might be made more what an artist would have made it.

In doing so do not let it be thought that any wrong is done to the fair name of "photographer" or "photographic artist," because these things are hard to do, and an artist has been educated to do them. It is the entire force of his knowledge that is in question, and I think few men who have been educated to their ideas of art in the way that photographers have mostly been could be expected to do better; but, for all that, they may do so in the future. Let the multitudinous operations and messy preparations of the past be entirely forgotten in the simple, sweet future of dry gelatine plates, and then the brain will have opportunity to turn to the more important needful points that make the artist. I am not going to define any of these; they are best seen when shown in their results.

To show the way in which these will gradually come about I will point out the various smaller and larger matters in which the *Flower Girl* might have been advantageously different from what it is. As these new points of art are, in fact, matters of actual truth they will be easily noticed; indeed, the highest point to which art reaches is perceptible as a matter of simple truth to common observation:—1. The *Flower Girl's* boots are the wrong pattern; high heels are not right. 2. They are too clean; even the heel shines. Flower girls are not shod thus. 3. Stockings for flower girls are not of this fancy pattern. 4. The striped skirt is not right; for a flower girl it is stagey and too short. 5. The loose wicker apparatus for holding the flowers is, I think, not correct to fact, and it is hung too low. 6. The flowers are not done up as for sale but are all loose. Some very good flowers seem to be on the floor; this cannot be. 7. Flower girls may be short-sleeved, but they want a shawl, and are seldom or never seen so unprepared for the weather. 8. As to surroundings: where will you find a flower girl with such surroundings? The scene is one of pure luxuriance in vegetable beauty; a ruined balustrade runs along the top, and the rich foliage is about perfect—in fact, it is simply a bay in some flower show or bazaar. No flower girl will be found in such a place.

One theory only will account for a flower girl looking anything like this one. She might be supposed to be at a fancy dress ball and being got up in the usual way that comedians admire, but not the way of nature and fact.

Now, when it is impossible to find such faults as these, and when in their stead some deep touch of truth is portrayed that makes the mere artist or the mere poet to start with wonder and awe, then it will be quite right to plead for the fine art of photography.—I am, yours, &c.,

February 13, 1883. ALFRED DAWSON.

LANTERN SLIDES.

To the EDITORS.

GENTLEMEN,—I for one would gladly welcome a publication by Mr. W. Brooks on the preparation of lantern slides, and hope that that gentleman may be able to find the time necessary to carry out the suggestion.

I am a country amateur, nearly 200 miles from London, with a good lantern and photographic apparatus, but with very limited time to do anything with it; and no doubt there are many, like me, who would greatly value the fullest information on the subject.—I am, yours, &c.,

February 10, 1883. MEW.

ON THE PACKING AND TRANSPORT OF NEGATIVES PER POST.

To the EDITORS.

GENTLEMEN,—I read your article on packing negatives for transit by post with pleasure; but allow me to suggest one thing which, from experience, I find to be most valuable. The negative or negatives may be safely packed in a comparatively thin box if the box be packed up in *black* paper, and a label for stamps, &c., attached with a string, as you suggested. The reason for the black paper is so evident I need say no more. I have often sent six or eight negatives in a thin box, and never had one broken.—I am, yours, &c., W. VICK.

February 14, 1883.

To the EDITORS.

GENTLEMEN,—I notice that in last week's issue mention is made of so many negatives being broken in transit per post. No one can blame the post-office officials, as the regulations are most stringent—to the effect that "they will not be responsible for glass." I believe also that if it were known at the time of posting they could (if they wished) refuse to forward the same. Of course negatives are sent every day this way, but, as a rule, either no notice is taken, or else in obliterating the stamps at the office (where they usually "come down" with the date stamp with no mean pressure) the mischief is committed, and instead of receiving negatives the consignee receives broken particles of glass.

When I was employed by a firm in the City we invariably used pine boxes, made about two inches too large every way. The negatives

were wrapped in paper and the sides padded with wool, and we never had a broken one. The old saying, "penny wise and pound foolish," to my mind applies to the cases named last week. If the package be a little heavier it is surely better to pay a little extra than to find that all the time, chemicals, &c., have been wasted.

In conclusion: I would say—never gum the label on the package, but use luggage labels, such as are made to tie upon the ends of the article to be forwarded.—I am, yours, &c., C. T. Frankland.

Holloway, February 13, 1883.

EXCHANGE COLUMN.

I will exchange a good cabinet-size burnisher for a studio chair or anything useful.—Address, T. Hayward, photographer, Devizes.

Wanted, Ross's or Dallmeyer's postage stamp lens, in exchange for Ross's single landscape lens, four and a-half inch focus.—Address, J. Thomson, Burnside, Fochabers.

I will exchange my 8½-inch square mahogany camera for a good 5 × 4 camera, bellows-body preferred; must have two slides.—Address, S. Boyce, Market-street, Devizes, Wilts.

I will exchange two backgrounds, interior and exterior, for accessories; also *Photo. News* for 1881 and 1882, for anything useful.—Address, F. Stanley, Rembrandt Studio, Guildford.

Wanted to exchange, seascape for landscape backgrounds; also Cadett's pneumatic shutter for posing-chair or rustic balustrade.—Address, with photographs, C. Berwick, 2, Holly-terrace, Lansdowne-road, Worcester.

I will exchange imitation old stone arch with two portable steps, also dark box or backgrounds or other studio accessories, good 10 × 8 camera, with swing back, or dry-plate camera, for half- or whole-plates, by good maker.—Address, H. Redshaw, Bourne, Lincolnshire.

Wanted, half-plate view lens, by any average maker; must be symmetrical type of lens. Will give in exchange a Victoria camera, four lenses, by Moorse, Holborn, and *carte* rolling-press; camera and lenses have never been used.—Address, A. A., 10, Stockbridge-terrace, Pimlico.

For sale, a splendid covered photographic waggonette, nearly new, fitted ready for work, with lamps and brake complete; also, good pony and harness for same, for anything useful in photography, such as lenses, camera, &c.—Address, B. W. Bindon, 26, Basinghall-street, Tunbridge Wells.

I will exchange a quarter-plate, square brass-bound mahogany camera, sliding body, with rising front, and a *carte* lens, with rack and diaphragms complete, both perfect, for 5 × 4 or half-plate folding bellows-body camera, double backs, and view lens; difference in cash.—Address, J. Rayner, Cavendish-hill, Nottingham.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

D. H. T.—The chemical added was, no doubt, nitrate of silver.

C. W.—We have forwarded your inquiry to the gentleman who described the apparatus.

Pyro.—The mixture is of no consequence; the silver can be recovered just the same as if the solutions had not been mixed.

K.C.I.O_3—Without seeing an example it is impossible to state the cause. From your description it would appear that the plates are unevenly coated.

R. Walter.—We have your plates, but have not yet had an opportunity of testing them. We shall do so on the very earliest occasion, and will let you know the result.

W. S.—The actinometer is sold, we believe, at two shillings and sixpence. It is only intended for use in carbon printing, being of little practical value for anything else.

R. W.—We shall be glad to try the plates by the new process, but do not quite understand what you wish when you ask if we will take your photograph and send a negative.

Thomas Forrest.—We will go over the measurements in order to test their accuracy, and will let you know the result. If we find them incorrect in any part we shall, of course, publish the correction.

Lower Rung.—There is justice in your remarks; but we scarcely think you would wish to see them printed, especially if, as we judge to be the case from your letter, the parties are personally known to you.

Horace.—1. Yes; the patent for carbon printing by double transfer has expired.—2. Yes.—3. The words "chromotype" and "autotype" are, we believe, trade marks, and cannot be used without permission.

S. B. J.—The formula is quite correct, but you have employed a pyroxyline which is unsuitable. Change it for another sample giving a more fluid collodion, and try again. The same dark room will do for both kinds of plates.

Prometheus.—There is no royal road to lighting the sitter. All must depend upon the aspect of the rooms as to what kind of blinds are required. The judgment of the artist will generally supply all the information needed.

H. B. S.—We are not aware that any of the former makers of collodion emulsion do so at the present time, nor that the article can be obtained commercially. You will find information on the subject in the Almanac for the present year.

Beginner.—Supposing each of the lenses are equal in quality, the one of eight and a-half inches focus will be the best for your purpose. Of course we cannot express an opinion as to the merits of them, as optical instruments, without a trial.

Bromo.—The "salt of sorrel" is not sufficiently soluble for the purpose, besides which it contains too large a proportion of free acid. If the acid oxalate be employed it should be neutralised, or nearly so, with carbonate of potash before mixing with the ferrous sulphate.

Rev. A. H. M.—The stains appear to be due to the prints adhering together while in the hypo. bath, and so setting up a sulphuretting action. This is the only explanation we can suggest from the information furnished. Perhaps the stains are augmented by the use of acid or starch in the mounting.

Coleswegen.—Unless the acetate of soda contain a very large proportion of free acid, as the crude samples sometimes do, an ordinary tinned-iron vessel will answer every purpose. Zinc we should not recommend. The questions you ask regarding the fineness of division of precipitated silver bromide are not clearly expressed. Will you repeat them.

Melbourne.—1. We fear the iodide of calcium will not now be of much use. If you dilute the dark fluid with distilled water, filter, and carefully evaporate you may recover some of it, but the better plan would be to reject it.—2. Distilling off the solvents from the old collodion will not pay; the only use for the collodion now is as a plate-cleaning solution.

Novice.—1. The usual colours employed for water-colour painting will answer quite well for colouring photographs. They may be procured from any artists' colourman.—2. *Silver prints*, by A. Wilson, price one shilling, published at 2, York-street, Covent Garden, W.C.—3. We cannot give the address required. Messrs. Marion and Co. supply glasses suitable for crystoleum.

Major Gubbins.—1. One of the best plans of making paper negatives transparent is by waxing them. Lay the negative on a hot iron slab, and then rub it over with a piece of white wax until the paper becomes saturated. Now place it between several sheets of blotting-paper, and iron with a hot laundry iron. This will equalise and remove all the superfluous wax.—2. Thanks; but at present we will not put you to the trouble.

H. R.—1. Unless the emulsion be required for immediate use it is better to allow it to stand for at least a day or two, as it then has a chance of attaining its maximum sensitiveness. If successive batches are made and used up at once there is a probability of their showing a want of uniformity in rapidity, and this probability becomes less in proportion as the emulsion is kept in the presence of ammonia. This, of course, presupposes that all the earlier conditions have been as nearly identical as possible.—2. The temperature to which you may safely raise the emulsion for coating depends greatly upon the gelatine itself. For very "soft" samples it is not safe to go higher than 100° Fahr.; while some of the harder or hardest commercial makes will stand 140° or 150°.

Received.—E. Dunmore; "Lex." Thanks.

Photographic Club, Ashley's Hotel, Henrietta Street.—At the next meeting of this Club, on Wednesday next, the 21st inst., the subject for discussion will be *Dark Room Windows.*

LONDON GAZETTE, *Tuesday, February* 13, 1883.

Scotch Sequestration.

Peter Davidson, Maxwell-road, Glasgow, photographer.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician.

For two Weeks ending February 14, 1882.

These Observations are Taken at 8.30 a.m.

Feb.	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
1	29·48	W	36	35	—	47	31	Overcast.
2	28·96	SW	47	45	—	50	34	Raining.
3	29·64	W	41	39	—	46	35	Cloudy.
5	30·24	SE	42	41	—	50	38	Foggy.
6	30·11	SE	37	36	—	46	33	Foggy.
7	29·86	S	40	39	—	41	34	Raining.
8	29·63	SE	44	43	—	54	36	Raining.
9	29·73	NW	41	41	—	49	36	Raining.
10	29·53	SW	49	47	—	56	37	Cloudy.
12	29·57	SW	49	44	—	50	40	Cloudy.
13	29·82	SW	42	40	—	49	38	Cloudy.
14	29·97	S	47	44	—	48	38	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1190. Vol. XXX.—FEBRUARY 23, 1883.

THE DECOMPOSITION PRODUCTS OF GELATINE.

Though in the past year or two gelatine in its application to photographic purposes has received so much attention that one would imagine its properties, its constitution, and its behaviour with reagents ought to be as well known to photographers as to chemists, it would seem from recent publications that such is not the case. The majority of photographers, of course, cannot be expected to study minutely the chemistry of the materials they employ, especially when they happen to be such complex organic substances as gelatine.

Within the last month or two we have heard a great deal about a new medium in which it is proposed to form the silver bromide previous to its final emulsification with gelatine, and to this new preparation the name of "leucine" has been given. Several accounts have reached us as to the efficacy of the medium, and its qualities and characteristics have been freely discussed at the meetings of more than one metropolitan society. Without saying one word for or against the medium in question, we must follow the example of Mr. W. E. Debenham and protest against the application of the term "leucine" to a preparation which certainly is *not leucine*, and which probably contains little or none of that substance.

At a very recent meeting of the London and Provincial Photographic Association the new medium was discussed, and, if we are to judge from the published reports of that meeting, we have still further ground for doubting the presence of leucine in the medium in question. When we find Mr. A. Haddon reading a paper, which appeared in our last issue, on the subject of *Freeing Gelatine Emulsion from Soluble Colloids*, and which was directly applied to the so-called leucine, it is time photographers should be told what leucine really is. It is only just to Mr. Haddon to say that he has plainly shown that he is not speaking of leucine, but of the preparation which has received that name.

It has become almost a cant expression that "gelatine is a complex organic substance but little understood." If that be true of gelatine itself, it is equally, if not more, applicable to the products which arise from its decomposition. Many of these are absolutely unexamined, especially those which result from its dry distillation; but with this branch of the question we have, for photographic purposes, nothing to do. We have to treat gelatine in the process of emulsification, either—1st, to prolonged emulsification at a low temperature (90° to 100°); 2nd, to a short emulsification at a high temperature (nearly boiling) in a neutral or acid state; or, 3rd, to a more or less prolonged emulsification at a low temperature in the presence of ammonia. The following facts will show what small likelihood there is of leucine or any of its congeners forming any part in the process of emulsification, or of its adaptability to the purpose of holding silver bromide in suspension previous to its addition to the bulk of the gelatine.

Leucine is produced, together with glycocine, by the action of sulphuric acid or a caustic alkali upon gelatine. It is also obtainable by similar means from albumen, fibrin, or any of the proteids. Confining ourselves to gelatine, however: if the latter be dissolved in twice its weight of strong sulphuric acid, allowed to stand for twenty-four hours, and the mixture then diluted with eight or ten times its bulk of water and subsequently boiled for several hours, leucine, glycocine, and other unexamined substances are formed. Or the preliminary digestion may be dispensed with, and the gelatine simply boiled for several hours in the diluted acid, after which the solution is neutralised with chalk, filtered and evaporated, when the glycocine and leucine are separated by their different degrees of solubility.

Still another plan is open, namely, to boil the gelatine with a caustic alkali—preferably potash—when after several hours the same substances are formed, and may be separated in a similar manner to that just mentioned. Leucine so obtained has the formula $C_6 H_{11} (N H_2) O_2$, and consists of minute white crystals very slightly soluble in water and less so in alcohol, requiring at ordinary temperatures 27·7 parts of the former and 658 parts of the latter for solution. It is soluble in acids or alkalies.

Glycocine, glycocoll, or "sugar of gelatine," is formed simultaneously with leucine and in larger quantity by the same treatment of gelatine. Its formula is $C_2H_5NO_2$, and it crystallises in large transparent crystals, which are soluble in about four and a-half parts of water but quite insoluble in alcohol. The wide difference between the respective solubilities of leucine and glycocine permits their ready separation. This remarkable substance, though really an acid—"amidacetic acid" being its modern name—behaves also as a base forming well-defined salts with several of the acids.

Tyrosine is another substance of a similar nature, procured usually by the action of sulphuric acid or potash upon horn, hair, fibrin, and similar substances, and occasionally from gelatine, especially if the latter contain any considerable proportion of chondrin. Tyrosine forms long, silky crystals having the formula $C_9 H_{11} NO_3$, and but slightly soluble in cold water, though more so in hot.

With regard to the proportions in which these substances are formed when gelatine is boiled with sulphuric acid or an alkali, much will depend upon the character of the gelatine itself. It is well known that many gelatines, especially some of the foreign ones, contain a considerable proportion of chondrin—a substance closely resembling gelatine, extracted from the cartilaginous portions of the animal instead of from the horns, hoofs, and skins. It is remarkable that the action of alkalies upon chondrin produces very little leucine, while, on the other hand, sulphuric acid forms leucine without any glycocine.

All these substances, but especially glycocine, form compounds with silver which have never yet been investigated photographically. Such being the fact, however, it is obviously impossible to employ them as media for suspending the silver bromide, even if their physical properties permitted. If present even in small quantity in a solution of gelatine or metagelatine, either leucine or glycocine is more likely to produce an injurious action by its combination with the silver nitrate than a beneficial one. Silver nitrate does not form a precipitable compound with gelatine itself, yet if it be allowed to act upon it for even a short time red fog is produced. Glycocine does form a precipitable compound, and is, therefore, more to be feared.

In conclusion: we repeat that it is not our wish to express any opinion on the merits of the so-called "leucine," which we have not

tried, but merely protest against what seems to be a needless misapplication of terms. From what we have said it will be seen that leucine is not a colloid substance, and so, therefore, can scarcely be expected to act as a vehicle for suspending the silver salts. It is true the solution supplied under that name may, and probably does, contain traces of the real leucine, to which, probably, it owes some of its peculiarities. We find this substance quoted in the price list of an eminent firm of chemists at "twenty shillings per drachm."

IMITATION VITRIFIED PICTURES.

On several occasions, during the past few years, we have directed attention to the subject of ceramic photography, and the different methods by which vitrified photographs may be produced. Although a great deal of useful information has from time to time been published, and the different processes are untrammelled by patent rights, very few photographers have taken the matter up; hence the production of burnt-in photographs is still confined to very few sources. One of the principal reasons we can assign for this is the imaginary difficulty supposed to exist in carrying out the different operations in practice. Another, doubtless, is that few photographers are possessed of a muffle furnace or kiln for the vitrification of the picture; although one suitable for small work, such as enamels, may be purchased for a small sum—from thirty shillings to two pounds. For larger sizes—such as for *plaques* or tiles—a properly-built kiln is requisite, which is a more expensive matter.

We are now about to call attention to a method of producing photographs on ceramic ware or glass which are said to possess much the appearance of vitrified pictures, while at the same time they are, practically, nearly, if not quite, as permanent. Their production does not require nearly so great a heat as for the vitrification of ceramic colours; hence a specially-constructed furnace (at least for working on a limited scale) is unnecessary. We may mention that we have seen some few examples of pictures made by a method analogous to that about to be described, and we must confess that they are indeed a very good imitation of ceramic pictures; and the surface is so hard that it can only be abraded with the greatest difficulty.

The process is one for which provisional protection was obtained in this country, on behalf of a M. Irlánde, of Paris. Briefly described, the method consists of developing a carbon print on the ware in the ordinary manner, and then submitting it to what the inventor terms "a kind of enamelling." This is what the specification says:—

"I spread with a brush a layer of boiled oil, oil varnish, or alcohol, with or without the addition of a small quantity of spirits of turpentine. I carry to an oven or kiln the objects thus decorated and varnished; the heat spreads and renders regular the coating of varnish, obliterates all traces of the strokes of the brush, and hardens the varnish, which then forms a resisting glaze, which protects the photographic image in carbon. The pieces taken from the oven or furnace are treated with pumice by the ordinary means."

Although the specification is rather more vaguely worded than specifications usually are, we can see at once that by this method very good and durable pictures can be obtained. The process, indeed, is analogous to that of japanning, and the surface obtained on the photograph by this means may be made quite as hard and resistant as that on ordinary japanned goods, which, as everyone knows, will bear a great deal of rough usage, and will also withstand moisture and a considerable degree of heat without injury.

The art of japanning, we may briefly explain, consists of coating the article with several layers of varnish, which may or may not contain a colouring matter, each coat being allowed to dry before the next is applied, and then submitting it to a high temperature in an oven—"stoving," as it is technically termed. After this operation the surface is polished—first with pumice powder, and then with rotten stone or tripoli and oil—until a high gloss is obtained, such as we are familiar with on ordinary japanned goods. For photographs on porcelain, of course, a varnish free from colour must be employed, otherwise the whites of the picture will be degraded. Amber and copal (when the palest varieties are employed) produce a colourless film which is exceedingly hard, and both are, under certain conditions, soluble in linseed oil and turpentine, which renders them very eligible for the purpose. Varnish suitable for japanning, made with either of the above resins, are articles of commerce. That made with copal is the one which gives the palest film, and, on account of its lower price, is the one more frequently used, although the amber yields the hardest surface.

Now, all will readily understand that a carbon photograph on a porcelain *plaque*, protected with a thick film of polished amber—such as the mouthpieces of pipes are made of—will very closely resemble a genuine vitrified picture. It, of course, will be very durable, as the carbon print, if made with permanent pigments, is not liable to change; and the surface will be as hard as the amber itself, which material, as most are aware, is not easily scratched. If by chance it should be, it can easily be repolished with tripoli and oil. It will also resist a considerable amount of heat, as the melting point of amber is somewhere about 550° Fahr. There is no reason whatever why the pictures should not be coloured before they are submitted to the japanning operation, which would still further inprove their appearance. This is alluded to in the specification. We have just mentioned that the carbon print should be made in permanent colours; this is necessary, for it must not be assumed that the protecting coating, however thick it may be, will prevent the action of light on fugitive pigments.

It is quite possible that silver pictures may be as successfully treated as carbon; but we very much doubt if the treatment would render them what might reasonably be considered as permanent. It appears to us that this process is one which may be made available for the production of very excellent and permanent results on vitreous ware, although they can in no way be considered as vitrified photographs.

With regard to the source of heat for the "stoving:" the oven of an ordinary kitchen range will supply all that is necessary, especially for experimental purposes; so that no additional outlay need be incurred until the process has been fairly tested. Certainly this method of producing permanent pictures is one well worthy of the consideration of our readers; and, as it has received provisional protection only, and the six months since it was filed has now expired, the process is open to all who choose to utilise it.

When time will permit we shall make a few experiments with it to see how far the process is really practicable.

GLASS ROOFS.

There seems to be a timely lull in the series of terrific gales that have been devastating the country for so long a period. Though we have not arrived at the equinoxes—so noted for atmospheric disturbances of the kind—we have yet suffered, in January and February, from winds such as are rarely equalled by the fiercest "equinoctial." Many are the photographers who have been in dire distress of mind for fear of their studios falling, or, at least, of their roofs being blown in, the builders of studios throughout the length and breadth of the land not being compelled to work under the restrictions imposed upon those carrying on their business in the metropolis—more fortunately for them as regards their pocket, but less fortunately, perhaps, as to the actual value and permanency of their structures.

If, when the equinoctial gales do touch our shores, their force is to be at all comparatively commensurate with the weather we speak of, the matter will be serious to some photographers. We are not writing in an alarmist strain, and we do not for one moment believe in the vaticinations of the transatlantic weather-prophet who has recently obtained, at anyrate, newspaper notoriety in America, he having lately been kindly forecasting the weather for the President of the United States, and sending him, unsolicited, the details of his prophecies; but the present is a favourable time for looking to the safety of studios already built, and for going more fully than is usual into the details as regards wind and weather in plans of studios to be built.

As some of our readers may not have heard of the prophecy we allude to, we may say it is that of Dr. E. Stone Wiggins, of Ottawa, Canada, who wrote to the President predicting for March 11th next

such a storm that, to use the writer's own words, "no vessel, whatever her dimensions, will be safe out of harbour, and none of the small tonnage can hope to survive the tidal wave and fury of this tempest." It is amusing to note that, though the Surveyor of New York was so impressed with the forecast that he wrote for advice as to certain marine works he was engaged on, the press took the alarmist at his true value, one paper gravely stating that "President Arthur, having received timely warning, has instructed the Secretary of the Navy to employ a few horses and have our war vessels hauled up into a field, and have a shed built over them! This precaution may entail an expense of eight or nine hundred dollars, but the American navy must and shall be preserved!"

Passing by this prediction as a mere figment, let us look upon the conditions that do and should prevail in studio building. Very many, modest in dimensions and limited in scope, are built by the "nearest carpenter," whose "rule-of-thumb" errs as often on the side of unnecessary strength as on that of fatal weakness, so that no rule can govern them; but, when the more pretentious studios are erected, method, system, and plan are called into play. The architect, if one be called in, should be capable of answering all queries as to strength and soforth of roof, rafters, and glass; but a photographer has frequently so many ideas and "fads" of his own that the architect is ordinarily, in studio-erecting, tied down more than usual, even for his much-enduring, if heavily-paid, class, by his employer's requirements.

The photographer will have a particular slope to his roof. He knows a certain other photographer who produces marvels of pictures, owing, he believes, to the particular pitch or slope (originally, probably, hit upon only by necessity or accident); or he will have bars of a certain section, cut, or slant (probably unsafe); and glass of a certain thickness only will suit him, any other being light-obstructive or objectionable in other ways. A discussion arises, and it often happens that the architect's arguments and data do not get properly appreciated. The plans are drawn for a studio to be built which perhaps stands safe for years, but in some disastrous hailstorm or during a terrible gale the windows are riddled in the one case or blown in in the other, the damage done far exceeding in amount any possible saving of expense when an economy descending to parsimony was the first cause of the insufficiency of strength.

It will be most useful for any photographer to be fully acquainted with the comparatively simple laws governing the various points in which his views on artistic lighting or other technical standpoints might clash with those of the architect, who would, if he were permitted to carry out his own views without interference, feel bound to consult safety and durability before any æsthetic considerations; and in our next issue we purpose to enter as fully as possible into the data requisite for the non-architectural photographer to form a sound opinion as to the safety and durability of any plan he may have matured from a mere artistic or "actinic" standpoint.

It has been thought that, owing to the advent of the quick gelatine plates, "photographic studios" would become things of the past; but we do not hold any such opinion. Our columns have shown how quick and excellent pictures may be taken without studios; but for the professional photographer, who works for his daily bread and who does not care to turn a sitter away on the dullest of days, the studio special will for some time to come remain a paramount necessity—where, of course, the electric light is not used.

The photographer who gives snap exposures in good days, and only ten or a dozen seconds on the dullest of November days, will, *cœteris paribus*, have a great "pull" over his more conservative brethren who have not such light accommodation as he has, and still greater over those who have "given up studios and work in a room," as we have heard some assert to be their practice or intention.

Our remarks for the present we may conclude with a hint to those in whom recent experience has raised a doubt as to the safety of the structures in which they work. It will naturally be obvious that, so far as force of wind alone is concerned, any studio built in a recess between walls or high buildings is fairly safe, no matter how strong the gale; so that our remarks are only addressed to those whose studios are in more exposed positions. Our hint is simply—"Bring in an architect (see you select a good and competent man) and follow his advice implicitly." It will cost little, really—an infinitesimal sum in comparison with a possible disaster—and will lead to content of mind, which will not be disturbed by the slight pecuniary disbursement required, if his verdict be satisfactory.

THE English eclipse expedition, consisting of Mr. H. A. Lawrance and Mr. C. Ray Woods, sailed on Saturday to join the American party, their destination being the Caroline Islands. We are glad to be able to announce that Mr. Lawrance has promised to send us an account of the operations, and will, no doubt, keep our readers fully informed with regard to this approaching application of photography to astronomical purposes.

ONE of the considerable items often found among the expenses of lantern exhibiting is the charge for new gas bags or for repairing old ones. Of course no kind of apparatus is of such perennial character as to last for ever, still gas bags might be expected to have a longer life than is often the case; though, *per contra*, many careful exhibitors get an immense amount of work out of one bag before it becomes useless. Those who are so foolish as to deliver the gas direct into the bag without the intervention of a wash-bottle must expect a very rapid deterioration of the rubber-cloth. Where one wash-bottle with water is used a great advantage is found, and still more where two are employed. Those, however, who use a solution of caustic soda instead of water wherewith to fill the wash-bottles find very little deterioration after repeated charging of the bag; and it is incontestably the best way of forcing the oxygen from gaseous matters likely to be found accompanying it by reason of impurities in the mixture in the retort, or owing to the manner adopted in producing the gas. Herr A. Wagner has lately shown that the chlorate of potash of commerce contains impurities sufficient to cause oxygen gas made from it to be always accompanied by chlorine, while, provided the absence of carbonic acid or organic matter is excluded, pure chlorate of potash will yield oxygen free from chlorine. As it is quite out of the question to use pure chlorate for the purpose, it is well that the cause of the evil is so conclusively shown; and if the use of caustic soda in the washing water be adopted little fear need be apprehended of danger to an expensive gas-bag.

THAT oxygen gas-holders in the form of gasometers are not necessarily safe, our readers who remember the recent explosion of one of that form in a laboratory on the continent will be aware. The cause of the disaster was the action of acid gas upon the zinc of the holder, hydrogen being liberated. It can be provided against either by varnishing the interior of the holder, or by devising means of keeping the acid vapours out of the water surrounding the vessel. This latter object has been attained by Dr. Loewe by placing about an ounce of slacked lime in a strong linen bag very near the outflow tube of the water vesssel of the gasometer, thus ensuring the neutralisation by the lime of all carbonic acid and acid vapours which the water might in time absorb from the atmosphere.

SOME singular and interesting properties of the platinum group of metals have lately been observed by Herr Traube. Their behaviour in absorbing large quantities of hydrogen is well known; but Herr Traube shows that not only when containing hydrogen, but also when free from that element, they oxidise carbonic oxide in the presence of water to carbonic acid, hydrogen peroxide being produced. Further: if platinum in form of plate or wire be shaken up with hydrogen, water, and air, hydrogen peroxide is produced in abundance. These facts may have a remote bearing on the beautiful platinotype process, which is now so much better known, and in consequence so much more in request.

ON Saturday, the 10th instant, a lecture, interesting to photographers, was given at the Sorbonne by M. Wolf, chief of the Physical Department of the Paris Observatory, on the *Methods Employed in Astronomical Physics.* He spoke upon the difficulties of

vision where instruments of great magnifying power were employed, and showed the true place of photography in astronomical operations. It was not, he pointed out, *any* description of astronomical observation in which photography could be used; indeed, he stated it should be almost exclusively employed for photographing the sun and moon. In face of the recent excellent cometary photographs the public statement that photography could not be employed to aid in producing star maps, and with the beautiful photographed spectrum of stars, comets, and nebulæ before us which have been recently produced, we are bound to think that if the chief of the Physical Department of the Paris Observatory is not incorrectly reported he betrays a strange ignorance of what our science can do and has done.

There is a pretty case of *brouillerie* about a copyright which is interesting artistic circles at the present time, and an instalment of correspondence upon the matter in dispute appeared in the columns of the *Athenæum* last week in connection with Mr. Charles Rowley. This gentleman is well-known in Manchester and the neighbourhood, from the earnest exertions made by him to promote the cause of popularising art (not alone pictorial art) among the people by all possible means, and has associated with him, in a picture-publishing company having these laudable aims in view, two other gentlemen, one of these being an artist of great talent and reputation—Mr. F. J. Shields. Their efforts have so far met with loss financially; yet they continue their course, and perhaps, ultimately, may make a paying transaction out of what we verily believe has not pecuniary gain as a primary object. Their mode of working is to produce and publish autotype photographs of meritorious works of art, and among those chosen by them was one by the late Dante G. Rosetti. Mr. Rowley emphatically states that the photograph was "matured under the guidance and by the help of the late D. G. Rosetti." The present owner of the original—which is known as *The Lady of Pity*—says he is informed that Rosetti "declined distinctly to permit its issue." It is not for us to step in between the rival statements; but we are naturally interested in the question of copyright, which is one very deeply affecting photographers. As far as the facts at present have been placed before the public the matter is merely one of honour. When an artist permits a second person to have temporary possession of his picture, and to photograph it for his own ends, pecuniary or philanthropic, it is pure philandering to bring in the question of the copyright belonging to the purchaser of the picture as against the owner of the photograph. In fact, the owner of the picture seems to be half aware of this, as he builds his claim to suppress the publication of *The Lady of Pity* on the gentlemanly, if unwise, expression of opinion of one of the trio forming the publishing company. No doubt we shall hear more of this matter.

PLEASING TONES WITH GELATINE TRANSPARENCIES.

It is long since so great an amount of interest has been evinced in the subject of the lantern and lantern transparencies as has been the case during the past or passing season (for the lantern has not yet been put aside for the camera), though little new information has been evoked in connection with the production of slides or transparencies possessing agreeable tones. Too many of the pictures exhibited, whether they emanate from professional or amateur sources, are of too cold and black a tone to give entire satisfaction, though they may be all that is desirable in other respects—a fact which is directly attributable to the difficulty which exists in obtaining warmer tones by any of the processes which are found most suitable for this class of work.

To the amateur especially the gelatine process offers peculiar facilities if properly worked, except, perhaps, in the matter of tone; though even here I am of opinion that far more pleasing results are to be obtained than most of those I have seen. The rapidity of the gelatine plates enables them to be employed in the camera, thus rendering it easy to reduce within the required limits ($3\frac{1}{4} \times 3\frac{1}{4}$) the subject included in a larger negative. Where negatives are specially taken of the required size, and when contact printing is consequently possible, nothing can exceed the beauty of the results producible by means of collodio-bromide, carbon, Woodburytype, or gelatino-chloride with ferrous citrate or citro-ferrous oxalate development; but, unfortunately, these methods are too slow, as a rule, for employment in the camera when reduction is necessary, so that the wet collodion process continues to be used by the majority of makers of lantern slides.

It is not merely in connection with lantern slides that the gelatine process would prove useful if suitable tones could be obtained with certainty. Opal enlargements, transparencies for window decoration, or even gelatino-bromide enlargements upon paper would be more frequently utilised if it were not for the blackness and, generally, the coldness of the tones obtained. With gelatino-chloride and either of the modes of development I have mentioned a most extensive variety of beautiful tones are obtainable, ranging, as Mr. B. J. Edwards has said, from bright ruby to any degree of coldness according according to circumstances; though I must confess I have not myself succeeded in compassing the ruby tints—a warm claret brown, particularly suitable for lantern purposes, having been my nearest approach to it. However, as I have said, gelatino-chloride is too slow for camera work—at least for the majority of amateurs.

I have for some little time been experimenting with a view of combining the rapidity of gelatino-bromide with the variety of tone obtainable with gelatino-chloride, and have secured such satisfactory results that I venture to make my method public in the hope of securing the assistance of others interested in this branch of photography. I may, however, premise that there is nothing whatever new in the matter except the "how to do it," and the one explanatory hint will make the whole thing clear—at least in principle—to any ordinary comprehension. Briefly, the system consists in making the transparency in the ordinary way upon a gelatino-bromide plate, developing, fixing, and washing as usual, and then converting the positive image into chloride of silver. This bleached image is then washed, exposed briefly to light, and again reduced by means of ferrous citrate or citro-ferrous oxalate, as may be preferred. There is the principle. The various steps of the process are carried out by well-known methods, and all that is necessary is attention to a few points of detail, which I will indicate.

In the first place, it is a *sine quâ non* that the gelatino-bromide emulsion be one which will work entirely free from veil or fog and give perfectly-clear glass shadows. Rapidity is a matter of minor consideration, and *extreme* rapidity rather to be shunned than courted. The sensitive silver salt must be in the finest possible state of division, in order that the developed image may possess that homogeneous transparency which has been described as "partaking of the character of a stain."

In order to secure these qualities I make an emulsion as follows:— In two ounces of water I dissolve 100 grains of silver nitrate and two minims of nitric acid of s. g. 1·2. Forty grains of "hard" gelatine—Heinrich's or "autotype"—are then placed to soak in this solution. In another two ounces of water I dissolve sixty-five grains of bromide of ammonium or its equivalent of bromide of potassium, and another forty grains of gelatine are allowed to soak in this. When the gelatine is fully swelled the two solutions are raised to a temperature of about 150° Fahr. until complete solution takes place; they are then mixed in the dark room by pouring the bromide solution into the silver. The mixed emulsion is kept at or about the same temperature for half-an-hour, when five grains of iodide of potassium dissolved in two drachms of water are stirred in and the emulsion allowed to set in any convenient manner. After washing it is remelted, half-an-ounce of alcohol added, and the bulk made up to five ounces.

This produces an emulsion of exquisite fineness, and perhaps two or three times as rapid as wet; if greater sensitiveness be required emulsify longer. The nitric acid prevents any action of the silver upon the gelatine, and the iodide helps to add "pluck" and "tone" to the image, and prevents halation.

With regard to the mechanical operations of exposure in the camera I have nothing to say, but pass on at once to the development. This should be performed preferably with ferrous oxalate—not that pyro. is unsuitable, but because less care is necessary in washing after the iron in order to prevent stains in the subsequent operations. Develope and fix in the usual manner, washing carefully after the latter operation. The transparency should now possess perfectly clear glass in the highest lights. If this be not the case, and if none of the "clearing" solutions will remove the veil, the wisest plan will be at once to reject it, as it will never give a satisfactory picture on the screen. If it be perfect the next operation is to convert the image into chloride. For this purpose ferric chloride, a mixture of hydrochloric acid and bichromate of potash, or cupric chloride may be used. The first I have tried, but not with very satisfactory results; the second, possibly because employed too strong, caused the film to frill, but the chloride of copper gave no trouble, produced the best result, and is, moreover, the most economical if prepared

by the double decomposition of sulphate of copper and common salt, both of which are very cheap products. If the chloride of copper itself be purchased (or crystallised from the mixed solutions of cupric sulphate and chloride of sodium) a twenty-grain solution will be strong enough, and with the cupric salt an equal quantity of ammonium chloride should be also dissolved.

The reason for this latter addition is that by the action of the cupric chloride the silver image is converted into chloride of silver, and insoluble white *cuprous* chloride is formed—partly in the film and partly in the solution. Ammonium chloride dissolves the sub-chloride of copper, forming with it a double salt; the solution is thus kept clear and the image in the film approaches more nearly to one of pure silver chloride. I find that the presence of this cuprous salt has an effect upon the resulting tone of the finished transparency, for which reason I have resorted to the use of a separate bath of ammonium chloride before applying the citro-ferrous oxalate solution.

A great variety of tones are obtainable by varying the length of exposure of the plate to light after treatment with the copper solution. Ferrous oxalate or citro-ferrous oxalate (if it be strong in oxalate) will reduce the chlorised image without any exposure to light; but the colour is then indistinguishable from that of an ordinary bromide plate developed with ferrous oxalate. When the feebler ferrous citrate predominates or is used alone a certain exposure to light is needful, and in proportion to the length of that exposure the colour will be made warmer and the development more rapid.

I have not yet tried the ferrous citrate alone, but have obtained very good colours with both Captain Abney's and Mr. B. J. Edwards's formulæ, which are to be found in this year's ALMANAC. So far I have succeeded best with the cupric chloride; but it is possible that one or other of the alternative solutions I have named, or even bichloride of mercury, may answer equally well upon careful trial. These points, however, I must leave for future experiment.

H. Y. E. COTESWORTH.

LANTERNS AND SLIDES.

No. III.

IN speaking of the manufacture of carbon tissue for lantern slides in my last paper I did not give any formula for mixing, principally because it is simply impossible to give formulæ which will work equally well at different places.

In the first place, as to the amount of water in which the gelatine is to be dissolved: this will entirely depend upon the thickness of the coating which the paper has to receive, and will also vary according to the quality of the gelatine and the temperature of the day. It may vary from three times the weight of gelatine to six or seven times. A very little experience, governed by the class of tissue desired, will soon put the operator at his ease on this point. It is my wish to render the process as easy and certain as possible, and I will therefore proceed to explain the *rationale* of it:—

When bichromatised gelatine is exposed to light it is rendered insoluble. There are, however, other causes of insolubility at work—moisture and heat. Without moisture there is very little action, and we shall see by-and-by that a certain amount of moisture must be retained in the *dry* tissue. In cold weather this normal amount of moisture does not cause the tissue to become insoluble; whereas in warm weather it will not retain its solubility for more than a day or two (more or less according to the nature of the gelatine with which it has been prepared) after sensitising. Early spring, therefore, is the very best time of year for carbon work. Light is good on the bright days, and if a few dull or wet days should intervene the tissue will keep sensitive and soluble.

The tissue is sensitised and exposed behind the negative. An actinometer of some sort is essential to the beginner to judge of exposure. A *safe* edge having been first secured by strips of black paper round the negative, the tissue is put into clear, cold water till it just begins to curl the reverse way, and then squeegeed down on to glass for developing. It is not necessary for me to enter into details of this part of the process. But take such a print and deliberately waste it, and, instead of squeegeeing it down directly it is ready, let it remain a little longer in the water, and examine its surface. The picture will be in relief, the parts protected from the light by the shadows of the negative being the most swollen. Look carefully, and, unless the safe edge be very opaque indeed, the picture will be distinctly seen, even where thus protected by black paper. This proves incontrovertibly that light has passed through the black paper quite sufficient to alter the chemical character of the gelatine, for one part swells more than another and yet not sufficiently to render it insoluble, for the moment it is put into warm water the part protected by the safe edge will wash away completely. It also proves that there is no hard-and-fast line of demarcation between solubility and insolubility, but that the action of light has really gone much deeper into the gelatine than would at first sight appear to be the case.

In preparing the tissue, therefore, if there be not sufficient thickness of gelatine beyond that required for the formation of the image, this partial insolubilising of the excess is sufficient to prevent the paper from coming freely away. If force have to be used to tear the paper off there is great risk of the softened film leaving the glass; and, even if it do not do so, the print rarely washes clearly and evenly. The real truth is that there is a positive reflex action of the light, which is reflected back again from the paper of the tissue, and so causes a double insolubilising action in those parts. I have frequently found a rough duplicate print of this character adhering to the paper of the tissue, and refusing to dissolve in the same warm water in which the real picture was developing, proving that the portion of the tissue next the paper was actually more strongly acted upon by the light than the intermediate parts between that and the print.

The obvious remedy is to use a black paper on which to spread the gelatine, in which case half the gelatine will suffice; for I take it for granted that the amateur will have quite trouble enough preparing his gelatine solutions to desire to make them cover as many square feet as possible. The solutions have to be quite free from bubbles, and it is needless to state that the thicker the solution of gelatine the more trouble it is to get rid of these unwelcome visitors.

If the solutions are made simply of gelatine, colour, and water the tissue so prepared would dry so hard as to be unmanageable. Something, therefore, of a hygroscopic nature is added so as to retain a certain amount of moisture, which, as I have before said, is necessary for the insolubilising action. Unquestionably the best and safest thing to use is sugar (loaf sugar) one-fourth of the weight of gelatine. In a recent communication Mr. J. C. Annan recommends the addition of twenty-five to fifty per cent. of glycerine My experience—based on the manufacture and exposure of over eighty to one hundred square yards of tissue per diem for several years—is that such a formula would in ordinary climates give a flabby, troublesome tissue, with a strong tendency to become insoluble on the slightest pretext. Another point of difference is that we always *boiled* our gelatine to get it dissolved in two to two and a-half times its weight of water, the bichromate being added from a ten per cent. of cold solution; and, when I add that my experience was gained at M. Ad. Braun's, of Dornach, where I re-designed and re-made the coating and grinding machinery, it will, I think, be allowed that it is based on successful practice.

Glycerine requires to be used with caution. It is often impure, and from that cause has at times given me an infinity of trouble. I should, therefore, strongly recommend the amateur to eschew it at first. Even the best has a tendency to render the tissue insoluble—or, perhaps, I should say, to increase the insolubilising action of heat and moisture. While, therefore, it would only add to the troubles of the beginner, to whom solubility is a *sine quâ non*, it may be of great use to the experienced carbon operator, who desires to diminish what he considers excessive solubility, and then I should consider about five per cent. of the weight of gelatine ample, the sugar being reduced to one-half or less.

In carbon work the principal difficulty to a beginner is the correct exposure. Now, let him take heart. It is not insuperable or even very difficult. He will, of course, have been in the habit of taking prints on albumenised paper from his negatives, and will have learnt that some prints much quicker than others, but probably will not have attempted to classify them. This he must now do, and, by the aid of an actinometer, number them according to the number of tints they require. This once established the proportion will hold good for carbon work, too; and, although correct exposure is desirable, the latitude is incomparably greater with carbon than with silver. There is no hard-and-fast line of insolubility. A little longer washing will bring down an over-exposed print; prolonged washing with a little alkali will often save one exposed twice too long; while there are several "dodges" for saving prints that have not been exposed half long enough; so that, supposing a print should have received ten minutes' exposure, if it have had anything from five to twenty it may yet be developed into a good one.

As to the relative time of exposure compared with albumenised paper, no formula can possibly be given. It will depend upon the gelatine, the amount of colour, the proportion of bichromate, and the weather, and also upon when the picture is to be developed.

Mr. E. W. Foxlee has several times exhibited a series of pictures illustrating the continuating action of light on bichromatised carbon tissue; that is, pictures exposed for the same time under the same conditions and developed at varying intervals after exposure. Nothing is more clearly established than the fact that, if a carbon print is to be developed immediately after exposure, it must receive considerably more exposure than if it is intended to keep it for some time before development, otherwise by what is called "the continuating action of light" the picture would be over-exposed. In all carbon-working establishments allowance is made for this. The pictures are all exposed in the morning and developed later in the day, and are therefore under-exposed; but the continuating action brings them up to proper exposure. I fully admit the fact (for it is indisputable), but I am not altogether satisfied that it is due to the action of light alone.

Having on one occasion to produce a great number of *facsimile* pen-and-ink drawings—the most difficult of all subjects in carbon—I transferred some hundreds of negatives so as to get reversed negatives (the process was described in The British Journal Photographic Almanac for 1881, page 142), and printed them by single transfer. Now, as only the black lines, which were hard and sharp, had to adhere to the transfer paper, and were not helped as they would be from an ordinary negative by the half-tones, I adopted the plan of allowing them to completely dry after squeegeeing down on to the permanent support before development; consequently they were left till next day (afternoon) to develope. I cannot say exactly what exposure they had—probably about one-third to a-half what would have been required if they had been developed immediately—at anyrate, what my regular everyday experience told me was necessary. The room they were prepared in was filled up with tanks for hot water (heated by steam), troughs for washing of capacious size, brick floor always sloppy and wet, and by accident some of these prints fell down in a place where they lay unseen for months. They developed as perfectly as if they had been prepared the previous day, although exposed to the effect of moisture for the whole time. It was, however, in the cold weather. In summer they would have been hopelessly over-exposed in two days, and utterly insoluble in a week under the same conditions of moisture. George Smith.

THE ACTION OF LIGHT ON SUBSTANCES NOT GENERALLY USED IN PHOTOGRAPHY.

No. III.

It is now more than six months since the appearance of the last article I wrote on this subject. This long delay has not been from want of material to write about (for the subject is practically infinite), but from want of eyesight to write.

The next subject I propose to take up is chlorine and its various derivatives. It may seem curious to speak of the action of light on an element—which, for the present, chlorine must be considered to be, as it has not yet been proved to be otherwise, though from various directions come the preliminary murmurings which may generally be heard before any great discovery. Dangerous as prophecy is known to be I should say that it is not improbable that before many years have elapsed chlorine may be decomposed, and very likely bromine and iodine will soon follow. However, this is a digression from the action of light on chlorine, which, indeed, is a subject not very well understood. The majority of experimenters say that on exposing pure chlorine to bright light an expansion takes place greater than is to be accounted for by increase of temperature, or that the same effect may be produced by a beam of sunlight whose radiant heat has been intercepted by passing through a solution of alum or, still better, sulphate of zinc. The only explanation of this expansion that I know of is that the molecule of chlorine, Cl_2—which is the ordinary state of the gas—is under the influence of strong light broken up into atoms, or 2 Cl.

The nature of the combination of atoms in molecules is not at all understood, but it is a fact that free chlorine under ordinary circumstances is represented by the formula Cl_2; and there are pretty good reasons for believing that under the influence of light the molecule is broken up, and that then the chlorine is either partially or wholly in the state of Cl.

Before going further, however, it may be as well to mention that some experimenters have denied that light had any influence whatever on the volume of chlorine; but, whether the volume of the gas is affected by light or not, there can be no doubt that its chemical relations are entirely changed, in that chlorine is rendered much more energetic by the action of light, and I think it is likely that the cause of that change is the dissociation of the molecules into atoms.

The most striking experiment illustrative of the action of light on chlorine is when a mixture of equal volumes of chlorine and hydrogen which has been made in the dark is suddenly exposed to direct sunlight, when a violent explosion takes place, which effect may also be produced by the light from magnesium wire. The mixed gases may be enclosed in sealed glass bulbs and kept in the dark for any length of time, and will explode instantly on being thrown out into the sun. Combination also takes place slowly in diffused daylight, the speed being proportional to the amount of light—a fact which has been utilised by Bunsen and Roscoe in the manufacture of a very delicate photometer, which is, however, a very elaborate instrument, requiring much skill to work it.

A simple but not quite so direct action of chlorine is that on marsh gas CH_4. When marsh gas is mixed with an equal volume of chlorine the following action takes place:—

$$CH_4 + 2\,Cl = CH_3Cl + HCl,$$

the action being greatly assisted by sunlight, though in this case it never attains an explosive rapidity. On again mixing the monochlorinated marsh gas, CH_3Cl, with an equal volume of chlorine no action takes place in diffused daylight, but in sunlight the following:—

$$CH_3Cl + 2\,Cl = CH_2Cl_2 + HCl.$$

By another repetition of the process $CHCl_3$, or chloroform, is produced, which again by further action of chlorine and sunlight may be converted into CCl_4, tetrachloride of carbon, one molecule of HCl always being produced at the same time as one of the chlorinated derivative.

If the supply of chlorine be insufficient the action is the same but the change is not complete, some of the original substance being left after all the chlorine is absorbed. The production of CCl_4, therefore, takes place in four stages, thus:—

1. $CH_4 + 2\,Cl = CH_3Cl + HCl$
2. $CH_3Cl + 2\,Cl = CH_2Cl_2 + HCl$
3. $CH_2Cl_2 + 2\,Cl = CHCl_3 + HCl$
4. $CHCl_3 + 2\,Cl = CCl_4 + HCl.$

But though this looks very pretty on paper, in practice it is found that no one of these chloro-derivatives of marsh gas, CH_4, can be prepared in a pure state in this way. On mixing equal volumes of CH_4 and Cl a large quantity of CH_3Cl is produced, but also a little of some—perhaps all—of the other more highly-chlorinated derivatives; and, on the other hand, that however much chlorine be added a small quantity of the lower ones will remain mixed with the higher. The third substance produced, $CHCl_3$ is chloroform, but it is never practically prepared in this way. In the above reactions hydrochloric acid is always produced—indeed, the reaction may be said to depend on this fact, for the affinity of chlorine for carbon is not very strong, but that of chlorine for hydrogen is so; one atom of the molecule of chlorine takes up one atom of hydrogen, while the other takes the vacant place in marsh gas.

Instances more or less resembling this could be cited to any extent, but one is sufficient. Bromine and iodine resemble chlorine somewhat in their relations to light, but are in a general way much less readily acted upon. Neither bromine nor iodine combine directly with hydrogen, even when long exposed to sunlight, but there are several cases in which bromine and also iodine to a less degree are found to be changed by exposure to light, always being rendered more active. Bunsen and Roscoe's chemical photometer, which is an extremely interesting instrument, will be found very fully described in the original papers by the inventors, published in the *Philosophical Transactions of the Royal Society of London* for the years 1857, 1859, and 1862, where is also given an account of a very elaborate series of experiments by these eminent scientists on chemical photometry, and also on the nature of the action of light on chlorine.

It is worth mentioning here that Bunsen and Roscoe say that chlorine undergoes no physical change when exposed to light, while, as already mentioned, others affirm that it is changed; and it must be remembered that no one has so thoroughly worked up the subject as these two authors. Cosmo I. Burton.

PHOTOMICROGRAPHY.

[A communication to the Manchester Photographic Society.]

Photomicrography, or the process employed in photographing the magnified images of microscopic objects, has been practised in France, Germany, England, and America for some years to a more or less limited degree, but of late has received a great impulse from the facilities afforded by rapid gelatine dry plates for the practice of the art by ordinary artificial light. Under the wet collodion system the sensitiveness of the film was too slight for practical use with the lamp or gas, and few cared to encounter the somewhat precarious opportunity afforded in this climate by the happy conjunction of leisure and sunshine. Too often has the writer been victimised when, counting on a morning's holiday and having made all due preparation, the sun has unceremoniously withdrawn his face just as the sensitised plate was placed in the camera, and for weeks together has refused to reappear at an opportune moment.

The finest specimens of the art that I have seen were executed by Dr. Woodward, Surgeon-General of the United States Army, and residing at Washington, who has devoted much attention to the subject, and who evidently has been furnished by the Government with ample funds for carrying out his investigations. His apparatus is of the most complete description, an apartment being fitted up for the express purpose of taking photomicrographs, a heliostat provided, and lenses ground specially by Wales and others for accurate microscopic and photographic

delineation. A report, fully illustrated, was published a few years ago by the American Government, containing the results of the labours of this scientist and his coadjutor, Dr. Curtis. Besides portraying such objects as diatoms, the nature of the delicate markings on which has been the subject of so much controversy in past years, these gentlemen have photographed numbers of pathological subjects, which, however, present great difficulties to the photographer on account of the want of penetration in microscopic lenses.

Mr. J. B. Dancer, the well-known Manchester optician, as long ago as 1840, produced photographs of microscopic objects, the image of a flea and other subjects being taken on silver plates.

The first photographic illustrations of microscopic objects published in this country appeared in the *Quarterly Journal of Microscopic Science* in 1853, vol. 1, since which period many works have been illustrated by means of these beautiful prints.

Besides Dr. Woodward, the names of Drs. R. L. Maddox, Abercrombie, Wilson, and Redmayne, and of Messrs. Wenham and Shadbolt, have for long been connected with a successful pursuit of the art. A specimen of the work of Dr. Maddox, of London, who photographed the objects delineated in the frontispiece of Dr. Beale's work on the microscope, now lies on the table. Mr. York has also just published a series of transparencies of micro objects suitable for lecture illustration.

I have also prints of diatoms from negatives taken by Fritsch and Müller, of Germany, and published by Williams and Norgate, 14, Henrietta-street, Covent Garden, London. One of the prints is a magnified representation of the set of diatoms so marvellously prepared by Möller, of Schleswig-Holstein, and known as the "typenplatte," or type plate. It contains 100 specimens of these beautiful organisms, which are now classed under the vegetable kingdom, and are found both in a fresh and fossil state over the whole world; for any stagnant pond, running ditch, or seaside pool will afford living examples for the microscopist.

I diverge for a moment from the immediate subject of my paper to describe these peculiar organisms on account of the beautiful skeletons they contain, which form favourite subjects for the photomicrographer, the valves presenting a flat plane to the focussing-screen, and exhibiting wonderful variety in the sculptured markings on their faces. As a rule they consist of two plates of siliceous material covered with delicate patterns, the plates being held together by a band or hoop of similar material, the whole forming a sort of flat case—in some specimens like a round, shallow snuff-box, and containing protoplasm within. For microscopic purposes the specimens are boiled in acid, and the clean shells mounted dry or in balsam.

These examples of the German photographers, however, do not in any way exceed in beauty the work privately published by my late lamented friend, Dr. Redmayne, of Bolton, whose book of diatom photographs is also here for inspection.

Dr. Woodward, of Washington, has kindly sent me for the purpose of this paper a print of the diatom, *Surirella gemma*, as an example of high magnification and the resolution of difficult markings. Few microscopists, comparatively, succeed with their own instruments in resolving the lines of dots thereon, even with high powers, their resolution being much more difficult than that of the common test object *Pleurosigma angulatum*, to which I have before referred. This photograph was taken with a lens of $\frac{1}{25}$ focus, made by Powell and Lealand, and the magnification is 2,800 diameters, the dots, so plainly seen, each measuring about $\frac{1}{67000}$ of an inch; but I cannot say whether the negative was afterwards enlarged.

Those interested in this subject may find magnificent specimens of Dr. Woodward's work in the libraries of the Royal Microscopical Society at King's College, and of the Microscopical Society of Liverpool.

Apparatus.—The apparatus employed need not necessarily be expensive. Any small microscope, with fine and coarse adjustments for focussing, and an ordinary quarter-plate camera arranged on a short base-board, will serve for a beginner, and even the camera and microscope stand may be dispensed with by the use of a dark box, as described in the *English Mechanic* for February 2, 1883.

It is preferable, however, to have a base-board four feet long and eight inches wide, provided with a ledge of wood half-an-inch square on each side, between which a block or carriage may slide, and upon which a bellows camera can be fixed at such an altitude that the flange for the lens will admit the eye-piece end of the microscope, which must be placed in the horizontal position. To allow of a wide field it will be well to have the body or tube cut off about an inch from the nose, and a screw collar arranged to allow of replacement of the tube when it is desired to use the instrument in the ordinary way, or to photograph with the addition of the eyepiece. A short cardboard tube fitting in to the lens flange of the camera will allow of a taper velvet collar two or three inches long being glued thereto, which will serve to keep out the light and yet allow free movement of the object-glass for focussing.

The bellows should possess the greatest latitude of expansion, allowing a variation of length of focus from ten inches to thirty-six inches. The interior of the microscope body should be lined with black velvet to prevent flare on the plate from reflection. When the camera is extended to the full limit, a piece of looking-glass held in the left hand at a suitable angle opposite the ground glass screen will enable the operator with his right hand to focus roughly with the coarse adjustment screw. For accurate focussing a rod passes under the camera, having at one end a knob as a handle, and at the other extremity a pulley one inch in diameter provided with a V groove, in which runs an endless cord working the button of the fine adjustment, also grooved. The rod and pulley should work smoothly to avoid uneven strain on the arm carrying the objective, and the fine adjustment should run sweetly and answer immediately to the least turn of the rod. A mechanical stage with rectilinear motions for carrying the object to be photographed is very convenient, but not essential. The stage plate should, however, be furnished with levelling screws at the corners for bringing all parts of the picture into a flat plane. Both of these appliances are to be seen on the instrument before you.

On the shaft of the fine adjustment screw a short split brass tube half-an-inch long is made to slide stiffly, to which a stout wire pointer three or four inches long is soldered. A semicircle of cardboard, having its centre coincident with the axis of the fine adjustment screw, is placed behind the pointer, and marked in its circumference with degrees. The split tube allows of the entire revolution of the adjustment screw, whilst the pointer acts as an index through 90° of arc, and records with exactness any slight alteration in focus. The necessity for this will be hereafter explained.

As correct focussing is a most essential point in photomicrography, the finest ground glass is inadequate for viewing the image for final adjustment. The screen is therefore removed, and a lens of short focus, mounted in the middle of a light lath, two inches wide and fourteen inches long, is so adjusted in a short tube that its focus is coincident with the plane of the sensitive film when the lath is held against the back of the camera. This operates as an eyepiece, and the adjusting rod is turned till the picture appears in sharp outline.

At the side of the base-board a scale of inches is marked, measuring from the object carrier for recording the length of focus employed. Scales of diameter under the respective object-glasses can also be added, showing at a glance the magnification obtained. Thus, at thirty-six inches, it is definitely seen on this instrument that the two-inch objective gives twenty-one diameters.

The chief difficulties to be surmounted by the novice occur under the following heads:—1. Non-coincidence of actinic and visual foci of lenses. 2. Even illumination. 3. Exposure. 4. Selection of suitable objects for photography. G. J. Johnson.

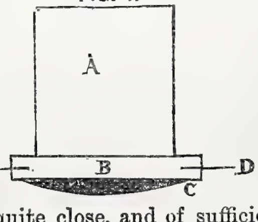
(To be concluded in our next.)

JOTTINGS.

For storing dry plates in the dark room for use I find great comfort in the use of a plate-box with twenty-four grooves, the outside being first covered over with orange paper, then with white (which can easily be distinguished in the dark room, and is handy for memoranda of the plates within), and the inside blackened with black polish (a mixture of Brunswick black and French polish). Not only is the inside blackened but also the edges of the lid of the box where the lid closes down, so as to prevent even a streak of light gaining admittance. If a small screw be put into the side of the lid, another one about three inches down in the side of the box, and an india-rubber band stretched over the two screws, the chances are very small of leaving the box open after taking a plate out.

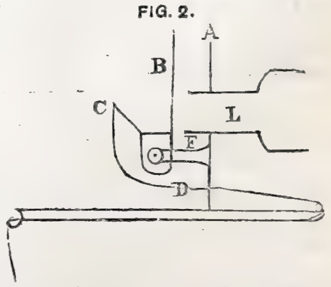
For instantaneous (!) exposures in the studio I have fitted a shutter inside my camera which is both very cheap and very effective, and can easily be made, as mine was, at home. It consists merely of a piece of wood six inches long and half-an-inch square. On one side a piece of a maroon flock mount 5 × 4 is nailed (the reverse side being covered with dead black paper), A (*fig.* 1). Below this is nailed four pieces of quarter-inch lead pipe, C, flattened out so as to lie quite close, and of sufficient weight to counterpoise the cardboard when the two pivots D D are held loosely in the hand.

FIG. 1.



This shutter is fitted in the camera behind the lens, as shown in *fig.* 2. A represents the camera front and the lens, B the shutter, C a piece of brass fixed to the wood, and D a piece of string which is attached to C by a hole at the top made for it. This string, passing under the counterpoise, and out through a small hole at E, is brought over a tiny pulley wheel on the front of the camera stand and over a brass hook at the back. The shutter works upon the two pivots (*fig.* 2), which are inserted in two small brass standards screwed (F) into the back part of the camera front. My standards are the shanks of two picture-frame rings, one being filed to allow one of the pivots to drop in so as to obviate any lateral play.

FIG. 2.



This shutter is used by pulling the string, when the shutter falls back and remains so as long as the string is held tight; release the string and the shutter flies up and closes the lens. For focussing I have a nail driven into the stand, round which two or three turns of the string are quite sufficient to hold the shutter down. W. T. WILKINSON.

MARION'S FERRO-PRUSSIATE PROCESS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

THIS process, which I have been invited by your Secretary to illustrate, offers great advantages to engineers, architects, and others, for the reproducing of drawings, patterns, plans, &c. The ferro-prussiate paper is obtained from Marion's, in rolls (thirty-two feet long and from twenty-four to thirty-nine inches wide) ready prepared for printing, and is at once the most simple and practicable process for the multiplication of draughtsmen's plans, &c.

No complicated apparatus is necessary to work it, no poisonous substances or dangerous acids are used, it does not need very great care, nor does it require the use of a photometer in the printing; and last, but not least, as far as time and labour go it requires neither toning nor fixing, but, after being exposed to actinic light in the printing-frame, it is only necessary to wash with water, which speedily gives a white line on a blue ground, the transparent parts of the drawing to be reproduced giving a blue ground, while the opaque parts give the white lines. The greater the amount of actinic light to which the print has been subjected the deeper the blue. There is another way of working the process so as to obtain a blue line on a white ground; but to do this a negative must be made on a special paper supplied for that purpose, and is known by the name of "mince."

In very bright sunshine the exposure required varies from five to ten minutes, while in the very dull days of winter it may need two or three hours or even a whole day. The exposure required to make negatives is at least three or four times the length of time necessary to make positives. While printing, the "ferro. paper" assumes various tints, changing from yellow to greenish-blue, then to blueish-grey, and last to an olive colour. When it arrives at this stage the exposure must be stopped. The printing-frame need not be opened to ascertain the progress of printing; this can be judged by the margin of the paper, which, of course, must be little larger than the tracing under which it has been placed.

The washing can be effected in any room. The print is taken from the frame and immersed in clean water until the lines become purely white, the time for washing occupying from five to ten minutes. Over-washing reduces the intensity of the blue ground. The prints are afterwards suspended over a wooden bar to dry, and if the prints are very large in size some difficulty will be found in lifting them from the wsshing trough without tearing them. Frequently I have prints from five to six feet long by three feet wide. The method I use in lifting them is to pass a wooden roller under the side of the print, then gently raise the roller, holding the print with the hands to prevent it slipping off, and then it can easily be placed over the wooden bar covered with sheets of blotting-paper to dry. Those who prefer preparing their own paper can easily do so, the only points to be attended to being the selection of a suitable paper and the mixing of the salts. I have found a hardish, unglazed paper to answer best; then, after being sensitised, it must be dried in a warm dark room, and kept from the light until required for use.

The chemicals used for sensitising are potassium, ferricyanide, and ammonio-citrate of iron. Separately these salts are not affected by light, but when they are mixed a new compound is formed, which, upon being exposed to sunlight, is decomposed with the formation of prussian blue ($Fe_4\ Fe_3\ Cy_{18}$), which, after being washed, gives the paper the beautiful bluish tint. The exact chemical reactions are undoubtedly complex, and I refrain from entering into them.

The proportions I have found to give the best results are one part of ammonio-citrate of iron to five parts of water, and one part of ferricyanide of potassium to four parts of water, mixed together in equal quantities. The paper may be coated with this solution with a large camel's-hair brush, one even coat being sufficient. The paper being dried is then ready for use.

This system of blue printing can be still further extended by the aid of photography, and may be employed to print copies from glass negatives of machinery, models, &c., at a very low cost and without skilled assistance. EDGAR GOOLD.

PELLET'S PATENT DIRECT COPYING PROCESS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

THE mechanical part of this process can be described in very few words, although it is much more complicated than Marion's process, inasmuch as the prints have to be developed in two solutions, namely, the yellow prussiate of potash bath and the hydrochloric acid bath respectively; after being in each of these baths the prints must be well washed in clean water. The method of finishing prints by this process occupies much more time and care than the one I have just illustrated; while its great advantage is the extreme sensitiveness of the paper and the consequent shorter exposure in the printing-frame. The exposure can only be determined by constant practice and test slips, the exposure varying from half-a-mfnute upwards according to the intensity of the light.

The paper for this process can only be obtained from G. E. Chapman, 113, Victoria-street, London, in endless rolls about twenty-five inches wide and upwards.

Testing the exposure with the test slips before mentioned is best done by placing three or four of these slips under a piece of paper of the same quality as the original tracing, with a few lines marked on it, and exposing in a smaller frame placed alongside on the tracing being copied. After the print has been subjected to the action of light for a short time draw out one slip, dip it in the prussiate solution, and watch the chemical action for about three-quarters of a minute. If the background remain yellow and the lines come out blue the exposure has been sufficient; if, however, the background come out with a bluish tinge the frame must be re-exposed. While testing the frame must be covered or turned face downwards. It is absolutely necessary that test slips be taken from the same roll of paper as the one used for the copy.

The print must be made so as to form a sort of tray about three-quarters of an inch in depth, by carefully turning up the edges with the aid of a straight-edge. The print must then be floated face downwards in a saturated solution of yellow prussiate of potash previously mixed with hot water and allowed to cool. After floating the copy in the prussiate bath for half-a-minute raise the print at one end with great care; this ought to be done without allowing any of the prussiate solution to get on the back of the print, as it would cause stains.

It must now be held up, and the chemical action allowed to continue until faint blue spots begin to appear in the background; it must then be immediately immersed face downwards in a trough of clean water, to check the further action of the prussiate solution. One edge of the paper must now be depressed under the surface of the water; then lift the whole paper by that edge to allow the water to flow all over the back of it. After repeating this washing two or three times the print must be placed in the hydrochloric acid bath (strength, one part of acid to ten of water), and wholly immersed for from five to fifteen minutes, the surface being worked all over with a brush to start and loosen the blue mucilage. The copy is next taken out of the acid bath and placed in a tray containing clean water, where it must again be well rubbed all over with a brush to clear it of the superficial gum mucilage. After washing, the lines of your print will be found to stand out blue on a white ground.

Any blue stains on the copies may be removed by the use of the "blue solving liquid" applied very lightly with a camel's-hair brush to the part to be erased, and when dried with blotting-paper the stains will entirely disappear. This solving solution is suppled with the paper. EDGAR GOOLD.

NOTES ON PHOTOGRAPHY.

LECTURE XII.—THE GELATINE PROCESS (CONTINUED).

INTENSIFICATION.—There are two principal methods employed for increasing the density of gelatine negatives:—1. By taking advantage of crystalline attraction to deposit additional silver on the image. This is usually called a "physical" method, since it depends on a physical attraction. 2. By taking advantage of the reducing power of metallic silver to reduce a soluble metallic salt to a subsalt, the subsalt being either itself insoluble, and thus precipitated on the image, or by reaction with another substance producing a suitable increased deposit. This is termed a "chemical" method, since it depends on chemical attraction.

The second, or chemical, method—examples of which we have in the various mercury intensifiers—is the one most generally employed, and will, therefore, be considered first.

Dr. Eder's Method with Mercury.—The following solutions are required:—

No. 1.

Mercuric chloride	½ ounce.
Water	1 pint.

No. 2.

Ammonia, ·880	2 ounces.
Water	1 pint.

No. 3.

Potassium iodide	1 ounce.
Water	1 pint.

No. 4.

Hypo.	½ ounce.
Water	1 pint.

No. 1 generally wants filtering to give a clear solution. The plate, being well washed after fixing, is first immersed in No. 1, when, after a short time, the image becomes perfectly white. Now metallic silver has the power of reducing mercuric chloride ($Hg\ Cl_2$) to subchloride ($Hg\ Cl$), itself combining with the other chlorine to form ordinary silver chloride—

$$Ag + Hg\ Cl_2 = Ag\ Cl + Hg\ Cl.$$

Mercury subchloride, being insoluble in water, remains in the film with the silver chloride, so that in place of the original silver we have a mixture of silver chloride and mercury subchloride. Both of these happen to be white substances, so that, although there is a considerably-increased deposit, the opacity of the film to transmitted light is not much affected, and a further operation becomes necessary. This depends on the amount of additional density required. If it be but slight, the plate, after washing, is immersed in the ammonia (No. 2) solution, which rapidly turns the previously-white image black, the change which occurs in the film being rather complicated. In the first place, it dissolves out the silver chloride (of which, we know, it is a ready solvent) from the film, so that there only remains mercury subchloride forming the image, and this it converts into mercury suboxide and a complex compound called "mercuros-ammonic chloride," the following equation representing the change :—

$$4\,NH_4\,(Ho) + 4\,Hg\,Cl = Hg_2O + \underset{\text{Mercuros-ammonic chloride.}}{Hg_2Cl\,(NH_2)} + 3\,NH_4\,Cl + 3\,H_2O.$$

If a considerable increase of density be wanted the plate is, after treatment with No. 1 and washing, immersed in No. 3, which converts the silver chloride and mercury subchloride into silver iodide and mercury subiodide—

$$AgCl + HgCl + 2\,KI = Ag\,I + HgI + 2\,KCl,$$

and then with No. 2 as before. In this case mercury suboxide, as previously, is formed, and a similar complex compound; but silver iodide, being insoluble in ammonia, remains in the film, and so gives a considerably greater density.

Finally: if after this the image is found to be over-intensified, it may be reduced again by treatment with the hypo. (No. 4) solution, which slowly dissolves out the silver iodide, ultimately leaving an image hardly distinguishable from that produced by No. 1 and No. 2 alone.

Dr. Monckhoven's Method with Mercury.—Two solutions are prepared :—

No. 1.

Mercuric chloride	½ ounce.
Potassium bromide	½ ,,
Water	1 pint.

No. 2.

Silver nitrate	½ ounce.
Water (distilled)	½ pint.
Potassium cyanide	½ ounce.
Water	½ pint.

The potassium cyanide solution should be added gradually to the silver solution. At first a dense precipitate will be produced, but as more is added this will dissolve up again. When there is only a little of the precipitate not dissolved no more cyanide is added, and what little remains should be thrown down the sink.

The washed plate is immersed in No. 1, again washed, and then in No. 2. The plate should be carefully watched and taken out immediately the darkening is complete, otherwise the density will again be reduced.

Mr. Edwards's Method with Mercury.—A solution is made as follows:—

Mercuric chloride	60 grains.
Water	6 ounces.
Potassium iodide	90 grains.
Water	2 ounces.
Hypo.	120 grains.
Water	2 ounces.

Add the iodide to the mercury solution, when a red precipitate will be thrown down; then add the hypo., when it will dissolve up clear. Immerse the roughly-washed plate in the solution, when the density rapidly increases; if required to act more slowly add more hypo., which also improves the colour.

The *rationale* of these two latter intensifiers are very similar to the first one described. The great objection to all of them is their want of permanency, all mercurous compounds being unstable substances.

M. Selle's Method with Uranium.—A solution is prepared—

Uranium nitrate	¼ ounce.
Potassium ferricyanide (red prussiate of potash).	¼ ,,
Water	1 pint.

A small quantity of a reddish-brown precipitate is usually formed in making the solution; this should be allowed to settle or the solution filtered before use. The well-washed plate is immersed in this solution, the image gradually increasing in density, the increase ultimately being very great. The metallic silver reduces the potassium ferricyanide to ferrocyanide, and with the potassium ferrocyanide uranium forms an insoluble double cyanide, which becomes precipitated on the image. Unfortunately for this intensifier hypo. also reduces potassium ferricyanide to ferrocyanide, so that unless the plate be very thoroughly washed a precipitate is produced all over the film.

Mr. M. Carey Lea's Method with Schlippe's Salt.—Schlippe's salt consists of a double sulphide of sodium and antimony. To intensify a plate it is first immersed in a sherry-coloured solution of iodine (dissolved in water with the aid of a little potassium iodide) until the whole or a part—according to the increased density required—of the silver forming the image is converted into silver iodide, and then in a solution composed of—

Schlippe's salt	½ ounce,
Water	1 pint,

which intensifies it to a bright red colour. The silver iodide combines with the salts, forming a double sulphide of silver and antimony—

$$Na_2\,I,\,Sb\,S_5 + 2\,Ag\,I = Ag_2\,I,\,Sb\,S_5 + 2\,Na\,I.$$

The solution does not keep very well, and should, therefore, be made as required. It evolves a smell of sulphuretted hydrogen, so would not have a very beneficial effect on sensitive plates if within their vicinity.

Captain Abney's Method with Silver.—This brings us to the first, or physical, methods of intensification, of which it is an example. In order to use it successfully it is imperative that every trace of hypo. and silver bromide should be removed from the film. For this purpose the plate, after fixing, is immersed in a fresh hypo. solution, and then washed thoroughly with water for an hour or two. After this it is soaked for half-an-hour in a weak solution of peroxide of hydrogen (one drachm of a twenty-volume solution to five ounces of water), which destroys any traces of hypo. still remaining. Finally, after another washing, it is ready for intensification.

No. I.

Pyro	2 grains.
Citric acid	2 to 4 ,,
Water	1 ounce.

No. II.

Iron sulphate	5 grains.
Citric acid	10 ,,
Water	1 ounce.

Either of these solutions being taken, a few drops of a ten-grain solution of silver nitrate is added and immediately flowed over the plate. As soon as the requisite density is obtained the plate is washed, put into a dish containing a solution of common salt, once more passed through the fixing-bath for a few seconds, again washed, and then dried. If stains occur they are removed with a five-grain solution of potassium cyanide. E. H. Farmer.

FOREIGN NOTES AND NEWS.

Obituary. — The Photo-Electricity of Rock Crystal. — On Obernetter's Emulsion.—The Keeping Qualities of Dry Plates in Warm Climates.

The *Deutsche Photographen Zeitung* mentions that Herr Ette, a photographer who owned two studios in New York, was one of the passengers of the ill-fated "Cimbria" who perished. One of the rescued passengers, who shared the same cabin as Herr Ette, saw the lifeboat swamped in which the latter had taken refuge. Herr Ette, who was a native of Thuringia, had come to Europe to visit his relatives when he met with his untoward fate.

Another number of the same journal announces the sudden death, at the early age of forty-two, of Herr Joseph Janssen, the well-known author of the *Systematic Introduction to Portrait Retouching*, and who has for the last year and a-half been the proprietor of a flourishing school of retouching in Berlin.

The *Annalen der Physik und der Chimie* says Herr Hankel has continued his experiments on the actino-electricity (photo-electricity) of rock crystal. He found that when the light of the sun's rays, electric light, the light of a flame, or of a heated body penetrated a rock crystal electric poles appeared at all the six edges of it. These six poles are alternately positive or negative, so that each conjugate axis bears a positive pole at one end and a negative pole at the other. The actino-electric tensions attain their maximum in thirty to forty seconds, and remain at that as long as the strength of the light remains the same. When the light ceases to fall upon it the actino-electricity disappears in the same way—at first decreasing rapidly, then more slowly. An electric arc light (= 4,000 candles) produces an actino-electricity nearly equal to that of sunlight. The actino-electricity seems to be excited principally by the heat rays.

Herr Obernetter writes as follows to the *Mittheilungen* regarding his emulsion:—

"Certain difficulties have arisen in emulsionising by my process which I now mean to discuss. In certain cases plates prepared by that method furnished flat negatives with little sensibility. At first I supposed the reason to be insufficient washing, but it became evident that even thirty hours' washing did not improve matters, but rather gave still thinner pictures and still less sensitive plates. A comparison of the different localities which suffered from this fault showed that it occurred where the water supplied for washing the emulsion was very soft. The soft water acts upon the highly-sensitive bromide of silver, which is in the external parts of the gelatine strips; while, if it be altogether cold, it penetrates with difficulty into the interior of the strips, and so creates the disturbance. The hard mountain spring water of Münich has always a temperature of 76.8° Fahr., and can be used for washing a whole day.

"The remedy for this fault is pretty simple:—Allow the silver-containing jelly to stiffen as fast as possible. Then, in order to terminate the washing as quickly as possible, cut the jelly into very thin strips of about

one-quarter c.m. Bromise in a warm room. When the strips are so thin as these from two to three hours should suffice for bromising. Then set the washing apparatus going, but under no circumstances wash longer than ten to twelve hours—that is to say, over night. If the flow of water be interrupted for a time that is no disadvantage, but rather the contrary. The strips of emulsion have then time to pass their salts from within outwards by dialysis, without the external sensitive bromide of silver being carried off by the contact of too much water.

"The sensitiveness of my plates has been sufficiently tested by practical workers. I state it as at seven-ninths of the sensitiveness of Monckhoven's plates. But a greater sensitiveness can be obtained, particularly by after-sensitising. This is no novelty, but a long-known fact. For this I use emulsion which has lain at least eight days in spirit, and so does not contain much water. I wash off the superficial alcohol with plain water, place the emulsion in an alembic, and melt it by placing the wash bottle in water of about 70°. When the emulsion itself has reached this temperature I add to every 100 grammes of emulsion four grammes of bromide of potassium and one gramme of iodide of potassium dissolved in a little water, and allow the temperature to remain at 70° for from fifteen minutes to an hour. Half-an-hour at 70° should give a sensitiveness equal to that of the best English plates. When the action is continued for an hour it is difficult to obtain plates free from fog. At the end of thirty minutes I cool the emulsion down to the heat of one's hand by placing the bottle in cold water; then add two to three c.c. of solution of ammonia, shake up well, and pour out into shallow dishes. The emulsion stiffens in an hour or two, is then cut up into strips again, and washed in the washing apparatus for six to ten hours."

The geologist, Dr. Wähner, bears witness to the great keeping qualities of gelatine dry plates. The plates used by him when he accompanied Dr. Pollak in his recent journey through Persia were prepared by Dr. Heid, in Vienna, in February, 1882, exposed in July and August in Persia, and developed at Vienna, at the end of November, with Dr. Eder's ferrous oxalate developer. The result was very satisfactory, and the plates did not appear different when compared with others freshly prepared and exposed but a short time before development. A similar result was obtained by the traveller, the late Dr. Siegfried Langer, who about the same time exposed plates in Arabia which had been prepared along with those of Dr. Wähner, and developed them on the spot. Dr. Langer was murdered by natives before he was able to make use of the scientific results obtained on his plates.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

ABRIDGMENTS OF BRITISH PATENTS.

No. 2209.—"Improvements in the Means for Graining and otherwise Ornamenting Surfaces." S. J. J. Kelly, Great James-street, Middlesex, and C. B. Lindsay, of Blackheath, Kent.—*Dated May* 10, 1882.

The object of this invention is to simplify the process of graining, and at the same time produce work equal to the best hand graining it; also relates to otherwise ornamenting surfaces with the most elaborate patterns and designs in oil colours. In carrying out this suitable transfer paper, of the class known, for instance, as "decalcomanie" transfer paper, and upon this paper we print in oil colour a *facsimile* of the pattern of graining desired. The depth of colour will depend upon the character of the graining, whether for light or dark oak, mahogany, walnut, or other wood. The graining thus obtained is applied (say) to a door panel in the following manner:—The panel is rubbed down and receives a first coat of paint in the usual way. When this first coat of paint is dry the ground colour of the required tint is applied in the usual manner, and this ground colour, when dry, receives a thin coating of copal varnish. When the varnish is about half set or is still tacky the grained surface of the paper is applied thereto, and by means of a hard roller or other convenient tool the graining coat is caused firmly to adhere to the varnish. Care must be taken that the adherence between the graining coat and the varnish is perfect at all points, otherwise, on the subsequent operation, the graining coat will be liable to pull up and form blisters or tear off. The paper backing is then wetted with warm water, and, after soaking for (say) half-an-hour, is peeled off, leaving the graining on the panel. The panel is next washed with a sponge and water and dried, and can then be finished off by varnishing in the usual way. As the graining coat is practically dry when applied the varnish may be applied almost immediately, by which means damage to the grained surface before varnishing will be avoided. This apparatus consists of a frame carrying a table and brackets, in which are formed the bearings for the axle of the printing cylinder or drum. Below the cylinder is mounted in adjustable bearings an impression cylinder or drum of any convenient construction, and arranged to press against the cylinder with any required amount of pressure. An opening is made in the table to allow for the contact of two cylinders. At one end of the table is arranged a roller carrying the web of paper on which the graining pattern is to be printed. In rear of the cylinder is arranged a guide roller, or equivalent device to prevent the paper after printing adhering to the printing cylinder. This guide roller may be made with a number of projecting points, and may be driven, in which case it serve as a drawing-off roller to draw off the paper as it is printed, and pass it to tapes or their equivalent, which will convey the paper to drying-rooms or apparatus. In addition to the above, drawing-off rollers, arranged to run on the margin of the paper, may, if desired, be employed. A pair of guide rollers which serve to keep the papers always at the level of the table whatever may be the diameter of the roll of paper. A colour-supplying apparatus, of any suitable form, is adapted to the printing cylinder or drum. The printing cylinder or drum make about three feet in diameter, as then a nine-feet run is obtained before the pattern is repeated. In some cases, of course, the character of the pattern to be printed will allow of a smaller cylinder being employed. The printing cylinder will consist of a supporting cylinder or drum, which may be of cast metal or of wood, but in either case it must be accurately turned, and an engraved plate of zinc or other suitable material, which is bent round and secured to the cylinder. In preparing this plate the sheet of zinc is first cleaned and roughened. Then draw the pattern on the roughened surface with a lithographic crayon. The plate is next treated in a similar manner to a lithographic stone with a suitable acid, which will eat into the parts that are not protected, leaving the pattern in relief, as in a wood block. The engraved plate is bent round the cylinder as before referred to, and the ends are carefully soldered together, and the line of solder will be engraved so that there may be no break in the continuity of the pattern. The engraved cylinder thus formed is secured to the supporting cylinder by means of screws round the margin, or in any other convenient manner which will permit of the engraved cylinder, when done with, being removed from the supporting cylinder, to be prepared by another of a different pattern. By thus removing the engraved cylinders when required the expense attendant upon having a stock of supporting cylinders will be saved.

No. 2277.—"A New or Improved Process for Producing Pictures on Glass, Stone, Metal, and other Materials." H. J. Haddan, of Kensington; a communication from E. Godard, of Paris.—*Dated May* 15, 1882.

This relates to a new process for reproducing and fixing images on glass, metal, prepared canvas, wood, stone, and other materials. The original is drawn on white or bluish paper, and a sheet of glass placed on the back of the paper previously impregnated with petroleum for making it transparent. The glass, or other surface, on which the image is to be produced is coated with a sensitive solution of bichromate of ammonia and glucose, or dextrine prepared and applied in a dark chamber or in non-actinic light, after which the coating is dried at a temperature of 50° to 60° Centigrade. The sheet of glass with the original is then fixed in a photographic copying frame, so as to place the prepared surface in contact with the original picture, and the frame is exposed to light behind a window at a temperature from 14° to 18° centigrade. The time necessary for exposure can be ascertained by taking out one of the many pieces of glass, applying to the sensetive surface a vitrifiable colour, and observing whether the colour adheres well. If the colour adheres but slightly to the dark, shady portions of the image the exposure has been too long. The process must be recommenced. If, on the contrary, the colour adheres too well, the exposure has not been sufficient; the copying frames must be closed again and the exposure continued. When the frame has been sufficiently exposed it is taken into the dark room, the sensitised pieces of glass laid on a plate of glass or marble with the sensitive surface turned upward, and the previously prepared vitrifiable colour strewed over it by means of a few light strokes of a brush. This powder does not adhere to the parts of the picture fully exposed to light, but only to the more or less shady portions of the picture. The colour is applied to the surface until the image has appeared as dark as the original. Afterwards 1,000 grammes of wood-spirit is taken, such as is generally used in photography; add 30 to 40 grammes of nitric acid, and dip all prepared pieces of glass into this bath, leaving them afterwards to dry. This bath has the object to remove the coating of bichromate so as to allow the colour to adhere to the glass from which it had been separated by the layer of glucose and bichromate, which would prevent the vitrification. The application of variously-coloured enamels and the heating are then effected, as in ordinary glass-painting.

No. 2780.—"Improvements in the Manufacture of Sensitive Paper and Blocks or Tablets thereof for Photographic Purposes, which Invention Comprises an Improved Method of Reproducing Pictures from Such paper." W. T. Morgan and R. L. Kidd, both of Greenwich, in Kent.—*Dated June* 13, 1882.

This relates to the manufacture of sensitive paper, and to blocks, pads, or tablets of the same for photographic purposes; also to an improved method of reproducing pictures taken upon such paper. In carrying this into practice superfine paper is taken (preferably hand-made) as free as possible from grain or texture marks; and, in order to eliminate all traces of lime or impurities of any kind, it is passed through a bath or solution of strong acid, preferably sulphuric acid, and water and thoroughly rinse. Then coat the paper with an emulsion of ground asbestos, talc, Chinese clay, or other substance of a similar nature in a solution of gelatine, starch, gum, and alum. When this is dry the paper is placed between highly-polished steel or silvered plates, and subjected to very heavy pressure by being passed between rollers. This paper is then again coated as before, but with a stronger emulsion of the same materials, and when dry is ready for glazing or enamelling,—that is to say, for receiving a textureless, glass-like surface, essential to the success of this invention. This glazed or enamelled surface is obtained much in the same manner as lithographers obtain their transfer impressions from steel or coppered-engraved plates—that is to say, the prepared paper is damped on the back, and carefully laid with the prepared surface side downwards, on the polished metal or silvered plates, previously made warm, and this paper is again submitted to very heavy pressure. The damp paper will adhere to the metal plate, but on again warming the latter the paper may be easily stripped off. The paper is then stretched over a block by means of a frame similar to a linen stretcher, or by means of any other suitable apparatus. It is then carefully polished by being rubbed over the surface with paraffine-wax, bees'-wax, or any material of a similar nature dissolved in highly-rectified spirits; it is then coated by any of the well-known methods with a gelatino-bromide of silver emulsion, and when dry is ready for use. This paper may be used for a variety of photographic purposes. Pictures can be produced upon it by means of photography, which pictures may be afterwards transferred to glass, canvas, opal, wood blocks for engraving, or to any other substance to which it is possible to attach paper. It will be found most useful for decorative papers for windows, walls, panels, and the like, as any sized or shaped pictnre can be made. According to the important part of this invention, the paper is arranged in

the following manner, that is to say:—When the said paper has been prepared in the manner above described it is cut into suitable sizes and any number of these pieces are superposed one upon another, the prepared side being upward and between each piece is placed a sheet of tinfoil or similar material. The papers so interleaved with metallic sheets are then pressed into a shell or matrix of any suitable curvature by a die or pressing device of corresponding curvature, which is subjected to heavy pressure and forces the paper and tinfoil or other metal into a curve. The whole is then bound round the edges as is done with sketching or drawing blocks or pads; the tinfoil assists the paper to retain its curve, and also protects the rear sheet from light while the front one is being exposed in the camera. The object in bending or curving these tablets is that, when they are placed in the camera in position for exposure, they have the same centre as the curved surface of the lens, and by this means perfect equality of illumination is obtained over the whole surface. The lines are absolutely straight and the definition is more clearly defined. The tablets are placed in the dark slide and exposed in the same manner as an ordinary sensitive plate. After exposure, the exposed sheet is detached from the block and developed in the usual manner. The surface to which the picture is to be transferred should be previously prepared by brushing over the same a solution of gelatine and alum, and allowed to dry. The picture while still wet is pressed in contact with the surface, to which it firmly adheres, and when dry the paper may be stripped off, leaving the picture.

IN RE THE PHOTOGRAPHIC ARTISTS' CO-OPERATIVE SUPPLY ASSOCIATION (LIMITED).

On Thursday, the 15th instant, before Mr. Justice Chitty, there were two petitions presented by Mr. A. H. Loring, who claimed to be a shareholder, debenture holder, and auditor of the company, asking that the company might be wound up compulsorily, on the ground that the company was insolvent and carrying on business at a loss. The principal respondent was Captain Kerr, managing director of the company. Mr. Loring afterwards commenced the present proceedings in the Chancery Division, which have on several occasions been permitted by his Lordship to stand over with a view to an amicable arrangement. On the last occasion when the matter was before the court the petitioner offered, as one of the terms of the compromise, to withdraw all charges, but Capt. Kerr insisted on the withdrawal being accompanied by a definite apology, which Mr. Loring equally peremptorily declined to give. The difference was, by consent, referred to an eminent leading counsel, but when the parties came before that gentleman the question of an apology was not settled. When the matter came on, his Lordship expressed his disapprobation at the matter not having been settled.

Mr. Ince, Q.C., and Mr. Bramwell Davis for the company, stigmatised the petition as not *bonâ fide*. There was no distinct allegation of commercial insolvency. The company had been carried on for several years, and Captain Kerr had sunk in it some £10,000 of his own money, and so far from the concern being now unprofitable it was beginning to pay, and earning profits of £50 or £60 per week, with a total business of £20,000 a year, and doing the second largest business of the kind in London. When Mr. Loring bought his shares in 1882 he was aware that this company was then being carried on at a loss, and on this account he was enabled to buy his £10 shares at £4 10s., receiving at the same time from Captain Kerr a policy of assurance as an additional security. During the negotiations for the agreement with Mr. Loring a statement of the assets and liabilities was furnished by Captain Kerr, and amongst the charges made was that two sums of £1,456 and £315, due by the Association to Captain Kerr, were not included; but Captain Kerr explained this by stating that it was his intention to waive his claims as to these sums.

Mr. C. H. Turner and Mr. Trenchard, for creditors and shareholders, supported a winding-up order. Mr. Christian, for creditors and shareholders, opposed such an order.

His Lordship then sent for the provisional liquidator of the company appointed on the first petition by an order of Mr. Justice Day, obtained on an *ex parte* application. This gentleman stated that if a winding-up order were made the assets when realised would be sufficient to pay all the creditors and the debenture holders in full, that was to say, if Captain Kerr would release his claims against the company; if be did not there would be barely enough to pay 20s. in the pound. This claim appeared to be chiefly for unpaid salary. Captain Kerr also claimed, irrespective of salary, for advances, in respect of which £138 was payable to him. If Captain Kerr gave up nothing he would be a creditor for £138, exclusive of salary. If the company went on it would have to arrange with its creditors for the reduction or postponement of their debts; it would almost be impossible for it to go on unless Captain Kerr assented to his claim being arranged. Since the 5th of September to the present time the turnover had been about £4,400, with a profit of £400.

Mr. Justice Chitty said that it appeared that Mr. Loring under the agreement had become the owner of more than half the shares in the company. The case against Captain Kerr seemed to be that he had stated to Mr. Loring that his claim was only £202, whereas there was a far larger sum due to Captain Kerr. Mr. Loring also said that he could not have obtained payment of the £100 due to him as salary as sub-manager, because the banking account was overdrawn. On this latter point Mr. Loring was, his Lordship thought, right. On the other point, Captain Kerr was, when the petition was presented, insisting on his debt of some £1,500, although he afterwards released the debt. The petitioner was thereupon justified in presenting his petition. He was also justified as a debenture holder, because the debt to Captain Kerr for salary was ever increasing, to the prejudice of the petitioner as a debenture holder. Again: the statement of the provisional liquidator agreed with a circular issued by Captain Kerr inviting the support of the creditors in opposing the petition, saying that they would be paid in full—not at once, but in a short time; but, if a winding-up order should be made, that the creditors would be in a worse position. Whether Captain Kerr could set up any claim as against Mr. Loring might be a question, but there was nothing to prevent Captain Kerr pressing his claims against the company. His Lordship thought that it was shown that the company was just about able to meet its debts, including Captain Kerr's full claim. His Lordship, therefore, thought that the petitioner was entitled to a winding-up order as an unpaid creditor, and on the ground that he should be enabled to prevent the company from being continued so as to prejudice his (the petitioner's) claims in respect of the debenture. His Lordship added that the affidavits were so lengthy that he should direct the taxing master to look into the matter on both sides.

It was understood that the matter would become the subject of appeal.

Our Editorial Table.

Adams's "Brilliant."

We have had an opportunity of carefully testing the new preparation issued by Messrs. Adams and Co., of Liverpool, under the title of "Brilliant," for the purpose of clearing and reducing the density of negatives developed with pyro.

The solution appears to consist of an acid solution of a ferric salt—most probably the oxalate—and is sent out in a concentrated form. The instructions direct that the plate, after fixing and *before* washing, is to be immersed in the solution of "Brilliant," diluted with seven times its bulk of water, until the desired effect is produced. When worked in this manner we find that the shadows of somewhat stained or veiled negatives are cleared without much reduction of density; but, if further reduction be desirable, it is only necessary to prolong the immersion in the "Brilliant," and to again dip the plate into the hypo. bath. The action consists, in fact, of a conversion of portions of the image as well as the veil in the shadows into oxalate of silver, which is at once dissolved by the hypo. If it be desired to clear the shadows of the negative without reducing the density, remove the plate from the fixing bath into the "Brilliant," where it may be allowed to remain for a minute or two; then wash and apply the ordinary ferrous oxalate developer.

Seeing that the solution contains a large excess of acid it would, we think, be safer to wash the plate well after removing it from the fixing bath, and to redip it into clean hypo. before applying the "Brilliant," though, so far, we have experienced no difficulty from precipitation of sulphides in the film.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 28	Bristol	Studio, Portland-st., Kingsdown.
March 1	London and Provincial	Mason's Hall, Basinghall-st.
,, 1	South London	Socieiy of Arts, John-st., Adelphi.
,, 1	Bolton	The Baths.
,, 1	Leeds	Mechanics' Institute.
,, 1	Glasgow	172, Buchanan-street.
,, 1	Dundee	Lamb's Hotel, Reform-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on Thursday, the 15th instant, Mr. W. Cobb occupied the chair.

Mr. A. J. Brown exhibited a cardboard box for two dozen plates made upon Schwartz's principle, but the uprights for keeping the plates in place were made by folding the side inwards at the places required. The strips of card for keeping the plates separate were cut very much away along all but the ends of one side, so as to cause a narrow edge only of the plate to be subjected to pressure where the strips lay in contact with it.

Several members thought the plan very convenient, and that the box, being entirely of cardboard, could be supplied by dry-plate manufacturers in place of those now in use, and without extra charge, whilst one gentleman asserted his conviction that the box, although holding two dozen, did not occupy much more space than an ordinary dozen box.

Mr. W. E. Debenham thought it a pity to advocate the advantage of this box under a mistaken impression. He believed that Mr. Brown's box would be found to take up rather more space then two of the ordinary dozen boxes.

Mr. W. M. Ashman showed two prints which had had an enamel surface given to them in a very simple manner. A glass plate was rubbed with powdered talc, the prints were while wet squeezed on to the glass with the finger and allowed to dry. In about half-an-hour they fell from the glass dry and with brilliant surface. One of the prints which had since been mounted with gum had partially lost this characteristic.

Mr. Brown inquired whether the surface could not be retained after mounting.

Mr. Ashman replied that it could if the print were mounted at the edges only, or with rubber cement.

Mr. W. H. Prestwich suggested applying starch to the back of the print whilst on the glass, and mounting when dry on a damp card, in the manner which had been demonstrated at a previous meeting by Mr. A. Cowan.

Mr. A. L. Henderson said that an enamel surface could be given to prints by burnishing them unmounted. If they were mounted the glaze was not that of enamel. He considered that either burnishing or the method shown by Mr. Ashman was superior to enamelling with gelatine and collodion in the usual way, as prints so treated were more prone to fade. As a protective surface he recommended a mixture of white, hard, spirit varnish, plain collodion, and ether in equal parts.

The Chairman was under the impression that, on the contrary, prints protected by gelatine and collodion were more likely to be permanent.

Mr. Ashman, whose experience in enamelling went as far back as 1866, was of Mr. Henderson's opinion that prints treated with gelatine and collodion faded very quickly; those treated with collodion only did not fade so fast.

Mr. A. Haddon said that gelatine was a very hygroscopic substance, and the facility with which it abstracted moisture from the atmosphere might account for its causing prints in contact with it to fade. In illustration of this characteristic of gelatine, he said that Mr. Woodbury had proposed as a simple hygrometer a strip of carbon tissue. In very moist weather the gelatine absorbed so much water that the strip would curl with the gelatine side outwards; in dry weather the contrary was the case.

Mr. Harrison showed a gauge for cutting glass in several fixed sizes. The gauge consisted of an L square, and on the side used as the base were notches in which a movable brass catch was placed. The bottom of the plate rested on the base of the square, and stopped against the brass catch. The side to be cut was thus brought into a fixed position under the arm of the square which was used as the cutting rule.

Mr. Debenham pointed out that if the glass to be cut were not quite square, or were slightly broken away at the corner in contact with the catch, the plate at the other end might be left too wide to enter the dark slide. He preferred a sliding arm similar in length to the glass to be cut.

Mr. A. Cowan showed two transparencies on plates prepared with chloride and citrate of silver. Half of the silver having been converted into each of these salts, the emulsion was boiled with all the gelatine for a quarter of an hour and finished as usual. One transparency was printed out by the light merely, and the other was developed with ferrous citro-oxalate. The undeveloped picture had had four hours' exposure to daylight, and the developed one an exposure in the copying camera, with the negative pointed to the sky, of forty-five seconds. The opening in the lens was equal to $\frac{f}{12}$.

Mr. Ashman showed a plate which had been exposed in the camera twice the time necessary to obtain a negative. The plate had then been cut, and one half, developed on the plan described by Herr Obernetter, resulted in a positive image, whilst the other half, developed in a nearly spent solution and with a large amount of restraining bromide, produced the usual negative image. The plate was backed up for showing as a transparency by a glass which had been coated with a mixture of equal parts of spirit varnish and plain collodion, and immersed before drying in water. This had given a very fine white surface to it.

Mr. Haddon said that an experiment had recently been described in which an exposed gelatine plate had been immersed in hypo., then washed, and the image developed. Had any one present repeated that experiment?

Mr. Debenham inquired whether it was asserted that the immersion in hypo. had been carried to fixation or not.

Mr. Henderson said that more than twenty years ago Mr. Mudd, of Manchester, had described a similar experiment upon a collodio-albumen plate. In that case the iodide and bromide of silver were fixed out, but probably there was left an albumenate of silver insoluble in hypo.

Mr. J. Barker remarked that he believed such a development was possible upon a fixed bromide of silver plate. His theory was that with a camera exposure there was always some reduction of silver without development. This, although a very small quantity, might be enough to develope an image after the unaltered bromide was dissolved in hypo.

Mr. R. L. Sims was elected a member of the Association.

MANCHESTER PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held in the Mechanics' Institute, on Thursday, the 8th instant,—the President, Mr. J. W. Leigh, in the chair. The minutes of the previous meeting were read and confirmed.

Mr. G. J. Johnson read a very interesting paper on *Photomicrography* [see page 104], exhibiting the apparatus necessary for the production of photomicrographs, and describing at some length the difficulties to contend with, and how he had surmounted most of them. Mr. Johnson then commenced his lecture, which was illustrated by many dozens of photographs of his own production, which bore favourable comparison with others by professional artists. The lecturer gave a considerable amount of credit to Mr. J. Pollitt, whose valuable assistance he had secured. The first slides shown were an illustration of chromatic rays, produced by the bisulphide of carbon prism, which were fully explained by the lecturer. These were followed by diagrams of heat, light, and actinic rays, prisms of glass, and a splendid drawing of Dr. Woodward's studio, upwards of a hundred photomicrographs following, the nature of which Mr. Johnson explained.

The photographs were thrown upon the screen by the Honorary Secretary, who was complimented by Mr. Johnson, Mr. Pollitt, and other members on the able management of the lantern and the excellent definition given.

Mr. W. J. Chadwick explained that he used achromatic meniscus lenses of long focus, with a diaphragm in front, which he had found superior to most portrait lenses so generally in use with optical lanterns.

Mr. McKellen, in a very able manner, proposed a vote of thanks to Mr. Johnson, which was seconded and unanimously carried.

The Chairman exhibited two very large specimens of photogravure, by Messrs. Goupil and Co., Paris, which were universally admired. He also passed round several prints on the rough paper supplied by the Platinotype Company from 11 × 9 negatives.

This paper was considered by many to be more suitable for the style of picture than that of finer grain.

The Honorary Secretary exhibited, on behalf of Mr. J. J. Atkinson, Liverpool, three instantaneous shutters, viz., the Kirkby, Miller, and M. Boca's, the latter of which is provided with an ingenious arrangement for correctly timing the exposure from the fraction of a second to three seconds. Mr. Chapman showed one of Watson and Son's snap shutters.

These formed subjects of much interest to the members, and a vote of thanks to the exhibitors was cordially agreed to.

Owing to the lateness of the hour other contributions had to be postponed until the next meeting on March 8th.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held in the College of Physical Science, Newcastle, on Tuesday, the 13th instant, at 7.30 p.m.,—Mr. A. L. Steavenson, Durham, in the chair.

The minutes of the annual meeting were read and confirmed. A letter was read from the President (Colonel Sheppee) expressing regret at not being able to be present; also the following letter:—

University of Durham, College of Physical Science,
Newcastle-on-Tyne, February 6, 1883.

"Dear Sir,—I have much pleasure in stating that the portrait of the late Professor A. Friere Marreco, which was so kindly presented to the College of Physical Science by the Newcastle-on Tyne and Northern Counties' Photographic Association, was formally placed before the Council of the College at their meeting yesterday, and I was desired to inform you that the same was accepted with much gratification, and to beg that you will be good enough to convey the thanks of our Council to your Association for their very kind consideration.—Believe me, dear sir, yours very faithfully,
"*The Hon. Secretary.*" Theo. Wood Browning."

Messrs. J. Garland, E. Schumann, and R. Snowdon were nominated for membership.

Mr Edgar Goold, of Elswick, gave a practical demonstration of *Marion's Ferro-Prussiate Process* [see page 106], and also of *Pellet's Patent Direct Copying Process* [see page 106]. The operations, skilfully performed, were witnessed with much interest by the members present, and at their conclusion a hearty vote of thanks was accorded to Mr. Goold, on the motion of Mr. Payne, seconded by Mr. Pike.

Mr. J. B. Payne read a short paper on *Our Association*, referring to the opinions of some of the members that the meeting room was unsuitable. Mr. Payne said he had given the matter considerable attention, and had come to the conclusion that the room was not so much at fault as the members themselves; there was no doubt whatever that they were exceedingly fortunate in possessing such a home. Complaints had been made that there was an absence of interest taken in the discussions and various matters brought before the Association; but if they were afraid to speak on a matter, or enter into discussion, they must blame themselves for the silence. If members would contribute a little more to the interest of the meetings, and make more use of the Association by soliciting or offering advice on various topics, and by bringing samples of work, good, bad, or indifferent—for all were equally instructive—they would effectually help their fellow-members to gain information themselves and banish complaint. He (Mr. Payne) concluded by formally proposing—"That it be the custom, excepting on special occasions, to devote half-an-hour each ordinary meeting for questions and general discussions; and it should be understood that every member is expected to bring some object of interest, whether negatives, prints, or novelties in apparatus."

Mr. J. P. Gibson seconded the proposal, and said he thought Mr. Payne deserved the thanks of the Association for bringing the subject forward.

Mr. Payne exhibited some fine photographs of pottery and some stereoscopic transparencies—the latter on collodio-albumen plates. A conversation ensued with regard to stereoscopic pictures generally, in which Messrs. Payne, Sawyer, Laws, and the Chairman took part.

Mr. Laws showed an excellent photograph representing the crib (surrounded by figures) included in the decorations at St. Dominic's (Catholic) Church last month, taken under considerable difficulty, and by the aid of artificial light only, namely, three Argand burners, four kerosene lamps, several wax candles, and magnesium ribbon (for about one-sixth of the exposure, seventy minutes); lens used, a 10 by 8 rapid rectilinear.

Votes of thanks to Mr. Payne, Mr. Lyddell Sawyer (for contribution of photographs), and to the Chairman concluded the meeting.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met on the 16th ult., the chair being occupied by Dr. E. Horning. Eight new members were admitted.

The Chairman showed a picture of a sort of small carriage mounted as a two-wheeled velocipede, in which Herr Oswald Graf trundled about his dry-plate camera, 21 × 26 c.m. and 13 × 18 c.m., and two changing-boxes each arranged to hold twenty plates. Also a number of platinotype reproductions, by Dr. Just, of pencil drawings by Prince Auersperg. He (the Chairman) further exhibited a portrait of Sir John Herschel, drawn by Herr Claus, and printed in zincotypie by Herren Angerer and Göschl. The original study from which the drawing was made was a photograph by the late Mrs. Cameron. An appeal was made by the Chairman for aid to the family of a member of the Society who had been for some time in very narrow circumstances.

The committee appointed to award the medals of the Society announced that they had resolved to bestow the Society's silver medal for merit upon

Herr Oscar Kramer, on the occasion of his celebrating the conclusion of his twenty-fifth year in business as a photographer and photographic art-dealer.

A number of donations to the Society's collections were intimated.

Herr Scolik communicated the results of a considerable series of experiments which he had made with a Warnerke sensitometer, with a view to testing a variety of emulsions and emulsion plates obtained from different sources.

Herren Czerny and Scolik showed a folding tourists' stereoscopic apparatus with a double dark slide, and an instantaneous shutter made of vulcanite.

Herr Issler exhibited a series of views taken upon bromide of silver gelatine plates in the Tyrol, during the floods at the end of 1882.

The Chairman then laid a number of publications upon the table, The British Journal Photographic Almanac amongst others.

A Provincial Member inquired through the medium of the post:—Is there any means of preventing the cracking of the vulcanised caoutchouc, of which the tubes of instantaneous shutters are made, or at least of keeping them longer flexible and elastic? The answer was that the red-coloured caoutchouc articles vulcanised with sulphide of antimony were usually supposed to last longer than those treated with sulphide of chlorine; but, even in the case of the former, all methods as yet recommended (such as laying the articles in water or dilute ammonia, or rubbing them with linseed oil or other fatty substance) had as yet proved unavailing as preventives of the evil in question.

A number of Herr Obernetter's licensees complained the process had not yet given satisfactory results in their hands.

Herr Wrabetz said his first experiment with it had been perfectly satisfactory.

Herr Luckhardt expressed a wish that Herr Obernetter would demonstrate his process to the Society, but it was pointed out that he could only do so at a meeting of his licensees.

The Chairman and Baron Schwarz-Senborn mentioned cases in which patented processes successful in France and America failed in Austria, owing to differences in the raw material.

The list of office-bearers for the current year was then presented:—*President:* Dr. Hornig.—*Secretary:* Herr Luckhardt.—*Treasurer:* Herr Schrank.—*Committee:* Herren Haack, V. Angerer, Gertinger, V. Melingo, Antonie, Kramer, Schwarz-Senborn, Eder, Tóth, Löwy, Wimpfen, and Székely.

The meeting was then adjourned.

Correspondence.

SULPHUROUS ACID IN THE DEVELOPER.

To the Editors.

Gentlemen,—It occurred to me, on reading Mr. McLellan's recommendation to use sulphurous acid in conjunction with pyrogallol [see British Journal Photographic Almanac, page 140], that, probably, the sulphite of soda might work more uniformly and better if neutralised by this acid, instead of *citric*, as advised by Mr. H. B. Berkeley.

Some samples of sulphite of soda are much more alkaline than others, and therefore require larger quantities of citric acid to render them neutral or slightly acid; hence a source of irregularity when citric acid is used, because the citrate of soda exercises a powerfully-restraining (if not a destroying) influence on the action of development, as pointed out by Mr. G. W. Webster, varying, of course, with the quantity of the salt present in the developer.

This fact, no doubt, fully accounts for the difference of opinion concerning the utility of sulphite of soda in pyro. development—at least so far as its slowing effect is in question. I have since tested the matter, and found that what seemed probable is really the fact: sulphate of soda so neutralised—that is, with sulphurous instead of citric acid—has little or no retarding influence on the pyro. developer.

It does not seem to me needful to employ so large a proportion as four of sulphite to one of pyro., since the only difference between the use of these and equal quantities of sulphite and pyro. appears to be in the colour of the developed image—the larger proportion of sulphite producing a blacker deposit of silver.

When *soda* is substituted for ammonia in pyro. development, I have found nothing to answer so well as the above combination.—I am, yours, &c., W. Hanson.

Leeds, February 17, 1883.

THE PHOTOGRAPHIC CLUB AND PUBLICATION.

To the Editors.

"Oh! dear, I heard such a shout,
Asking for reformation which they can't do without."

Gentlemen,—As one of the "fathers" of the Photographic Club, permit me to thank my children for the compliment they have paid me, and to congratulate them on their adopting at least a part of the reform I so strongly advocated, namely, publishing a programme of the proceedings, a free meeting monthly, &c. Some of my friends have likened me to Arabi Pasha, whose enemies, after his having been kicked out, have seen fit to introduce the required reforms.

I am glad to see that at last something is likely to be done to "warrant the chairman in certifying that the matters of discussion are fit for publication" (being a rule of the Club). I can scarcely think that for two years a dozen persons have met weekly without something being said or done *worthy of publication.*

Apologising for intruding on your space, but, in the interests of the profession, thinking it right that this matter should be ventilated,—I am, yours, &c., A. L. Henderson.

49, *King William-street, February* 19, 1883.

PHOTOGRAPHY AND ART.

To the Editors.

Gentlemen,—In the last number of your Journal Mr. Alfred Dawson has a letter anent *The Flower Girl*, in which he says that, by calling attention to a few points, he "thought it might, at least, cause a trifle of amusement." For this we are thankful, and congratulate the gentleman on his success.

The few points he alludes to are as follow:—"The girl's shoes are wrong, her stockings are not right, her skirt is not what it should be, and she has no shawl on," &c. But he is not much surprised, "because these things are hard to do, and an artist has been educated to them"—photographers being less fortunate. He concludes that there is hope in the future, and when "some deep touch of truth is portrayed that makes the mere artist or the mere poet to start with wonder and awe, then it will be quite right to plead for the fine art of photography."

Now it is proper that when an individual of a distinct class is portrayed the costume should be correct; but photographers are accustomed to think that art consists in the fitness of the design and composition of a picture. However, it may now be hoped that in future, whilst attending to the weightier matters, they will not neglect to cast a poetical eye on the shoes, stockings, and suchlike "important needful points that make an artist."—I am, yours, &c., W. Neilson.

Edinburgh, February 17, 1883.

To the Editors.

Gentlemen,—The strictures by Mr. Alfred Dawson, in your number for last week, seem to me to call for as much, if not more, comment than the picture of *The Flower Girl.* I am "amused" at the assumption that an artist always, or even generally, treats subjects of this description according to "nature and fact," and that it remains for the photographic artist to adopt a fanciful treatment.

In the first place, the girl is not wearing "boots" but shoes, and these are far from being of the fashionable type. The other seven objections are greatly magnified, and all must admit that the general effect is pleasing.

I have visited many galleries, but never found a painting which did not betray departures from the living and actual models which we find in our streets. For instance: let anyone observe the twenty figures to be seen daily sitting around the Wellington statue, Royal Exchange. I will venture to state that there is no artist who would be found to exhibit any one of them as she there appears. A choice might be made from some superior and western district; but what should we inevitably find on a canvas at the Academy? Certainly not "fact," although we should probably discover a little more "nature" than usually appears.

Do we not constantly find flower girls, corn gleaners, blind beggars, and every similar study embellished by artistic license—often of a most exaggerated description—for the purpose of enhancing the attractiveness of the work? I do not object to the idealisation of a study by either a painter or photographer; but this reference to the superior judgment and treatment by the former I wish to protest against, as neither in painting nor sculpture would the true realist be tolerated by the cultivated artistic fraternity. The works of the past and celebrated modern productions do *not* owe their appreciation to an adherence to "nature and fact."—I am, yours, &c., John Nesbit.

18, *Lancaster-road, Stroud-green, N., February* 19, 1883.

To the Editors.

Gentlemen,—In their present ignorant condition it is evidently of no use for photographers to consider themselves "artists," because, if they do so far forget their true position, they will be speedily "sat upon," and have to exclaim with Lady Jane, in *Patience*—"crushed again!"

Will the gentleman who writes on the above subject in your last impression, if he be an artist, kindly let us know where we may see some of his work or works? If he be a photographer, will he oblige by taking a flower girl for his subject and publish the result of his labour? Or, if he be neither an artist nor a photographer, will he favour the members and friends of the South London Photographic Society with a paper on *Photography and Art*, as, judging by his letter, he may be able to tell *us* how to do things properly if he cannot do them himself? I can promise him a hearty welcome, and possibly no one will be more pleased to receive his instruction than our good friend Mr. Cowan—a gentleman who is at all times ready freely to impart the results of his careful study and experience to his brother photographers,

Some of your readers may perhaps be surprised to hear that had not Mr. Cowan's pretty picture been already in the printer's hands the committee of the above Society would—notwithstanding the errors pointed out by your correspondent—in all probability have asked his permission to kindly allow them to make *The Flower Girl* their presentation print for 1882.—I am, yours, &c., F. A. BRIDGE.

9, *Norfolk Road, Dalston, February* 19, 1883.

To the EDITORS.

GENTLEMEN,—Noticing in your last delightful Journal Mr. Dawson's comments on the art-qualities of *The Flower Girl*, I must say I think he is somewhat too severe. There are swell flower girls—Isabelle, to wit—and in sunny climes flower girls may be able to do without shawls, and find short skirts comfortable; but in the neighbourhood of the City, Charing Cross, or the Strand good hobnail boots and as substantial a shawl as possible would be the best rig. Poor Rejlander could have made a picture of one of *these* flower girls without the aid of tropical vegetation.

Mr. Cowan's *Flower Girl* must have been a foreign specimen—Spanish, I should think. She leans against the wall in an easy sort of way, which seems to imply that she is not over-anxious for business, and this effect is added to by some of the "very good flowers being on the floor." The place, also, does not appear to be much frequented by the public. The small boys would not have left those beautiful trailing plants *in situ* very long, I opine.—I am, yours, &c.,

February 20, 1883. JAMES MURGATROYD.

[Several other correspondents have written in similar terms, but we have not space to publish their letters.—EDS.]

EXCHANGE COLUMN.

Wanted, to exchange, a cottage window with side slip, for a pneumatic shutter.—Address, E. J. HOLMES, Post-office, Cranbrook

Folding camera for 10 × 8 plates, complete, with dark slide and screen, in exchange for a small microscope.—Address, JAMES FORBES, 6, East London-street, Edinburgh.

I will exchange twenty gross of half-plate negatives $6\frac{1}{2} \times 4\frac{3}{4}$, only once used, flatted crown, for anything useful.—Address, M. BATISTE AND CO., 29, London-road, Reading.

I would exchange photographic books for the last thirty or forty numbers of the Journal, or for the loan of same for a few weeks.—Address, H. GOVER, 41, St. Luke's-street, Hanley.

We will exchange one of Harrison's head-rests and 14 × 11 glass dipping-bath, in pine case, for a second hand 10 × 8 or whole-plate camera.—Address, F. E. and H. M. OSBORNE, Camberton-Hill, Kidderminster.

I will exchange a 10 × 8 walnut camera and lens, by one of the best makers, two dark slides, and extra body for copying, for four Victoria lenses; difference in cash.—Address, R. CARTWRIGHT, 349, Kingsland-road, E.

I will exchange a splendid dark tent, on wheels, for a camera and lens, or anything useful in photography (posing chair, in good condition, preferred); difference adjusted.—Address, J. LEACH, Dolgelly, North Wales.

Portable whole-plate camera, one single and one double dark slide, Darlot's view lens for 10 × 8 plates, would be exchanged for a half-plate portable camera with one or more slides.—Address, F PENNA, photographer, Falmouth.

I will exchange a 13 × 13 mahogany bellows-body camera, folding tailboard, dark slide, three inner frames, will extend thirty-three inches from back to front, for Dallmeyer's wide-angle rectilinear, Ross's symmetrical, or a good, full-sized magic lantern.—Address, R. LEATHER, 43, Chapel-street, Leigh, near Manchester.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

William Blakeley, 46, Withington-street, Pendleton, Manchester.—*Photograph of the Wesleyan Methodist Chapel, Oldham-street, Manchester.*

⁂ Several correspondents during the last two or three weeks have not conformed to our rules by enclosing name and address; hence many communications remain unanswered.

NEW BEGINNER.—1. We believe not.—2. The quantity of gelatine should be twenty grains to the ounce.

A. S. B.—The collodion may, doubtless, be renovated by thinning it with a mixture of equal parts of strong ether and alcohol.

R. J. BINDON.—Any manufacturer of photographic apparatus will supply you with plate-boxes so fitted. Where is the novelty in what you suggest?

B. J. F.—The only paper supplied for use with the photometer in question is the ordinary silver paper. We imagine there must be some mistake in th atter.

G. HARRIS.—If you consult our advertising columns you will perceive what you require advertised. You will find formulæ given in all elementary works on photography; but, unless you have had some experience, you will do better to purchase your collodion than to attempt to make it for yourself.

JAMES.—The best plan of renovating the bellows-body of your camera is to rub it over with ordinary negative varnish diluted with methylated alcohol. To clean the brass work of the lens wash it with soap and water If the lacquer have been injured the only plan is to relacquer it.

A. WILKIE.—In place of employing white wax, substitute ordinary yellow bees'-wax; but be sure that it is unadulterated, and dissolve it in pure benzole. After the solution has been rubbed all over the plate it must be carefully polished off, so that the glass appears quite free from streaks.

F. BLAKLEY.—The gelatine you employ should require no chrome alum to harden it. Possibly too prolonged washing or similar cause has produced partial decomposition, which would account for the blisters, or, probably, the emulsion has been insufficiently washed to free it from soluble matters.

R. W. S.—Without knowing of what your waste solutions consist it is impossible to aid you. If they contain hyposulphite of soda or cyanide of potassium of course common salt will not precipitate the silver as chlorine, or rather it will be redissolved as soon as formed. In this case sulphide of potassium (liver of sulphur) is the proper precipitant.

A. WATSON.—The fault in the prints forwarded is clearly due to the albumenised paper. The coating is not even, and, moreover, is full of minute air-bubbles. Reject it, and procure another and better sample. The formulæ you are using are quite correct; but we should prefer the fixing solution to contain one ounce more hyposulphite of soda to the pint than you are using.

COLESWEGEN.—1. If washed in pure water no change will occur in the precipitated bromide. The peculiarities of colour you name are produced at the moment of formation and are not affected by washing.—2. It is impossible to say, without trying it, which course will give the finer precipitate. It would be an easy matter to test it *practically* yourself. Prolonged heating will, of course, render the precipitate more granular.

THEOPHILUS.—Few artists set out on a tour with merely one lens. Most photographic tourists are provided with two or three additional ones, of different foci, to be employed as occasion may require. With the lens you have you must at times be somewhat inconvenienced—say when you wish to include a wider angle of view in your picture—as you cannot get sufficiently far back to include all the subjects you require. In these cases you would find one or two additional lenses of shorter focus an advantage.

LEX writes:—"I ask an actress to sit to me for her portrait and promise her photographs for so doing. I expose them for sale, and a few weeks after the lady orders me to desist from exposing her pictures. Can she compel me to do so?"——If our correspondent bargained with the lady—giving her so many portraits for the sitting with a view to publication—then he clearly has the right to continue exposing them for sale. If an artist pay a model to sit for a picture can the said model forbid the picture being exhibited or sold? The cases appear identical.

RECEIVED.—J. J. Acworth, F.I.C., F.C.S.; Edward Dunmore. In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—On Wednesday next, the 28th instant, the subject for discussion will be *On the Preparation of Lantern Slides.* It will also be a lantern night. Visitors are invited to attend and bring slides.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the forthcoming meeting, to be held at the House of the Society of Arts, on Thursday next, the 1st March, at eight p.m., Mr. T. Bolas, F.C.S., &c., will exhibit *Some Arrangements for Using the Electric Light for the Developing Room.* The use of the gas engine and electric light apparatus of the Society of Arts has kindly been promised, so that members can make some experimental exposures by electric light should they desire to do so. The subjects for the next artistic competition (which will this year be monthly) are landscape—*A Rural Spot;* figure, *The Gardener.* Pictures to be sent in by Thursday next, 1st March.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician.

For the Week ending February 21, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Feb.	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max Solar Rad.	Max Sh'de Tem.	Min. Tem.	Remarks.
15								
16	30·47	NW	38	36	—	49	32	Hazy.
17	30·40	S	41	39	—	46	32	Foggy.
19	30·11	N	38	36	—	44	33	Overcast.
20	30·23	SW	42	40	—	50	34	Overcast.
21	30·41	W	47	46	—	50	38	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1191. Vol. XXX.—MARCH 2, 1883.

A PROCESS STILL WANTED.

It may be remembered by many of our readers that some three years since, in a leading article entitled *A Process Wanted*, we called attention to the desirability of possessing the means of producing prints by a more expeditious method than we have at present. Shortly after our article appeared, Captain Abney, in a paper he read before the Photographic Society of Great Britain, gave several methods by which prints may be obtained with a very brief exposure and subsequent development with different agents. Since then, Messrs. Morgan and Kidd have introduced their argentic gelatino-bromide paper, by which, with an exposure of a very few seconds only to artificial light, prints may be produced. But, unfortunately, we are practically as distant from attaining the desired end—so far as the production of prints in everyday practice is concerned—as we were some five-and-twenty years ago; indeed, since the introduction of the alkaline toning system no improvement of any moment has been made in the ordinary silver printing process. The prints produced now are not a whit more permanent than were those made then, and the time required for printing is still as long.

It is true we have the carbon process, but that does not help us much in the direction of rapidity in printing, particularly in dull weather, when the want is most felt, although it does in permanency. We also have the platinotype process, which has the advantage of giving us permanent prints; but, unfortunately, they, like those on gelatino-bromide paper, do not resemble the ordinary prints with which the public are so familiar. If any process is to supersede ordinary silver printing as now practised it must be capable of yielding prints similar in appearance—at anyrate until the taste of the public undergoes a change.

Then, once more, we have the mechanical methods—the Woodburytype, stannotype, and collotype processes—by which prints may be produced with great rapidity, of any colour or tone, and of undoubted permanence—by the two former processes especially—quite equal to silver prints. But, again, unhappily, all of these processes are troublesome, and therefore become expensive when only a small number is required from each negative, while, moreover, few photographers possess either the requisite knowledge or appliance to work them.

What is really required at the present time is a method by which prints on paper, with an albumenised or similar surface, may be obtained with a brief exposure to light, and of a rich purple-brown or purple-black tone resembling those now in vogue and of equal excellence, also ensuring greater promise of permanence than experience teaches us can be expected from silver prints as now produced. Can ordinary albumenised paper be rendered more sensitive than it is at present? Or can the partially-printed picture be successfully developed and afterwards toned like ordinary prints to the colour required? These are interesting questions, and, so far as our present knowledge goes, can only be answered in the negative.

A surface similar to that on albumenised paper appears to be essential—not so much on account of the gloss as on its property of conferring transparency to the deepest shadows, which is one of the greatest charms of a silver print. The great objection to developed prints is their coldness in tone and lack of transparency in the shadows, which renders such prints quite unsuited to small work. For large prints, however, when the tones are not too inky, the developing process suits admirably, and, to our mind, yields prints which are frequently superior to those on albumenised paper.

Many of our older readers can, doubtless, look back to the excellent developed prints of large size produced, many years ago, by M. Blanquart-Evrard. In most of the published formulæ for printing by development, iodide and bromide of silver are the sensitive agents employed, with, sometimes, a small proportion of chloride added. Now there is no question that both the iodide and bromide of silver are far more sensitive to light when the image is to be developed than is the chloride; but with both these salts the picture is obtained in a much colder tone than with the chloride—the iodide, in particular, yielding a very inky tone.

Paper prepared with chloride of silver only, or with a mixture of chloride and citrate, will, when developed with gallic acid, possess a red or reddish-brown tone if the development be not carried too far, and the image thus obtained may afterwards be toned with gold to a purple-brown or purple-black.

That chloride of silver paper is somewhat less sensitive than the iodide or bromide is certainly no practical disadvantage for our present purpose, as it is seldom indeed that a print deep enough for development cannot be obtained with an exposure of three or four minutes, even in a dull light. It possesses also this advantage over the iodide paper, namely, that the image is sufficiently visible to judge if the printing has been carried to the proper depth, which is not the case with paper containing iodide only.

If this process could be worked on albumenised as well as on plain paper a great advantage would be gained, as a dozen or more impressions might well be printed in less than an hour; while experience proves that prints made by development, whether toned with gold or not, are far more permanent than those produced in the ordinary manner. Unfortunately prints on albumenised paper cannot be developed either with gallic or pyrogallic acid, even when restrained with acetic or citric acid, like those on plain paper, as before the image can be fully brought out it becomes obliterated by fog.

Captain Abney, in his paper, to which allusion was made at the commencement of this article [see page 103 of our volume for 1880], shows that prints on albumenised paper may, under certain conditions, be developed with the ferrous oxalate developer. Since our former article on this subject was written many improvements have been made in gelatine photography. The gelatino-chloride process has become a practical one; the action of the ferrous oxalate developer and its different modifications are better understood, and how far this knowledge may be taken advantage of in the production of paper prints remains to be seen. Although so much advancement has been made in the production of negatives, the fact remains that no improvement whatever in the method of obtaining

prints from them in silver, whether as regards quality, rapidity of production, or permanence has been made for the last twenty years; and we are as dependent as ever on the two or three manufacturers who supply photographic papers for the quality of the prints we obtain.

STUDIO ROOFS.

Last week we directed attention to the subject of the glass roof of the studio—its strength and durability, its mode of construction, and the risks it is exposed to—promising in the present issue to bring before our readers some exact data that would be useful in planning a roof or estimating the strength of an existing one. We have no desire to aid any photographer in dispensing with the assistance of a professional architect; for such a course is, as a rule, fraught with many ill consequences not perceived at the moment, but felt when it is too late to remedy them.

In reckoning the strength of a roof to sustain the effect of heavy hailstorms, two points reciprocally affect the result—the pitch of the roof and the thickness of the glass, and, to a lesser degree, the size of the panes. With roofs at so low a pitch as many greenhouses are built with, the large squares affected by photographers would afford poor protection unless far stronger than the average of such buildings; for the glass that when in small square might receive with impunity the impact of a heavy blow would assuredly give way to the force of a similar blow when in a large square. As most photographers, however, and with advantage, choose panes of large sizes, this element of size must not be neglected in estimating strengths.

With regard, first, to the pitch of the roof: it often happens that a photographer has no choice, owing to neighbouring rights of light. He then, of course, must take the best he can; but where no such considerations interfere it is of the highest importance to employ the steepest pitch possible. No consideration of difficulty in fitting blinds need interfere; for, as we have often pointed out, the blinds will do their work entirely irrespective of the roof, as they may be placed anywise as regards the angle of the roof. With a steep pitch there is far less danger of falling hailstones than with a flatter slope, when, also, the snow will cling very slightly, so that in lieu of a room darkened by a heavy fall of snow, one with a steep-pitched roof will barely allow it to lodge, and a little extra heat will soon cause it to slide away—an effect of no small value when there is not ready access to the roof. A lesson may be learnt from thatched cottages. In them the pitch is generally about forty-five degrees with the horizon; and a glass roof of similar proportions of rise would, when capable of adoption, be most useful.

The steep pitch has another advantage, in giving height to the room—a quality upon which, for summer time, too much stress cannot be laid. A low roof makes a studio stuffy and close, while a high one in exactly the same position will be in comparison cool and fresh. It possesses also another advantage—the deposition of soot, or the well-known film, whatever it may be, occurs much more slowly. We know a photographer who for a space of seven years did not once clean the inside of his studio roof, and yet when we saw it it appeared as clear as new glass; its pitch was extremely high.

With slates, even in exposed localities, it is considered that they should not have a smaller angle than about 33°. True, they of themselves form a heavy load for the rafters to bear, and, *per contra*, the rafters of the studio roof are always made at their lightest, so as to obstruct as little light as possible. Now, as a fall of snow will deposit from three to ten pounds upon every square foot of the roof's surface, it is very easy to see that several tons of snow might fall on a roof of no extraordinary dimensions; and as this is necessarily a source of danger to the stability of such weak roofs as are common, there is another cause for selecting a pitch that will most readily prevent the snow resting for any length of time. This is more particularly to be borne in mind when the momentum of a strong gale might be acting at the same time at a force varying from twenty to twenty-five pounds (vertically) to the square foot.

The thickness of the glass next claims attention; and here naturally the question of cost comes in. That alone, however, should, if necessary to be considered at all, determine the selection irrespective of the question of the light being obstructed by thicker qualities; for the latter in practice causes but a very small percentage of loss. When price is not allowed to interfere (and it would be a pity for it to do so; far better lose some interior adornment than be sparing in the glass employed) our strong recommendation is to use thirty-two-ounce glass, which means glass weighing thirty-two ounces to the foot. It will be about three-twentieths of an inch thick, will form a protective covering of excellent strength that no gale ever experienced in this country would blow in, and one unlikely to be pierced or cracked by any hailstorm this country will ever see.

We have an impression that twenty-six-ounce glass is considered very strong, and that twenty-one-ounce—that is, one-tenth of an inch thick—is most commonly used; but we do not hesitate to condemn it as a protection against probable hailstorms. Fortunately, such visitations are usually most limited in the area they devastate, but no one can say that his particular studio will be outside that area when a violent storm launches its pieces of ice, regardless of glass or other fragile matter lying in its course.

Another important point in the construction of a roof, and one which has not received much attention by those who have written on the subject, is the lap of the glass. In a low-pitched roof, as the rain cannot get away quite so freely, there is a greater liability for it to suck under and form leaking spots inside; but the point we wish to draw attention to is the space left between the glass at the laps. Many glaziers keep the panes apart, when puttying them in, by means of a thin tongue of lead (which they term in some parts a "tomkin"), and thus, when all the squares are placed, there remains for some time a space which prevents the rain backing by capillary attraction, allows any inside condensation to escape, and in summer materially aids in ventilation. But there is another side to this question. In winter this particular "ventilation" is far from necessary, and it tends very much to cool the room. The lap gradually silts up to a certain extent through the accumulation of dust and soot; in consequence it looks very unseemly, and loses any advantages it originally possessed. Finally, and most important of all, the open laps admit so many "blacks" that it is impossible to keep the place clean. Indeed, we believe that a considerable proportion of the untidiness of a photographic studio too frequently seen is owing to the despair of keeping it clean on account of the constant stream of sooty matter which gains egress in this manner.

A photographer of our acquaintance found such great inconvenience from this source of dirt that he called in a glazier and had every individual lap carefully puttied up. He informs us that since he had that done—stopping up also a space that had purposely been left between the lowermost panes and the wall-plate—he has been so free from "blacks" that he finds no trouble whatever in getting his studio kept neat and clean-looking.

It will be noted that we do not treat of plate-glass roofs. They are rarely built, and when such expense as they entail is borne special precautions will, doubtless, be taken to guard against the weight, and to ensure the use of a glass that will not gradually turn to a light-obstructive colour, as unfortunately too many samples of plate-glass are found to do.

We will conclude by giving one or two data to aid in designing the best width at which to make the roof bars, so as to cause the glass to come in at the least cost. The stock sizes of fifteen-ounce glass is fifty-five inches long, or thirty-eight inches wide, but should not exceed twelve feet in area. That of the twenty-one and twenty-six-ounce glass is seventy-five inches long, or forty five inches wide, and seventeen feet in area. The thirty-two-ounce glass is sixty-five inches long, or forty-two inches wide, and fifteen feet in area.

Questions of ground glass *versus* plain we do not now purpose to treat of, for already our remarks have exceeded the limits we intended. We trust, however, that they will enable anyone to estimate the value of any roof *in esse*, and give him confidence in designing one *in posse*.

After all the grand flourishes which heralded the introduction of the new-old electric acccumulators to the British public, an impression is gaining ground that they will not be of that great use

which sanguine electricians have anticipated. It is admitted that the full "charge" of electricity put into an accumulator, as the cant term goes, cannot all be got out of it in the shape or work done, and, further, that the percentage obtainable with each charge is a diminishing one. Now, according to the American papers, Mr. Edison has expressed himself strongly about accumulators, and declares that they are beginning to be found out. It is pretty evident, therefore, that photographers must not look to this form of battery for producing electric energy for their studio lights *in esse* or *in posse.*

Messrs. Lawrance and Woods—whom we named in our last as having been appointed to compose the English contingent for observing the May eclipse of the sun—must have had rather a hard time of it before their start, as the necessary funds from the Treasury were only voted a fortnight and a day before the last day upon which it was possible to start. However, Mr. Hilger for the optical work, and Mr. Meagher for camera work, did their best, and succeeded in enabling the observers to start with an excellent outfit, which, if all go well, it is anticipated will enable some fifty photographs to be secured. All the work is planned beforehand, and detailed instructions and a time-table stating the work to be done for every second—from ten minutes before till ten seconds after totality—have been sent with the observers, who started on Saturday week.

It would be interesting to know if these gentlemen had heard of the latest theory enunciated by Mr. Faye with regard to solar protuberances, in depicting which photography plays such an important part. According to that gentleman, the generally-received idea of their production is not correct. They have hitherto been supposed to be masses of gas thrown out from the sun to immense heights and at a terrific rate—from eighty to a hundred and twenty leagues a second; but he supposes them to become visible by heat imparted by solar radiation to masses of gas that have been evolved under great pressure at a slower rate than the above, and in expanding have become temporarily cooled so greatly as to be invisible.

The latest light-sensitive surface introduced to the public is the skin of a living earthworm. Professor Graber, of Czermwitz, who has been engaged upon a large number of experiments, states, in a paper lately presented to the Vienna Academy, that the eyeless worm of the fields and gardens, though possessing no organ equivalent to our eyes, has yet the power not only of distinguishing the effect of the amount of light cast upon its body, but also of telling one coloured light from another. Causing the conditions as regards radiant heat, light-intensity, &c., in a number of cases to be the same, but the colour of the light different, he noted the instances with which spots illuminated by each coloured light were frequented by the worms, and he tabulated the results, which showed marked differences. These results are very singular—somewhat akin to a man being able to tell the colour of each sunbeam passing through a stained glass window by placing his finger in them.

Professor Chardonnet has been investigating another phase of the same subject in determining the extent to which the eyes of man and of the lower vertebrates are penetrable by what he terms actinic radiations; or, in other words, those ultra-solar rays shorter than T or U—the limits of the ultra-violet solar spectrum. He finds that, owing to the absorbing power of the cornea, vitreous humour, and crystalline lens the transparency to these rays differs in various animals, no medium of the eye allowing the waves shorter than T or U to reach the retina. The mitilating membrane in sparrow-hawks and fowls allows rays up to P and Q to pass, but not any of lesser wave length.

The ease with which light radiations are affected by substances, transparent as far as the eye can judge, is shown in an interesting manner by the results of experiments made by M. P. P. Déhérain and M. W. Spiny. The former gentleman shows that electric light gives off radiations injurious to plants, but capable of being arrested by colourless glass, while the latter shows that water specially prepared, so as to be of complete purity, examined through the length of a tube sixteen feet feet long and provided with glass ends through which white light shone, appeared as a blue of most beautiful purity, but which, if a little lime water apparently perfectly limpid to the eye were put into it, instantly appeared as though the tube were filled with ink. Two more instructive experiments than these it would be almost impossible to devise to show the opacity of certain apparently transparent objects to light radiations of a particular quality.

At a recent meeting of the Chemical Society Mr. S. Cowper showed, among other metals, that silver was very slowly acted upon by dry chlorine. It is singular in how many cases chlorine gets the credit of doing certain work which really is performed by the oxygen of the water usually accompanying it.

The state in which the sulphur that always forms a constituent part of egg albumen exists therein has ever been a subject of considerable interest to photographers in view of "sulphurising" probabilities in the finished print. Mr. Stillingfleet Johnson has recently been upsetting some old ideas on the subject. When albumen is boiled with weak solutions of potash or soda it is usually believed that an alkaline sulphide is formed, but Mr. Johnson says not. He says if the boiling take place and lead solution then be added no precipitate ensues, thus proving the absence of the sulphide; but if the lead be boiled along with the alkaline albumen the colouration is produced.

Photographers know well the need for glass with a clean surface, and many are the methods proposed from time to time to attain the desired end with the greatest completeness and the least labour. They will be interested to note the method adopted by physicists when they wish to obtain a physically-clean surface. A little nitric acid is added to a quantity of sulphuric acid, and the whole heated. The glass is then put in, and afterwards washed in pure water.

THE TREATMENT OF COMMERCIAL DRY PLATES.

It is pretty generally assumed, and, perhaps, on the whole with a fair amount of correctness, that each manufacturer is best able to indicate the formula most suitable for the development of the plates he sends out; and, truly, judging by the very great variety of formulæ to be found in the papers of instructions accompanying each packet of plates, there ought to be a very valid reason for the infinite variety of the modes and proportions of mixing and applying the chemicals required. I do not wish now to pretend to adjudicate upon the merits of bromide *versus* bromo-iodide or chloro-bromo-iodide; the photographer takes his plate as he finds it. He may, if he have experience in dry-plate making, have a shrewd suspicion as to the class of plate, in this respect, which he is experimenting upon; but, as I have said, he takes his chance, and he brings to bear all his experience in working the particular brand he has in use.

With regard to keeping the "pyro." in solution, many various methods are recommended, and the wise do not fail to give some acid or other as a constituent of the solution. Recommendations to use sulphite of soda are not yet so common, as though the makers could not quite make up their minds whether its use really was to keep the stock pyro. solution from going brown or for some other purpose. Those who use it regularly know that that is *not* its use, it is employed to keep the plate from staining under development.

Another point of very varied practice is the amount of citric acid that is advised to be put in the pyro. (almost any acid will answer the same purpose); but, as I pointed out a long time since, the large proportion set down in some formulæ has a decidedly pernicious effect, citrate of ammonia being formed, which, as I have shown, acts as a restrainer of most powerful character. I do not hesitate to say that this acid used of the strength that some makers advise in their circulars will have a slowing effect of more than twenty per cent.—a very low estimate, I believe. Five grains of citric acid to an ounce of pyro. and a pint of water will keep in good condition for months. This would show that these gentlemen are not all entirely *au fait* with the effects of their chemicals on their own plates.

Glycerine in the developer has been largely employed, at one time being considered of the utmost value, and some makers still

recommend it. In my own experience, however, I have found these later additions quite to supersede it, and such, I imagine, is the impression among my brethren of the camera generally.

Then, again, the widest discrepancy exists as to the manner of applying the pyro., bromide, and ammonia. One maker advises a preliminary dip in pyro. solution alone; another in pyro. and bromide; and still another in a mixture of pyro. full quantity, ammonia, and bromide a portion only of the quantity ultimately employed. We all know that the effect of varying the modes of application of the three chemicals affects the question of green and grey fog very considerably; but, at the same time, the professional photographer, when he purchases plates, does not expect to have to "dodge" them to get fair average results. He wishes to get the best effects with the least labour, and he will not (unless special requirements in the direction of rapidity call for unusual precautions) purchase a brand of plate that will necessitate, or even be supposed to require, any roundabout mode of treatment that will try both his time and his temper at a busy period.

The plate that will fairly rapidly develope up to good printing density with one single application of a developer of uniform strength —that is, uniform for the plate and the purpose—will best suit the professional photographer who wishes to get well and quickly through with his negatives. I would particularly wish to guard against being supposed to pooh-pooh the use of variations in the treatment of a plate to produce a particular class of negative or a particular kind of effect. I simply wish to point out the desirability of a plate which for average subjects will quickly develope in one standard solution.

It is upon this point of development and the proportion the ingredients of the solution bear to one another that so much variety of opinion exists—a variety founded not entirely upon the qualities of the plate, but to some extent upon the preconceived ideas of the manufacturer.

The pyro. varies from one to almost three grains per ounce of water, and the bromide from next to nothing to a proportion almost equalling the ammonia present; while, again, the ammonia is made to vary in quantity from less than a minim to the grain of pyro. to three or more minims, and the restraining influence of the bromide is not recommended by the various makers in any fixed proportion to an increase or decrease of the proportion of ammonia to pyro.

I have tried plates by a large number of makers, and in the majority I find that for the highest class of work a quantity of ammonia is recommended which is about the maximum for rapidity, but which is quite over the mark when crispness of effect and transparency of the shadows are desired. Looking at a gelatine plate which has been fixed but never exposed nor developed, there is so frequently a trace of something—a "something" whose presence is readily shown by scratching a hole in the film—that it is palpably evident that to produce work of the highest class, such as even yet may be compared to that from a collodion wet plate, no developer is permissible that will in the slightest degree further degrade the shadows.

We have not yet emerged entirely from the blue or milky print stage which, in the earlier days of gelatine plates, stamped prints with the mark of their origin at once, and therefore we must employ a developer that has least tendency to beget fog in any form. I need not say that it was no difficult matter to fog a wet plate; but it is far easier to fog a dry plate, and wretched are the results when such a negative is printed from.

I would say that my experience is that, to show the extreme sensitiveness of their plates, makers often recommend a quantity of ammonia in proportion to pyro. which, with the most accurate timing, will fail to give the highest class of negative of which the plate is capable. This I hold to be a great mistake. A good working formula should be given that will enable in the ordinary routine of work the veriest tyro to get good negatives if he time his exposure to the developer. A very short explanation then would suffice to show how to vary the formula when the utmost rapidity was needed.

There will even then be sufficiently ample variations in formulæ to show qualities or properties differing to a great extent. The quality of the occasional amateur's work would be improved, and the time of the professional saved; for, to work a plate to its highest pitch of excellence, its character requires to be known so well that to fully learn it the trial of a dozen or two plates will be entirely inadequate.

G. Watmough Webster, F.C.S.

LANTERNS AND SLIDES.

No. IV.

There is yet another reason why it is impossible to give any formula for carbon printing, which is that the quality of water used for developing exercises a very important influence on the exposure required. This is so little known that I cannot do better than relate the experience of Mr. Jabez Hughes, of Ryde. When that gentleman determined to finally adopt permanent printing processes for all his work he decided to make himself thoroughly master of carbon, and entered into correspondence with other workers. Such serious discrepancies occurred that eventually he felt quite sure that it could only be due to the water, and, finally, an exhaustive set of experiments was made, which clearly proved that prints exposed under precisely similar conditions—even by the same person, from the same tissue, and from the same negative—behaved in one place as under-exposed pictures, whereas developed by the same person at another place (with different water) they proved over-exposed.

The advantages of the carbon process are twofold:—First, an absolute control ovor the tone of the transparency; and, secondly, purity of the high lights. To ensure this latter, however, one precaution is necessary, namely, that the room where the tissue is dried must not be warmed by gas or lamps, unless means are provided for carrying off the products of combustion. If they be present in the air an insoluble skin is formed on the tissue, and the high lights are consequently degraded. The disadvantages are no greater than with any other form of contact printing, where equivalent modifications must be made to suit different negatives.

I have said than an actinometer is necessary as a guide to exposure, and in most carbon printing works one is usually employed by the printers, but not always; for instance, at Braun's, of Dornach, they are not used at all. Their catalogue includes so many thousands of negatives that those in print are changed day by day, yet by a sort of instinct the exposure is so nearly judged that the loss from error on this score is quite nominal.

Another point of practice which I see recommended, and, indeed, spoken of in all papers on the subject as essential, is that of passing the developed print through an alum bath. What for? The gelatine is already rendered insoluble by the action of light and bichromate, and that to a far greater extent than alum could effect. How the practice has arisen and why it has been followed blindly by so many persons for years is a mystery. It is simply useless and perfectly unnecessary. At Dornach the developed prints are simply passed into cold water before drying; the alum bath is never used.

Woodburytype is especially suitable for lantern slides. The relief is simply a carbon print; but the tissue, instead of being highly charged with colour, is only lightly tinted, the object being to obtain as great a thickness as possible in the shadows, so as to facilitate the printing operations afterwards. Skill is here required —not only in the preparation of the tissue, but in drying the developed relief. The advantages of this process are that, once a satisfactory relief is obtained, any number of printing moulds can be secured from it by pressure in the hydraulic press, from each of which numbers of prints can be obtained of the exact tone and depth desired. It has the further advantage of allowing of a considerable amount of retouching. For instance: if the negative be full of pinholes these produce little raised points on the relief, which can be cut down. On the other hand, if there be any black spots on the negative these form raised ones on the leaden mould, which can also be cut down. These advantages are shared by Mr. Woodbury's new process, stannotype. All spots are touched out fully on the negative, and from this a positive is made, in which they show as white spots. From this positive a "relief" is produced, in which these white spots will be raised ones, and can, therefore, be cut down before the tinfoil is applied. This process has the further advantage that the positive can be either direct (of the same size as the original negative) or copied in the camera of any size; but it also shares with the Woodbury process the drawback of only being economical when considerable numbers are required.

Everything points to the speedy realisation of perfect lantern slides from gelatine plates, either by direct contact printing or in the camera, combining not only perfect transparence but every gradation of tone from the warmest chocolate to the coldest black. These results have already been obtained, and the demand which must arise for such plates is sufficient to ensure their being a commercial article before long.

The days of collodion for outdoor work are nearly gone, and for lantern slides they are certainly numbered. Their cold tone might be passed over, or, perhaps, improved; but their fatal defect is the difficulty in obtaining due transparence in the shadows. Whether regularity of tone can be more readily produced by gelatine plates remains yet to be proved. Certainly for the amateur it seems to present the greatest number of advantages of any process, and I therefore see no reason why—for amateur work at anyrate—a larger camera than three and a-quarter inches square should be needed.

Either from the negative an enlarged print direct may be made, or from the positive (or lantern slide) an enlarged negative might be produced of sufficient sharpness for all practical purposes. With the ordinary lantern, the condensers, being four inches in diameter, are large enough to cover the effective part of the three and a-quarter inches square picture, while with a very little modification I am satisfied that enlarged negatives quite equal to full-sized direct negatives might be produced.

It is often complained of enlargements that they lack crispness, and undoubtedly this is frequently the fact. But is it due to inherent defects in the process or defective manipulation? To commence: how many negatives are themselves sufficiently crisp to bear examination with the ordinary focussing eyepiece? If they will not bear this amount of anplification it is, of course, impossible to produce sharp enlargements from them. On the other hand, sharp photographs have been produced of minute objects, such as diatoms, in which the amplification has been carried to thousands of diameters. I have myself shown that a magnification of upwards of 100 diameters, with a degree of sharpness still requiring the aid of a magnifier to distinguish details, is within the range of the common microscope objective; and, having repeated the experiment with different objectives and the same success, I have no hesitation in saying that there is no reason why negatives should not be satisfactorily enlarged to any extent.

Every one at all conversant with the microscope is aware that good lighting is as important as good lenses. It is not a question of amount of light—for the tiniest lamp is sufficient—but upon the proper direction of the rays. The best lenses that can be produced are full of imperfections; it is, therefore, of the highest importance to assist them in every possible way, so that they may not be overtasked.

Let us consider the simplest case—that of a picture being enlarged with a single lens. A stop is necessary, as every one knows, and the smaller the stop the sharper the picture will be. Draw a diagram of the relative sizes of the lens and picture to be copied, and represent the stop by a point at the proper distance from the lens. Now imagine the picture to be copied to be illuminated by diffused light; that is, from any one point of the picture rays of light will be coming in every direction. Draw lines from that point in these different directions. A certain number of them will fall on the lens, but only those which are in the direction of the stop can possibly be of any use. The others must go somewhere; the lens tries to make what use it can of them, but it does not require much argument to show that they *can* only do harm. Suppose, now, instead of diffused light, the picture was only illuminated by rays which all pointed towards the stop of the front lens: it is abundantly clear that the work the lens would have to do would be considerably modified and lightened. This is the whole secret of enlarging. Whatever the form of objective, the lighting should be so arranged that the rays cross as nearly as possible at the point where the stop of the lens should be. GEORGE SMITH.

ON MEN AND THINGS.

It is interesting to note how, gradually, the whole aspect of photography is changing—that is to say, how new or hitherto comparatively unavailable applications are coming into vogue. This is, no doubt, solely due to the improved facilities which gelatine plates give, and to the "army" of new practitioners that these facilities have brought into the field. It is not only that photographers themselves have ventured on what they could not previously have attempted, or have found it worth their while to branch out in new directions not feasible under the old *régime*, but scientific men, who are never backward in availing themselves of new assistance, are constantly discovering new ways in which photography can be made to aid them.

* * *

As a case in point I may mention the rapidly-increasing practice of astronomical photography, more especially in conjunction with the spectroscope or spectrograph. But it is not merely in these higher branches that its services become valuable; for we have had recent instances in which the ordinary, non-astronomical photographer has been able to perform feats which were but a short time back impossible, even to the most scientifically-equipped astronomer. Take, for example the recent photographs of the comet and of the transit of Venus, produced by means of ordinary photographic apparatus, and in the almost entire absence of any special astronomical aid. Then, again, the intelligent amateur, with the time and inclination to adopt such a line of work, may now produce solar or lunar photographs with the utmost ease, and of a quality that, a few years ago, would have required not only the highest skill, but the most perfect apparatus. I have seen recently a photograph of the moon, taken by an amateur, with no special apparatus beyond a small astronomical reflector of the simplest construction. The size of the image was about one inch in diameter, the markings perfect, and the exposure had been so short that all necessity for an equatorial mounting was done away with.

* * *

Another branch of photographic science which has recently come prominently to the front, namely, photomicrography, has for years been one of the least practised of the applications of the art or science. Indeed, the list of those who have achieved any success in this department during past years may be counted easily on the fingers. Such being the case, it is all the more remarkable to find all at once such a sudden demonstration in favour of photomicrography in the shape of articles, lectures, and books, as well as actual photomicrographic productions.

* * *

Yet another branch of science—and one to which photography is perhaps more closely linked than any other—that has been coming to the front lately is "lantern work." This, although recognised as pre-eminently the photographer's winter amusement, and receiving on that account a fair degree of attention, appears during the past season to have grown considerably in popularity both with photographers and exhibitors (whom I place together as one class) and with audiences. We have it recorded that the last of the annual lantern gatherings of the South London Photographic Society was the largest and most successful ever held by that body; and even now that the long evenings are nearly drawing to a close the interest seems to remain unabated.

* * *

That these gradual changes are due to the increased facilities afforded by gelatine plates is true, as I have said, in each of the cases cited; but in none is the truth so obvious as in the case of the lantern. Photography first removed the "magic" lantern from the category of toy to that of scientific instrument, by replacing the crude, hand-painted slides by photographs of landscapes, architecture, figures, and, indeed, nearly every class of subject. But *toujours perdrix* soon falls, and the everlasting succession of landscapes became monotonous. Then came gelatine plates and the possibility of an entirely new class of subjects; then succeeded also a great increase in the number of followers of photography, both amateur and professional, but especially the former, and consequently followed the production of a vastly increased number of pictures which the lantern formed the most satisfactory means of utilising. Add to this the fact that popular taste amongst the new accessions to the ranks of photography was in favour of portable apparatus and small pictures, which are chiefly if not solely applicable to lantern purposes, and it ceases to be surprising that the "optical" lantern should progress in popularity.

* * *

Before leaving the subject of the lantern, I may remark on Mr. George Smith's recommendation to use carbon tissue for the purpose of making slides. The process, of course, requires that the negative shall be taken of the actual size required, so as not to necessitate reduction in the camera—a state of affairs which does not always prevail; but, that objection set on one side, I think the process is, without exception, *the* best an amateur can adopt. For quality of result, beauty of tone, and simplicity of manipulation it is unsurpassed, and few who have not tried it are aware how smoothly things work when, as Mr. Smith says, "the difficulties are overcome." I would strongly recommend the carbon process to those who take negatives specially for lantern slides. ARGUS.

NOTES ON EMULSION.—GELATINE.

No. I.

The year that has passed seems to have been prolific in the description of various methods of emulsion making, each process or method aiming, as a general rule, either to simplify or to ensure uniformity; and the gamut is rung from cold emulsification to boiling, from coarse and rapid precipitation of the bromide of silver to endeavouring to produce at the time of mixing the very finest bromide, taking, perhaps, an hour in this case to do what is done in the other in five minutes.

In one recent formula the silver is added in crystals direct to the bromised gelatine; and, although this is a new departure from the now generally-recognised rule, the writer seems to remember its being recommended at the Society of Arts some four years ago, but it had

evidently fallen into disuse for some reason or other. In the other formulæ the nitrate of silver is dissolved in water, and in some instances a little methylated spirit or pure alcohol added in order to ensure a finer suspension of the particles of bromide of silver. Elaborate pieces of apparatus have been devised in order that this fine precipitation or suspension of the particles may take place with certainty, and now, according to the most recent research, it appears most likely they may all have to find their way into the lumber-room.

In a play called "The Happy Land" great fun is produced by everybody having three courses or ways to do a certain thing; so, with the student in emulsion making, there are three separate and distinct methods of washing emulsion—before cooking, after cooking but before the bulk of the gelatine is added, and, thirdly, after the bulk of the gelatine has been added and the emulsion has set. This latter method is (or, shall I say, has been) the usual plan adopted by all the makers of plates sold commercially, except during very hot weather, when precipitation with alcohol has to be adopted.

Mr. W. K. Burton's excellent method, as demonstrated at a recent meeting of the Photographic Society of Great Britain, is mentioned, and is, in fact, recommended, as being far more suitable for large than for small makers, or, in other words, more adaptable for professionals than for amateurs. Now, it strikes the writer the converse is the case; that is, it commends itself to the requirements of the latter class, and for this reason—that a little can be done at odd moments. For instance: Mr. Burton tells us that, after cooking the emulsion, forty-eight hours at least ought to elapse before the supernatant liquid is poured off; in fact, it takes that time for the particles of bromide of silver to settle down, but if twice forty-eight hours pass by, or even a longer time, no harm is done. Indeed, by allowing a longer period than forty-eight hours the very finest particles have time to deposit, and thus loss is prevented; for, even if there are only a few grains of bromide of silver thrown away, it is better, if possible, to avoid even this waste. Here let me note two things—first, that the less the excess of bromide the quicker the deposition; and, second, the less milky is the supernatant liquid. Also, if it be considered desirable to further get rid of the boiled gelatine, the second washing water should be added warm—at least 120° to 130° Fahr.—and the precipitate well stirred.

Now, the reason Mr. Burton's method is not so suitable for commercial plate-makers will be dealt with, and the method adopted by many of them will be given. In making emulsion in bulk a quart or a gallon is mixed in one vessel, this latter being the largest quantity I have ever heard of being made at one mixing. If one quart or four quarts be one day's consumption, or, for the matter of that, forty gallons, the chemicals required are weighed up and added to the respective vessels. Thus, supposing the boiled method is practised, the water is measured out for the bromide and silver receptacles, next the gelatine is weighed up so that it may soak and swell lot by lot, then the requisite number of lots of bromide, and last the silver. After the mixing has been performed the jars or pots with their contents are either cooked in one large boiler or copper, or each is separately treated in a saucepan upon similar gas burners, so as to ensure regularity, and by this means it is unusual to find any variation in the emulsion of that day's making.

Further uniformity is secured by the following method:—After the emulsion is washed each batch is tested for sensitiveness; that is, a little emulsion is melted from each batch, poured upon a plate, and as soon as set all are exposed under the sensitometer at the same time and developed together. Should any difference be detected the batches are mixed whilst in a shreddish state, or after redissolving. Say a small maker uses four quarts of emulsion *per diem:* by Mr. Burton's method there would be about twenty-two quarts always in stock (Saturday being a short day)—not a bad array of jars. Now, take the case of a large maker, with his gallons used daily. Why, in this case it would need an extra room, with water and sink, and the proprietor upon looking round would find it a case of emulsion to left of him, emulsion to right of him, emulsion in front of him, ripening and perfecting. For these reasons it appears to me that Mr. Burton's method can never be extensively adopted by the large makers, especially if, as was stated the other night at a photographic meeting, that one commercial maker made his emulsion nine months in advance.

In all precipitation methods, Mr. Burton's included, the washing is done before the bulk of the gelatine is added. So far it is very convenient, but, as before stated, by the method adopted by Mr. Burton the precipitation occupies at least twice forty-eight hours, and, consequently, a large quantity of emulsion must always be kept in stock. The advantage gained is the being able to get rid of the boiled gelatine, or, at least, the greater proportion of it. This is, the writer supposes, a considerable one, although the Editors some short time ago devoted one or two leading articles to illustrate the fact that "gelatine boiled is not gelatine spoiled."

By a method presently to be described and first mentioned at a meeting of the Photographic Society of Great Britain on December 12th last, the writer there stated the plan he had been pursuing for over six months with a precipitation method, in which the emulsion could be used two hours after the first mixing. The doing away with the troublesome and wasteful method of washing the set emulsion is most desirable; for, be one as careful as possible, waste will occur in washing set emulsion. Some will stick on the canvas or whatever is used to break up the emulsion, and the finer it is broken up the greater the loss, and yet fineness is required that the washing may be done rapidly and thoroughly. Then many prefer not to use the hard deposit at the bottom of the jar, and so, then, that and whatever little sticks to the jar is lost also. It would be interesting to hear the opinions of those accustomed to emulsion making as to the desirability of discarding or retaining this powdery deposit. Personally it is discarded, and goes into the residue tub. Now, in a precipitation method it either does not become formed, or, being formed, it is used up with the emulsion and so finds its way into the plates.

When Captain Abney published the precipitation method over three years ago it was tried and discarded, chiefly because of the length of time the precipitate took to deposit. The process appears to have slumbered—at least we did not hear anything about it till last May, when Professor Stebbing, visiting the Photographic Club, indicated his plan of working, and it was left to the Editors to work out a formula and a method to pursue. Towards the end of June Mr. Alfred Dawson described his method of making an emulsion by precipitation, but he strongly advised—in fact, insisted—upon the necessity of washing the set emulsion; so the only advantage here gained is that no particular care need be given to the mixing of the bromide and silver. By-the-bye, Mr. Dawson omits to say how much and what proportion of bromide of ammonium he uses. As the precipitate appears to go down at once it is evident that the nitrate of silver must be in excess, or very equally balanced as regards the equivalents. Next Mr. Burton appears with his interesting paper and demonstration of his method. This has excited a considerable amount of interest. The writer, working upon the lines of Captain Abney, Professor Stebbing, and Mr. Dawson has worked out a formula which appears to combine all the good qualities of the above-named gentlemen's methods, including Mr. Burton's; but before indicating it he would advise the following experiments to be made in daylight:—

Take three or four test tubes or bottles—the former by preference. Next weigh out three lots of nitrate of silver of fifty grains; dissolve each lot in a separate test tube with one ounce of water, to which one drop of nitric acid has been added. Label these "N. S. 1," "N. S. 2," "N. S. 3," but to N. S. 3 add five more grains of nitrate of silver. Now, weigh out three lots of bromide of ammonium thirty grains, and dissolve each lot also in a separate vessel with one ounce of water. Label these "B. A. 1," "B. A. 2," "B. A. 3." Next take two grains of gelatine and dissolve in one and a-half ounce of water; now add the melted gelatine in three equal portions to B. A. 1, B. A. 2, and N. S. 3—that is, you have added gelatine to two lots of bromide solution and the one lot of the silver containing the extra five grains. Shake and put aside for the next operation, which is to mix the silver and bromide. Mix, by adding to B. A. 1, N. S. 1 drop by drop, stirring or shaking all the while. This will secure a fine precipitate, such as is required for the usual method of emulsion making. The bromide of silver is formed with free bromide in excess, the liquid is milky, and there is really no deposit. The further addition of bromide or silver will not alter its character, so far as the fineness of the precipitate already formed is concerned. This every one will recognise as ordinary emulsion making.

Archer Clarke.

NOTES ON PHOTOGRAPHY.

Lecture XIII.—The Gelatine Process (Intensification)—Continued.

The Polytechnic Method with Silver.—A solution is prepared as follows:—

No. 1.

Silver nitrate	1 ounce.
Water (dist.)	12 ounces.

No. 2.

Potassium bromide	¾ ounce.
Water	2 ounces.

No. 3.

Thiosulphate of soda (hypo.)	2 ounces.
Water	6 ,,

Add No. 2 to 1, and, after washing the precipitated bromide thoroughly by decantation, dissolve with agitation in No. 3. The muddy liquid thus obtained is either filtered perfectly clear or placed aside for a day, and the clear solution syphoned off; it is then made up to sixteen ounces with water, and kept for use. To intensify a plate wash roughly after fixing, and, taking it on a pneumatic holder, flood with the following mixture:—

Pyro. (preserved in sulphite)	4 grains,
Water	2 ounces,
Silver solution	1 drachm,

to which is added immediately before use about half-a-drachm of dilute (1 to 8) ammonia. If the silver show no tendency to reduction add more ammonia, and if it be thrown down immediately use less. With a little experience a peculiar browning of the liquid shows when sufficient ammonia is added.

Rock the plate and apply fresh solution as the density gradually increases. If not sufficiently dense and the solution be muddy rinse the plate and use fresh, and, finally, place it for a short time in the fixing bath and wash; or immerse the washed plate in the silver solution, and leave it there for five minutes. Take out, drain, and flood with an ordinary oxalate developer, when the image will rapidly increase in density. Rinse the plate and place in the fixing-bath as before. If the plate only require slightly intensifying dilute the silver solution more or less as desired. *Note.*—Plates which in ordinary development show signs of fog setting in can be successfully treated thus:—*Immediately* a trace of fog appears wash and fix the plate, again wash, and treat with the above intensifier, when the required detail and density can readily be obtained.

REDUCTION OF DENSITY.

There are three principal methods of reducing density.—1. The image may be changed in colour, so as to be more transparent to actinic light. 2. It can be partially converted into some compound, which can be dissolved out in hypo. or other solvent. 3. The gelatine film can be reduced in thickness by solution or mechanical means.

Mr. W. E. Debenham's Method with Ozone Bleach.—Two solutions are required—

No. 1.

Chrome alum	1 ounce.
Water	1 pint.

No. 2.

Ozone bleach.

The plate is immersed in a solution composed of half-an-ounce of each of these in five ounces of water and then in the hypo. bath. To reduce locally a stronger solution is poured in a stream on the part desired, the operation being repeated, if necessary.

Method with Chloride of Lime or with Eau de Javelle (Hypochlorite of Potash).—For the first a saturated solution of chloride of lime is prepared and for the second:—

* Chloride of lime	2 ounces.
Carbonate of potash	4 ,,
Water	40 ,,

The lime is mixed with thirty ounces of the water, and the carbonate dissolved in the other ten ounces. The solutions are mixed, boiled, and filtered. Either of these are diluted and the plate immersed until the required reduction is produced; it is then passed through the fixing bath and washed. In these cases a double action occurs, part of film being dissolved off, and a portion of the silver being converted into chloride, which is removed in the fixing bath.

Method with Ferric Chloride.—A solution is prepared with—

Ferric chloride	1 drachm.
Water	4 ounces.

The plate is immersed in this, which converts the silver into silver chloride, and on washing and immersing in the hypo. bath this is dissolved out.

Other Methods.—There are various other methods extant for reducing density—one or two, requiring only a single solution, I have found answer very well:—

No. I.

Copper sulphate	½ ounce.
Ammonia	Sufficient.
Water	1 pint.

The quantity of ammonia is such as to redissolve the precipitate first formed on adding it to the copper sulphate.

No. 2.

Potassium ferricyanide (red prussiate of potash).	1 ounce.
Water	1 pint.

A few drops of either should be added to an ounce of the hypo. bath diluted with four ounces of water, and the plate immersed until the requisite reduction is obtained and washed. In the first case silver sulphate, and in the second silver ferrocyanide, are formed, and immediately dissolved out by the hypo.

E. H. FARMER.

ON THE ROWLAND DIFFRACTION GRATING.†

I NEXT propose to show, in two simple ways, how the focus may be found mathematically.

P Q is the curved diffraction grating, A being the middle point. Take any point, B, near A, and join A B. Let C be the centre of the circle, of which P Q is an arc. Let it be required to find the focus for a ray coming in the direction A K. Join B C, and make C B D = C A K. Let H and E be the points of intersection, as shown. Draw C K at right angles to A C.

$$\text{Let } ACB = \phi$$
$$CAK = \theta \ddagger$$
$$AC = a$$

Join C E. Then since B C = A C,

$$CAB = CBA = (90° - \frac{\phi}{2})$$

$EAB = (90° - \frac{\phi}{2} \mp \theta) = 90° - (\frac{\phi}{2}) \pm \theta$, according as B is opposite or on the same side as E.

$$\text{Now } AE = AB \cdot \frac{\sin 90° - (\frac{\phi}{2} \pm \theta)}{\sin \phi} = AB \frac{\cos(\frac{\phi}{2} \pm \theta)}{\sin \phi}$$

$CBD = \theta$ by hypothesis.

$$AB = AC \frac{\sin}{\sin(90° - \frac{\phi}{2}} = a \frac{\sin \phi}{\cos \frac{\phi}{2}}$$

$$\therefore AE = \frac{a \sin \phi}{\cos \frac{\phi}{2}} \cdot \frac{\cos(\frac{\phi}{2} + \theta)}{\sin \phi} = a \frac{\cos(\frac{\phi}{2} \pm \theta)}{\cos \frac{\phi}{2}}$$

$$= a \cos \theta \mp \sin \theta \,.\, \tan \frac{\phi}{2}$$

Where ϕ is very small, *i.e.*, when B is indefinitely close to A, A E $= a \cos \theta$, which shows that C E A is a right angle.

To calculate the disc of confusion of focus, we will take the absolute size of the grating, taking P and Q as the external edges of the grating.

In this case, $\tan \phi = \frac{1}{48}$, since A C $= a = 12$ feet and A B = 3 inches = ½ width of grating.

Suppose $\theta = 30°$. Then $a \cos \theta = 144 \times \cos 30° = 124{\cdot}7$ inches.

$$A \sin \theta \cos \frac{\phi}{2} = 144 \sin 30 \cos 36' = {\cdot}754 \text{ inch.}$$

A further calculation will show that the disc of confusion or breadth of a point would be $= {\cdot}754 \tan \frac{\phi}{2} = {\cdot}015$.

The confusion of this disc would be almost inappreciable at the edges; in fact, we may take it to begin to be appreciable at ¼ that diameter. The breadth of a point may, therefore, be taken at about $\frac{4}{1000}$ of on inch, which is well within the limits admitted to give a sharp focus, and is better than that which can be got from a lens under similar circumstances.

The same problem may be solved geometrically. Using the same notation as before, and assuming B to be very close to A, it follows that A B is very small compared with C D or C K; and it will be seen that D K = A B, taking A B as parallel to C D; therefore for all intents C D may be taken = C K.

Now, the triangles A H C and B H E are similar, as are the triangles B H A and H C K.

$$\therefore \frac{BH}{HC} = \frac{AB}{CD} \text{ or } \frac{BH + HC}{HC} \quad \frac{AB + CD}{CD}$$

$$\text{But } \frac{BH + HC}{HC} = \frac{BC}{HC} = \frac{AC}{HC} \text{ and } \frac{AB + CD}{CD} = \frac{CK}{CD} = \frac{CD}{CD} = 1$$

(i.) $\therefore \frac{AC}{HC} = 1$ or A C = H C; that is, H is very close to A and B.

Again: $\frac{HE}{HC} = \frac{BH}{AH}$. But $\frac{HE}{HC} = \frac{AE}{AC}$, since H is very close to A, A B being small.

(ii.) $\therefore \frac{AE}{AC} = \frac{BH}{AH}$ now B H and A H are both small; and $\therefore \frac{BH}{AH}$ might be very large, and therefore cannot be reflected.

$$\text{Now } \frac{AH}{HH} = \frac{BH}{HC} \therefore AH = \frac{HK + BH}{\quad}$$

Substituting this value A H in (ii.)—

$$\text{(iii.) } \frac{AE}{AC} = \frac{BH \times HC}{HK \times BH} = \frac{HC}{HK}$$

Now both H C and H K are large quantities.

$$\therefore \frac{HC}{HK} = \frac{AC}{AK} \text{ since H is indefinitely near A.}$$

Substituting in iii we get—

$$AE \times AK = AC^2.$$

If a circle be described about C E K, it follows, since this relation holds good, that A C must be a tangent to the circle; and as, by hypothesis, C K is at right angles to A C, therefore the arc C E K is a semicircle; since arc C E K is a semicircle, C E K must be a right angle.

That is, the focus for the rays is found by letting fall a perpendicular from the centre of curvature on to the reflected ray; or if the focus of the reflected rays be at the centre of curvature, the focus for the incident ray must be found in the same way.

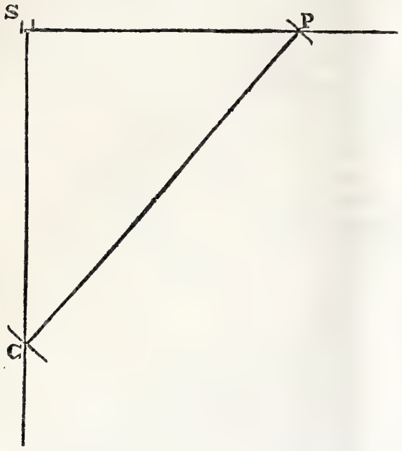
* *Instructions in Photography.*

† Concluded from page 91.

‡ In diffraction spectra, when any wave-length has to be calculated, the formula used is $\frac{n\lambda}{\zeta} = \sin \theta - \sin i$ where n is the order of the spectrum used, λ the wave-length, ζ the interval between the lines, i the angle of incidence, and ϕ the angle of reflection. In the present case either $\sin \theta$ or $\sin i = 0$.

This last is what Professor Rowland carries out in practice. The reflected ray is also reflected towards the centre of the sphere of which G is a segment; the distance between the grating and the plate or focussing-screen remains unchanged, and the distance between the slit and the grating is altered. To effect this he has two bars at right angles to one another—with a third bar sliding along them. This bar carries the grating G at one end, and the plate P at the other, the centre of the plate P occupying the centre of the circle of which the grating G is an arc. The slit S is fixed. It will be seen that this fulfils the requirements of the theorem just given. By keeping the centre of the grating at P a true normal spectrum is always thrown, and, however the angle S G P is altered so as to get different parts of the spectrum, the scale of the photographs remains unchanged, since the distance from G to P is fixed.

FIG. 2.



I would also ask you to remark, that as the angle is increased, so is the slit placed nearer to the grating, which means that a larger cone of fineness of the lines, since the breadth of a line is the disc of confusion, would otherwise be obtained; this is, however, at the expense of the light, and consequently greater brilliancy of spectrum is given than of a point + breadth of slit × $\frac{\text{distance of plate from grating.}}{\text{distance of slit from grating.}}$ This is, however, more than compensated for by the fact that if you largely increase the angle S G P, *fig.* 2, you work in higher orders of the spectrum, which give increased dispersion, and do not get a proportionate shortening of the distance of the slit from the grating. Thus we have already taken an angle of 30° as an example, and found that the total shortening of the slit is 124·7 inches.

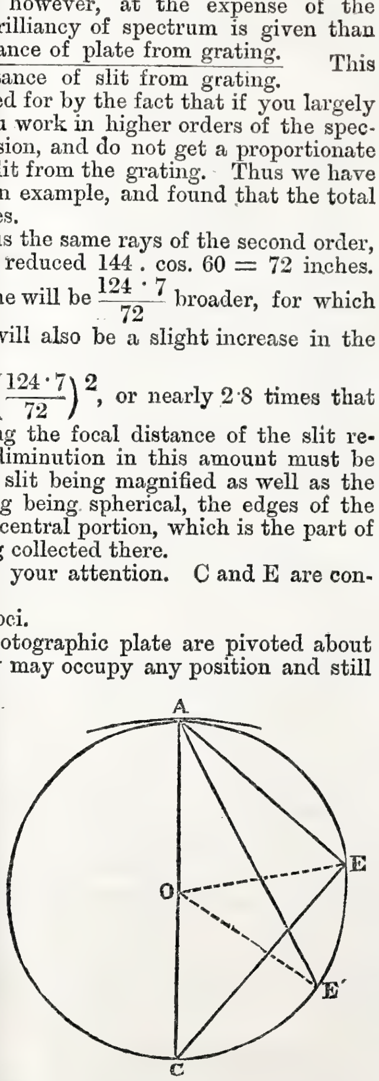
If we take 60°, which will give us the same rays of the second order, we find that the focal distance is reduced 144 . cos. 60 = 72 inches. In this last case the image of the line will be $\frac{124 \cdot 7}{72}$ broader, for which the dispersion is doubled; there will also be a slight increase in the disc of confusion.

The brightness is increased by $\left(\frac{124 \cdot 7}{72}\right)^2$, or nearly 2·8 times that which would be the case supposing the focal distance of the slit remained at 72 inches. A certain diminution in this amount must be made, owing to the height of the slit being magnified as well as the breadth; but, owing to the grating being spherical, the edges of the spectrum are less intense than the central portion, which is the part of importance, most of the light being collected there.

To another property I would call your attention. C and E are conjugate foci, as are C and E¹.

∴ E and E¹ are also conjugate foci.

If, therefore, the slit and the photographic plate are pivoted about O, with arms of length O E, they may occupy any position and still will remain in focus. The photographic plate would always be tangential to the circle, and would thus be in proper position. But the slit would have to be pivoted, as well, at the other end of the arm, in order to be directed towards A. I may state that all these properties of the grating are known to Professor Rowland, and I have merely shown how they can be arrived at by simple mathematics.



There is something remarkable in connection with the manufacture of these gratings. First of all Professor Rowland invented a method of grinding a perfect screw, which any mechanician knows is almost as difficult as it is to arrive at perpetual motion. 2nd. He had to make a perfect machine for the ruling. 3rd. He invented a method of casting speculum metal (the method is also applicable to other metals) to give the blocks on which his lines are ruled. The screw, perhaps, is the greatest invention. It may be asked how it can be said that it is a perfect screw. The spectrum itself is the best test. If each line be sharply defined the ruling must be regular; and if there are no "ghosts" to the lines, it shows there is no periodicity in the ruling, which is not the case in Rutherfurd's gratings which I possess. The grating I show you gives defined lines, and gives no ghosts; hence it must be concluded the screw is near perfection, at any rate.

Perhaps making a grating involves more nicety than almost any other mechanical work. For instance, the diamond point has to be carefully selected to cut the proper-shaped groove and the proper ratio of line to space. 2nd. The temperature of the ruling-room has to be kept within a couple of degrees or less at the same temperature, to avoid expansion or contraction of the metal. 3rd. The rate of ruling has to be kept uniform, which means that an engine has to be carefully watched for days in some cases.

Professor Rowland is to be congratulated on his achievement. So far, our best gratings have come from America; and as long as we have such men as Professor Rowland to help forward science, we need not be anxious as to spectroscopy in its highest branches. At the same time, I think we ought to try in England to approach towards this instrument, though we can scarcely dare to hope to improve on it.

W. de W. Abney, R.E., F.R.S.

PHOTOMICROGRAPHY.

Actinic and Visual Foci.—In photographic lenses by good makers great pains are taken to make the actinic and visual rays meet in the same point; but, as microscopic lenses as a rule are constructed solely for giving the best definition to the human eye, a different formula is adopted for the curves of the glasses. For the sake of your junior members, some of whom may be imperfectly acquainted with optics, you will, perhaps, grant me a short indulgence while I explain the principle of achromatism. [Diagrams were thrown upon the screen illustrative of the construction of achromatic lenses and the over-correction of microscopic objectives.]

As it is generally accepted that the best definition is obtained in photomicrography without the use of the eyepiece, you will at once see the necessity for allowing readily for this discrepancy between the visual and actinic foci. In the instrument before you I have determined by experiment that, when a two-inch object-glass by Baker is employed, the screen being thirty-seven inches distant from the object screen which has been visually focussed, the objective must be withdrawn $\frac{15}{2000}$ inches, or the rod turned till the pointer previously placed at zero passes through 15° to the right (at half the focal distance 7½° must be allowed.) The chemical rays will then make a sharp picture on the film, whilst the outline appears blurred to ordinary vision. In the more delicate corrections required by the higher powers recourse may be had to extension of the bellows instead of altering the fine adjustment screw. The allowance required for each objective can readily be ascertained by placing an ordinary micrometer scale ruled to $\frac{1}{100}$ths and $\frac{1}{1000}$ths inch on the stage of the microscope at an angle of 10° to 15°, so that each line has a varying focal point. On the screen is a photograph of such a scale taken at thirty-seven inches by the two-inch lens, the visual focus having been adjusted at the first line of the thousandths, and the best photographic definition coming out about the fifth or sixth line of the hundredths. The difference in the visual foci of these two lines was represented by 15° on the scale, which was readily found by viewing the scale through the eyepiece and swinging the index between the two focal points. Instead of the micrometer scale an object not pressed too flat—such as a fly which has delicate hairs lying in different planes—may be employed in a like manner.

If a specially-sharp picture be required of some difficult object, trial plates should be taken with determinate variations in the length of the bellows, either by cutting a dry plate into slips—which should be numbered and exposed separately—or a diaphragm can be placed immediately behind the focussing-screen, having a revolving disc three inches in diameter fixed in the centre, a quadrant being cut out of the same to allow of successive exposures, the disc being revolved and the shutter lowered between each variation of the bellows. Four results will thus be exhibited on the same plate.

No tables can be given for the actinic allowance required by the various powers. A one-inch by Dancer, lent by a friend, was found to produce sharp pictures without any such allowance, whilst another by Swift required 2° on my scale. Powers above one-quarter of an inch seldom require compensation, and some of the *photographic* lenses of English make, when stopped down, perform admirably on large objects of a half or one inch in diameter. Many of the pictures to be seen tonight were produced by Dallmeyer's stereoscopic lens, kindly lent by Mr. J. Pollitt. The tyro is recommended to ascertain definitely, once for all, the exact allowance required for each lens, and to keep a careful record of the same.

In order to produce satisfactory negatives no pains should be spared to obtain a flat and even picture, by levelling the object by means of the set screws referred to. I have seen many otherwise commendable photographs utterly spoiled by one-half of the picture being out of focus.

Illumination.—The most preferable source of light, as far as my experience goes, is the sun, but the electric arc, lime-light, gas, and paraffine lamps have all been used. Now that sensitive dry plates are

* Concluded from page 105.

ithin the reach of all the paraffine lamp is usually employed, either aked or with a bull's-eye condenser interposed. If the latter be employed difficulty is often experienced in obtaining even illumination all over ıe field, the thickness of the glass breaking up the rays into prismatic olours. Mr. Dancer recommends a double combination quarter-plate ens used as a condenser, an image of the lamp flame being formed hereby a little behind the object, so that the rays just cross before rrival. A disc of light should be produced which amply covers the ize of the object. It will be found convenient to ascertain the correctness of the illumination by placing a slip of white writing paper on the object-slide, and observing whether the image of the flame fully envelopes the field. In using the higher powers, when it becomes necessary to obtain more intense light upon a small space the paraffine flame may be placed edgewise. With a good lamp powers up to one-fifteenth of an inch may be employed with dry plates. For low magnifications ordinary daylight from a white cloud will suffice. In using sunlight it is sometimes necessary to interpose a glass cell containing a solution of common alum to arrest the heat rays, otherwise the object or the lens may be injured. With naked sunlight, also, diffraction and interference lines are apt to appear around the image, when a plate of ground glass should be fixed an inch or so behind the object to soften the light. Dr. Woodward, in using very high powers, has sometimes found it imperative to make use of monochromatic light. This can be obtained by causing the sun's rays to pass through a solution of sulphate of copper, to which is added strong ammonia.

In photographing the delicate markings on some diatoms the light must impinge on these transparent objects at a considerable angle, or the direct flood of rays will drown all detail. In photographing the proboscis of a blow-fly I have found a superabundance of light fatal to the fine delineation of the false *trachea.* With objects difficult of resolution the ordinary achromatic condenser of the microscope is often employed.

Definition.—In the lower powers definition is rendered much more perfect by the introduction of a stop behind the back lens. For instance: in portraying a section of the stem of the dog rose, a stop a-quarter of an inch in diameter materially improved the definition of the delicate cells, and in many histological specimens, where great penetration is required, the tissues being comparatively thick, a reduction of the aperture of the lens is imperative. Stops of cardboard or turned wood may be employed, or Davis's iris aperture shutter, which gives all variations in size from a pin point upwards.

Objects.—All microscopical objects are not equally suitable, on account of either colour or thickness. Tissues stained light blue or purple give faint images, whilst dense brown objects will not allow light to penetrate the detail. Preparations of insects (such as fleas, which make capital subjects for the beginner) should have lain in the potash solution or turpentine a sufficient time to render the body semi-transparent. Sections of woods, if cut thin and stained a suitable colour, make good pictures. Sections of lung, if thin, give good results, but many anatomical preparations of soft tissues are too thick to allow of perfect focussing with the higher powers. A beautiful section of the retina of the human eye which I possess, although most interesting when viewed in the ordinary microscope, is quite unfit for the camera. Diatoms which present a flat surface, like *arachnoidiscus*, are most suitable, but require careful levelling on the stage.

Exposure.—No fixed rule can be given for exposure, which varies with the light, lenses, and length of focus employed, but much trouble will be avoided by the operator if a standard light be used, and a careful record kept of the results of exposures by means of a register, such as that which lies on the table. With Swan's "ten times" dry plates a small microscopic paraffine lamp without condenser, fixed seven inches from the object, gave a good picture in one minute, with a two-inch lens full aperture, and the bellows extended to thirty inches.

As a rule, amateurs over-expose their plates, and produce a weak, thin negative. The movable disc before referred to affords an easy method of testing the time of exposure, four tests being obtained on one plate. Another method is to partially raise the shutter at intervals, noting the time for each exposure; then to cut the plate down the middle with a diamond, and develope one half two or three minutes longer than the other. Six variations on the exposures can thus be seen, and the utmost novice will be able to discern "which way the cat jumps."

Photographic Process.—If sunlight were always at command I should prefer the wet collodion process, on account of the readiness and rapidity with which trial plates can be developed and examined. Every object differs so much in density or size that the time of exposure is ever varying, and carefully-repeated experiments are necessary. I have heard it stated that Dr. Maddox thought he did well to secure one good negative a day.

Development.—For readiness of application at rare intervals of leisure I have preferred the ferrous oxalalate developer for dry plates, and all my gelatine negatives have been executed so far by this process; but it is doubtful whether this method allows of so much latitude in nursing up the contrasts in a negative of a very transparent object, as is afforded by the pyro. developer. I have also intensified, where requisite, with the saturated solution of bichloride of mercury, and, after well washing, steeping in the solution of ammonia. The solution of mercury may be kept in stock and used over and over again.

Magnification.—The greater the disparity between the distance of the front lens from the object and the distance of the lens from the sensitive plate the less chance is there of securing penetration or deep focus. Therefore, if large prints are required, better results will follow from employing a low power and taking a small picture, afterwards enlarging from the negative. Quarter-plates will suffice in most instances for this class of work, and those members who have seen Professor Piazzi Smyth's negatives of the Pyramids, only one inch square, and enlarged three diameters by Mr. Pollitt, will be aware how well they bear further magnification on the lantern screen.

The highest resolution I have heard of or seen by photomicrography is that by Dr. Woodward with Zeiss's oil immersion lens one-twelfth of an inch, on the diatom *Amphipleura pellucida*, where the striæ, which in nature count about 100,000 to the inch, are plainly delineated on the print; and Mr. Crisp, the secretary of the R. M. S., tells me the lines have never been so clearly shown by ordinary vision. The nineteenth band of Nobert's test-plate of finely-ruled lines on glass, containing about 100,000 to the inch, was also resolved by this unapproached operator with Tolle's one-eighteenth of an inch immersion lens.

From certain late researches of Professor Abbe the theory is established that when we are near the limits of "resolution," the superiority of photographic vision, so to speak, over that of ordinary microscopic vision is as five to four, all other things being equal; but it must be remembered that ordinary microscopic powers are constructed for vision and not for chemical portraiture.

The various magnifications obtained by the several powers are set down by Mr. Davis as follows. At thirty-six inches:—

4 in. = × 12	$\frac{1}{4}$-in. = × 173
2 ,, ,, ,, 21	$\frac{1}{8}$,, ,, ,, 360
1 ,, ,, ,, 37	$\frac{1}{15}$,, ,, ,, 530
$\frac{1}{2}$,, ,, ,, 80	

Bibliography.—Dr. Beale's *How to Work with the Microscope; Monthly Microscopical Journal:* report by Dr. Woodward, vol. vi., page 169; *Quarterly Journal of the Microscopical Society*, vol. i., 1853; *Northern Microscopist:* article by G. E. Davis, April, 1881; *Science Gossip*, 1876: article by F. H. Powell; THE BRITISH JOURNAL OF PHOTOGRAPHY, January 26 and February 2, 1883; *English Mechanic*, February 2, 1883.

In conclusion: before we show upon the screen some of the combined work of Mr. Pollitt and myself, allow me to admit that in the presence of such an important Society I feel I have much more to learn than to teach, and I invite your candid criticism of any statement I have made with a view to furthering the development of a most interesting branch of your art, which for some years has been a source of much interest to myself, and is evidently about to become of great educational value. G. J. JOHNSON.

A TOUR IN ITALY WITH THE CAMERA.

No. II.

I SHOULD hardly be doing justice to Turin did I pass on without remarking that, although the town is prosaic enough, some interesting views may be obtained in the neighbourhood. Turin is situated on the river Po, somewhat near its source; the river is consequently narrow. Some very pretty river scenes may be obtained if one have plenty of time to search them out and wait the best opportunity for a "shot." As I decided to go eastward I booked direct for Verona, not wishing to stop at Milan, as the only attraction there is the cathedral, and I doubted whether it would be worth a day's delay. It was now that I learned that all was not plain sailing ahead, but that the inundations were doing their worst; that all the lower Po valley was under water; and that railway bridges were either broken or rendered unsafe.

The day was truly Italian, with balmy airs and clear blue sky flecked with fleecy clouds—in fact, I might say it almost reached the photographer's ideal. All went well until we reached the Porta Nuova station at Verona. Here began a series of delays. We scarcely knew what was the matter, but were informed we could go no further. It mattered little in my case, as I only wished to go to the central station of that town. I therefore at once engaged a cab to drive me there. On passing through the town a melancholy spectacle presented itself. The river Adige, known by the epithet "rapid," had caused fearful devastation. Everywhere it had overflowed its banks, houses were in many cases half washed away, others were rendered unsafe, whilst nearly all were more or less choked with mud, water, and rubbish. All around us was a scene of desolation. Boats, which had been recently used in rescuing many of the unfortunate sufferers by the floods, lay scattered about in all directions. The tottering bridge across the river was in charge of some *gendarmes*, who only allowed a few vehicles to cross at a time. Arriving at length after considerable difficulty at the central station, I left my luggage, except my apparatus, at the cloak-room, and started off to give my camera an airing.

The far-famed arena and the house of Juliet, Romeo's beloved, were naturally two first objects of interest. The former—a monument of antiquity scarcely surpassed in beauty by the Roman Coliseum—is difficult to get, as a whole, without a wide-angle lens, as it is of immense size. It was capable of accommodating some 100,000 persons in the palmy days of the Roman empire, and is yet in a remarkably fine state of preservation. Very pretty views may be obtained if one

be satisfied with taking in a portion only of that magnificent ruin. The "House of Juliet," if she ever graced that uninviting dwelling, is scarcely worth a plate, were it not connected with Shakespere's play, founded on events which really occurred in Verona. The whole scene is an unattractive one.

I was much tempted to spend a few plates on inundation scenes, but came to the conclusion that they would have possessed but a passing interest, and were more suitable for the illustrated journals. I therefore decided to leave and get on towards Venice. This was easier said than done. The whole railway system was in a state of disorganisation, and every kind of information was volunteered. However, as there was a train about to start, and which would undoubtedly go somewhere, I decided to take my chance. At length we got to Vicenza, where we were informed it would be wise to stay the night. Possibly it would have been, as I might have succeeded in getting a few pretty views, which I know can be had, of the town. However, I wanted to get to Venice, if possible, but in this I was doomed to disappointment; for at Pojana, a station before Padua is reached, we were positively informed that we could get no further, as a bridge ahead was broken, and that, as the village consisted of only some three or four houses, the company would take us back to Vicenza if we wished. I did not wish it, neither did I desire to remain in Pojana railway station until the following morning. At length I found means of hiring a carriage to Padua, thereby escaping the rotten bridge of Ponte di Brenta. Arriving at Padua between 10 and 11 p.m. we found railway communication with that town entirely broken, and were forced to remain there the night.

Next morning, being bright and sunny after a terrific thunderstorm during the night, I spent my time getting a few views of the town. The fine church of St. Anthony, with its massive heavy cupolas, is naturally a point of attraction. Some interesting "street scenes" may be obtained in many parts of the town. However, the "learned city" does not really possess any great attraction to detain the artist, and I was not sorry when in the afternoon I left in a carriage with some other "travellers in trouble," like myself, for Dolo, *en route* for Venice. The distance between Padua and Dolo is about twenty-one kilometres, or some thirteen miles. It was an interesting, yet at the same time rather melancholy, drive—interesting because we seemed to be returning to the old coaching days, and we could therefore enjoy the surrounding scenery so much better; yet extremely sad to see what havoc the floods were playing all around. In many cases the whole country looked like a vast inland lake. The golden harvests of maize, together with the rice crops, were practically ruined. Vines hanging in festoons from tree to tree, heavy with their rich burden of luscious grapes, were already soddening in the dreary waste of waters, which extended as far as the eye could reach. Quantities of melons, vegetable marrows, and similar vegetables were floating about in all directions. Many houses were quite isolated, ingress and egress being made entirely by boats. We were glad to get to Dolo and to leave such distressing scenes behind. After a couple of hours' serious debate the Dolo railway officials decided they could safely start a train, which in due course arrived in Venice.

Venice, as is well known, is situated in the sea, and is now connected with the mainland by means of an embankment upon which the railway trains run. Arrived at the station I at once hired a gondola—which here takes the place of the omnibus and carriage of other towns—to take me to my hotel, situated on the Riva degli Schiavoni. Naturally I was anxious to see how I was progressing with my photographic work, and that same evening I sat down to develop, interested in knowing how I was getting on with regard to exposure. The experience I gained on this head was at the cost of several of my plates taken so far. They were mostly very much over-exposed. I had no idea the Italian light was so good as I now found it to be. My calculations were based on that of London, but in Italy the air seems purity itself, excepting the smells (not usually due to *fleurs d'orange*), common to all continental towns, which have no actinic effect on the light. On reducing the exposure six or eight times, and getting satisfactory results, I soon found I should have little difficulty in securing good instantaneous work.

Unfortunately water is very scarce in Venice. It is usually brought from the mainland in boats, consequently one is not allowed to use it too freely. My small jugful had to serve my photographic purposes and ablutions besides (I am afraid my ablutions suffered somewhat), so that great care was requisite in husbanding it. However, as far as I have since observed, none of my negatives suffered in any way from this small allowance of water.

Whilst developing I noted a fact which may, at anyrate, appear new to many. After developing of course I wished to fix, as usual, so I poured some of my "saturated" hypo. into a dish and placed the first plate in it. After remaining there fifteen to twenty minutes the film was in no way cleared. This fairly puzzled me for some time, being under the impression I must have dissolved some other salt, although the crystals in the bottle looked like hypo. At length it occurred to me that it might be too concentrated. I therefore added some water so as to dilute the solution to about twice the original volume, with an entirely satisfactory result, the film being cleared in a minute or two. Since my return home I have tried the same experiment, and find it is impossible to clean the plate with "saturated" hyposulphite.

J. J. Acworth, F.I.C., F.C.S.

IODIDE OF SILVER IN THE EMULSION.*

This was the position of affairs when, on the 11th of October, another communication from Herr V. Schumann and a new batch of plates reached us. In the communication he said :—

"Dr. Eder says :—An iodo-bromide emulsion which contained one-twelfth of iodide of silver, and which was emulsionised in neutral or slightly-acid solution, developed more slowly in the ferrous oxalate developer, was less sensitive, and gave thinner negatives than a pure bromide of silver emulsion, whenever both were not digested with heat. (*Photo. Corr.*, page 149, No. 229, 1882.) As I had never yet worked with unripe iodo-bromide emulsion, and as Dr. Eder's observation interested me, I prepared the other day two preparations, one of which contained bromide of silver and the other iodo-bromide of silver. In the preparation I observed all the important points which require to be observed in making analogous preparations. After drying the plates were tested, and by a number of comparative experiments it was ascertained what influence iodide of silver exercised upon unripe bromide of silver emulsion. The collective result I hand over to you in the form of twenty-three negatives. From them you will see how far the assertions I am about to make are well founded. If, on this occasion, I have once more included in the testing the emulsions Nos. 117 and 118, which were prepared with oxide of silver and ammonia, it was, on the one hand, in order to furnish further testimony of the superiority of emulsion containing iodine, and, on the other hand, to ascertain the proportionate sensitiveness of silver oxide and ammonia emulsion to unripe emulsion. For that purpose I have grouped together nine spectra negatives upon strips of the four preparations, Nos. 117, 118, 120, 121, exposed them simultaneously, and also developed them simultaneously. As I have sent you the whole of the plates, including even the less successful ones, I omit to particularise their peculiarities more minutely. The character of the series is also so distinctive that it requires no commentary. At the first glance you will recognise how little these negatives agree with Dr. Eder's statement. You will perceive from my plates clearly and distinctly that the mixed but undigested emulsion also works better when it contains iodide of silver.

"Dr. Eder's statement cited above is of comparatively recent date (May number of the *Correspondenz*, 1882); therefore my result may, since it culminates in the opposite of what Dr. Eder found—perhaps in spite of the accompanying negatives—only be moderately believed in by you if I do not also relate the course of the experiment. In order, however, to remove as far as possible any doubt that may arise regarding the correctness of my assumption, and to leave no room for the supposition that in my preparation I have made use of some special and as yet unknown artifice by means of which only I have obtained the different result, are the following particulars regarding the manner of the emulsionising and of the testing of the emulsions, Nos. 120 and 121, given:—

"Preparation of Emulsions Nos. 120 and 121.

A. 3·0 grammes Simeon's hard gelatine was soaked for six hours in 30·0 c.c. of distilled water, then melted at 60° C. and halved.

"No. 120, Pure Bromide Gelatine.

B. Half the quantity of A, 1·2 K Br, } heated to 59° C.
C. 1·5 Ag No_3, 15·0 distilled water, }

C was added in small portions to B, B being well shaken up during the process, and the residue of the silver was rinsed out with D: 2·5 cold distilled water. It was then agitated for two minutes, and the bottle set for ten minutes upon the cold experiment table in order to allow the froth to settle; it was then put to stiffen in the cold water bath at 15° C., the nodules pressed of about one and a-quarter mm. diameter, and washed for forty-five hours in running water at 13° to 15° C.

"No. 121, Iodo-Bromide Gelatine.

5 K I : 100 K Br.

Prepared like 120, only, besides the 1·2 K Br, 0·06 grammes KI and from as much to 1·5 Ag NO_3 was added.

"Coating of the Plates Nos. 120 and 121.

Temperature of the melting and filtering apparatus, 54 to 56° C.
,, plates previously warmed in the box, 60 to 62° C. (intentionally high in order to be able to coat quickly).
Temperature of boxes with plate-glass slides, upon which the plates rest during the coating .... 40 to 43° C.

The melted nodules gave only twenty-five c.c. of emulsion, and had, therefore, lost about eight c.c. of water in the washing. The twenty-five c.c. of melted emulsion was diluted with twenty c.c. of distilled water, and several times filtered through glass wool. A measure of special form was used. *The coating was accomplished with the greatest possible celerity so as to prevent the emulsion from after-ripening*, which might become of importance, especially when large quantities of unripe emulsion have to be poured. It is evident that even a temperature of about 40°, at which the pouring bottle must be kept, helps to ripen the emulsion, particularly the last part, and that it is the more ripened the longer the melted emulsion is kept warm. *The drying of the plates took place in the drying-box*, and required about ten to twelve hours.

"Preparation of the Quadripartite Plates for Spectrography. Each plate prepared with emulsion No. 117 (Br I, with silver oxide and ammonia), those prepared analogously with (Br) No. 118, No. 120 and No. 121, had two, one, three, and four diagonal pencil lines running across them, and were then cut into strips four and a-half mm. in breadth and eight mm. long. The intention of the pencil lines is to guard against one of the sixty strips being mistaken for the other. Every set of four strips is fixed together with gummed brown paper and dried in the drying-box. In the subsequent exposures the spectrum fell simultaneously upon all four preparations.

* Continued from page 95.

"Testing of the Plates Nos. 120, 121 (117, 118).

I. *With my small spectrograph* (according to Vogel)—

a. By sunlight.—3 fourfold plates, 2 double plates, 4 single,*
on the 8 Oct., 1882. 9 Oct., 1882. 10 Oct., 1882.

b. By cloud light.—3 fourfold plates,
on the 8 Oct., 1882.

c. Magnesium light.—2 fourfold plates.

d. Petroleum light.—1 fourfold plate.

Developer.—Eder's normal oxalate developer, always freshly mixed except in the case of the fourfold plates. These four plates were developed one after the other:—

Br	Br I	Br	Br I
120	121	120	121

in the same 28 c.c. bath. The pure bromide plates had thereby the advantage, and were yet less sensitive than the iodo-bromide plates towards the less refrangible rays. A single fourfold plate was developed with Stolze's developer.

II. "*With the Stereoscopic Camera*† (of E. Liesegang, Dusseldorf).—Two aplanatics, seven lines aperture, stop $4\frac{1}{2}$ mm.

By daylight in a room with light grey sky { 8 Oct., 1882 / 10 Oct., 1882 } Three pairs of plates.

First pair exposed for twenty-five minutes, from twenty minutes past three .... Second pair exposed for sixty-five minutes, from seven minutes past four............... } first Br at the left side of the dark side, then at the right.

Object taken: a table furnished with with white and coloured objects.

Third pair exposed for three hours, namely, from nine to twelve o'clock; a dimly-lighted interior, smallest top.

Developer.—Eder's normal oxalate developer, freshly mixed for the first pair, and stored in a tight bottle for the second. Third pair freshly mixed developer.

Results of Nos. 120 and 121.

"*Bromo-Iodide of Silver Gelatine*, which was only mixed but not digested in heat, and under the already-mentioned circumstances, showed *a greater sensitiveness* than the analogously-prepared bromide of silver gelatine—(1) in taking white and coloured objects; (2) particularly *towards the less refrangible rays* in the spectral light of the sun, of magnesium, and of petroleum. Thereby the sensitiveness of the maximum was driven considerably towards the red end by the iodide of silver. Where the action ends upon the gelatino-bromide there is only a moderate decrease in sensitiveness. While the spectrum of that only stretches to F, with the same treatment, the spectrum of this only disappears in the neighbourhood of E, between E and D.

"*The Duration of the Development* of the iodo-bromide plates was somewhat greater than that of the bromide plates; yet, if these be also hastened on before in the bath, they were soon overtaken and even surpassed by those, since they gave not only more details in the shadows but also somewhat better half-tones. I have not been able to discover want of intensity in these iodo-bromide plates, but in places even the very opposite. *The duration of the fixation* was certainly considerably prolonged by iodide of silver if I, as usual, used weaker solutions (1 : 4). For iodo-bromide plates 240 seconds were required, while *equally thick* bromide plates were fixed in only 110 seconds. But since the iodo-bromide plates, as I have briefly mentioned, can bear without injury a strong fixing bath (1 : 2), and dissolve in it considerably quicker than in a weaker solution, it appears as if iodide of silver bore in itself the cure of its fault—at least when hard gelatine is used.

"I must still refer to the spectra No. 117. All are fogged, and many even very much fogged. As is easily seen, the unmanageable plates, No. 117, developed much sooner than the others; consequently they fogged before anything was seen of the others. The emulsion is, therefore, by no means spoilt, as one might easily suppose from its spectra. That these plates still work free from fog you will perceive from the accompanying plate, No. 117 (interior view taken by a wide-angle lens), which I exposed just in order to show that. I have already observed in the case of earlier emulsions that the iodo-bromide containing ones darkened more rapidly, when exposed to daylight, than pure bromide emulsion does. I have again observed the same thing. The washed nodules of Nos. 120 and 121 were exposed to daylight in two glass beakers; here, also, the iodo-bromide preparation darkened most rapidly, if also more moderately, than the former highly-sensitive emulsion."

"In the first place," adds Dr. Stolze to the foregoing, "these plates confirm Herr Schumann's contention that the superiority of the addition of iodide is the more distinct the more the emulsion is treated with ammonia—a circumstance which is more interesting because iodide of silver is directly insoluble in ammonia. The sensitiveness of the bromo-iodised plates appears to be about half as great again as that of the pure bromide plates. They are particularly sensitive to the action of weak light, as is best demonstrated by the exposures to spectra by clouded sky and overclouded sunlight. In so far, however, as regards *general* sensitiveness: with respect to sensitiveness to colour, on the other hand, the difference is less pronounced than between the ripened emulsions. The nine combination spectra are real treasures for the cabinet. Each is formed of four narrow strips of glass, and, therefore, the collection embraces in all thirty-six separate spectra. The comparative spectra placed beside each other for sunlight, cloud light of every sort, petroleum light, and magnesium light are so instructive and speaking that we would wish all our readers could see them so. Placed alongside of each other they testify powerfully, both for ripened and unripened emulsion, to the correctness of Herr Schumann's contention by showing how advantageous the treatment with ammonia is along with the addition of iodine. In this respect, also, they are perfectly irrefutable, and will show all practical men who have as yet only been using iodide without ammonia how they must proceed when trying to obtain the maximum of sensitiveness."

* Here the camera was drawn out wider, therefore the width of the spectrum was increased from $19\frac{1}{2}$ to 23 m.m.

† I must remark that this camera is excellently finished, and the difference between my plates by no means results from faults in the apparatus.

In a later number of the *Wochenblatt* Dr. Stolze prefaces yet another communication from Herr Schumann with the following words:—

"It is recognised that the certainty of every disputed point—except, of course, such as are purely mathematical—is very much increased when one obtains the same results by different ways. Now, however convincingly Herr Schumann's former labours may prove to unprejudiced persons—the greater sensitiveness of iodo-bromide emulsion to both white light and light of little refrangibility—he has not shirked the trouble of beginning a new series of experiments according to new principles. He has again sent us a series of spectral photographs, and writes regarding them:—

"'In another way I have yesterday collected further material in proof of the superiority of gelatino-iodo-bromide. As yet I have always exposed bromide and iodo-bromide plates directly to the light of the spectrum, and generally exposed both simultaneously, one alongside of the other. As hundreds of my spectrographs show you, the less-refrangible rays act upon gelatino-iodo-bromide when under the same circumstances gelatino-bromide is quite insensitive to them. As is generally known, only those rays have a photographic action upon a substance which are absorbed by it, yet part of the light not absorbed by the bromide plate must have succeeded in acting upon the iodo-bromide plates.

"'In order to convince myself of the permissibility of my assumption, I divided two plates (one of No. 120, unripened bromide gelatine, and one of No. 121, unripened iodo-bromide gelatine) into strips 12 mm. in breadth. Three such strips were simultaneously exposed to the light of the spectrum. The three strips were so arranged that the rays first passed through one bromide plate before reaching the pair placed behind and alongside of each other, one of which contained only bromide of silver, but the other iodo-bromide of silver. As all the strips were only 12 mm. in width, but my spectrum in that dimension measured 21 mm. (that is, broader than before), I obtained upon the two plates placed alongside each other four different spectra; the two middle ones elucidated the influence of the bromide plate upon the absorption. The sky was covered with dark clouds, for which reason I lighted up the slit of my small spectrograph with petroleum and magnesium light. The width of the slit during all four exposures was about one-third of a mm., the duration of the exposures one, two, and three hours, and the distance from the magnesium ribbon was 40 c. m. The development took place with Eder's normal developer *without* the addition of bromide of potassium.

"'The spectrographs obtained in this way are very interesting, and are, therefore, sent along with this. I must, however, mention that the plates marked II. (the exposures are numbered I., II., III., and IV.) were exposed differently from the others; in this case the light of the spectrum was allowed to fall first upon the pair of plates and then upon the single bromide of silver plate, which was placed beneath them. In this way the influence of the reflex light between gelatine films lying one upon the other must have made itself evident. How considerable the reflex action is one may sufficiently perceive from II. In every case the high gloss by which these plates are distinguished has greatly supplemented it.

"'All the iodo-bromide plates have, where covered by the bromide plate, an extensive spectrum of great intensity, while the covered bromide plates, even where by direct lighting their photographic maximum would lie, hardly allowed even a trace of action to be recognised; and that even with an exposure of two hours and with the petroleum lamp at a distance of only 4 c.m. The magnesium light acted similarly. As soon as the weather permits I shall repeat this experiment by sunlight.

"'In order to be able to find again the reciprocal position which the plates occupied during the exposure, I made a stroke diagonally across the bromide plate, and this stroke could be recognised on both the other plates as black or transparent lines. The result of my exposures to the spectrum surprised me somewhat, in so far as that I had previously thought a certain amount of action of the light would be perceptible upon the undermost bromide plate—at least with so extended an exposure as that of two hours is, especially as the unripened gelatine films were pretty transparent. I shall, with necessary precautions, carry out an experiment analogous to the present one upon doubled plates. The iodo-bromide plates will then show more clearly than my present stereograms how energetically iodide of silver is able to hold the rays which bromide of silver allows to pass through it. The photograph of a group of palms seems particularly suited, by what I have already observed, to serve the present purpose.'"

In order to the better understanding of the above, Dr. Stolze adds that the spectra sent to him are of four groups, each consisting of three spectra, two of which—upon a bromide and upon an iodo-bromide plate respectively—are firmly joined together; while the third, a pure bromide of silver plate, was placed, in the case of I., III., and IV. over, and in the case of II. under, the other two joined plates, so that the half of each was free while the other half was exposed under its influence. No II. was particularly interesting as showing how considerable a quantity of actinic light is reflected by a pure bromide plate. One cannot really consider it a wonder, since such a plate really looks *white* by reflected light. It would have been well if Herr Schumann had also tested in the same way iodo-bromide of silver plates, which reflect yellow coloured light, and ascertained how much actinic light they transmit or reflect. As is to be expected, the amount—at least in the first case—will turn out to be very small, though, theoretically considered, on account of the displacement of the maximum action in iodo-bromide plates, it was not here absolutely concluded that they transmitted some actinic light exactly at the place of the maximum action upon bromide of silver. At anyrate, the whole way in which this new series of experiments is arranged is a new proof of Herr Schumann's deep insight, and of the masterly way with which he knows how to handle scientific photographic experiments.

(*To be continued.*)

Our Editorial Table.

"MICROPHOTOGRAPHY." By A. COWLEY MALLEY, B.A., &c.
London: H. K. LEWIS, 1883.

THIS work, which has just reached us, is a treatise on *Photomicrography*, and the first suggestion that presents itself to the mind is that an author should be acquainted with the correct title of the subject he deals with. "Photomicrography" and "microphotography" are quite distinct terms.

It is a fact evident to all who read the photographic journals that a lively interest has recently been awakened in the art and practice of photomicrography and its capabilities. It has often been stated by those most competent to judge that, in drawing illustrations of the microscopical character of histological and other subjects, authors are apt to be led into the pardonable error of drawing what their preconceptions of a structure induce them to believe, and with a view of impressing on their readers the points to which their attention should be directed—to, as it were, "punctuate" their drawings, so that, strictly speaking, they have not the appearance actually and veritably seen by an unbiassed observer, and which to other eyes might he capable of differing interpretations. Hence photomicrography has come to be considered a valuable auxiliary in arriving at truthful conclusions relative to the nature of a structure. The revival of attention to this art has been regarded with great interest, and has eventuated in much writing on the subject.

The author of the work under consideration has furnished his quota to this writing in a neatly-bound little volume of 151 pp., and he seems to have had some practical acquaintance with his subject. But one lays down the book with a feeling of disappointment, for it might claim to be a treatise on optics or a guide to a histological laboratory quite as much as a description of a method of photomicrography; and, while optics and histology are both of some importance in their bearings on this art, yet one regrets that 73 pp.—nearly one-half the book —should be occupied by material which any Encyclopœdia or manual of photography could more fully and as readily furnish, while the treatment of the subject which the book especially treats is limited to 38 pp.

Undoubtedly the art is environed by many and great difficulties, and the photographic frontispiece to this volume bears sufficient testimony to the fact that much will have to be overcome before we can congratulate ourselves upon success.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 5	W. Riding of Yorkshire	Godwin-street, Bradford.
" 6	Sheffield	Freemasons' Hall, Surrey-street.
" 6	Halifax	*Courier* Office, Regent-street.
" 7	Benevolent	181, Aldersgate-street.
" 7	Edinburgh	Hall, 5, St. Andrew-square.
" 8	Manchester	Mechanics' Institution.
" 8	London and Provincial	Mason's Hall, Basinghall-st.
" 9	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of the above Association, held on Thursday, the 22nd ult., the chair was occupied by Mr. W. H. Prestwich.

The question of the advantage, or the contrary, of the addition of iodide to a bromide emulsion was discussed.

Mr. A. COWAN said that he could not obtain such good quality when using iodide as he got with bromide only.

Mr. J. BARKER remarked that the difficulty he found when adding iodide to emulsion was that the image refused to take density with pyro. and ammonia, and required subsequent intensification. The addition of the iodide, however, helped to keep the shadows clean.

Mr. A. J. BROWN found that iodide showed the emulsion very materially.

The CHAIRMAN showed a packing-box which he had made for commercial use on the Schwartz plan, as modified by Mr. Brown, by using cardboard only. He had, however, made a little change by having the fold of card which represented the original wooden pillars made of a V form, as when made flat, after Mr. Brown's model, they were apt to be bent on one side.

Mr. BROWN said it had been suggested that the pressure on the plates caused by the card at the ends would cause insensitive markings. He had tried a pressure of three pounds to the square inch without producing any such result.

Mr. A. L. HENDERSON observed that he thought danger might arise from the plates rattling or chafing, as they were not held tightly together as in the usual packages. He (Mr. Henderson) then showed a plate envelope sent by the editor of the *Scientific American*. The envelope or dark slide (for it was intended to be used as such) was made of a very stout reddish-coloured paper of the thickness of thin cardboard, and was about a quarter of an inch thick and three-eighths to half-an-inch larger each way than the plate it contained. The two sides and one end of the envelope were formed internally of narrow strips of wood about one-eighth of an inch thick, and the plate was slipped in at the remaining end. To these slips of wood the opaque paper was attached—one thickness for the back and two for the front. The two papers in the front had openings nearly as large as the plate itself, and between the edges of these two front pieces was the piece which served as the shutter. The last eighth of an inch of this piece was folded sharply back to form a stop when the shutter was drawn out for exposure. The inner of the two thicknesses of paper on the front of the envelope and the piece forming the shutter were continued in the form of envelope flaps, and were tucked under a strip fastened across the back of the slide. Two brass clips held the inner flap close down in its place, whilst allowing the shutter flap to be withdrawn. It was stated that the envelope slide had a large sale in the United States, and that a number of plates could be carried with much less weight and bulk than by using either double dark slides or a changing-box.

The CHAIRMAN said that he had tried the method of enamelling described at the previous meeting by Mr. W. M. Ashman. He had also tried to retain the gloss by the method then suggested of pasting the prints while on the glass and mounting when dry by rolling pressure on a damp card. He found that it was successful only when, in addition to previously rubbing the plate with talc, he applied to it a coating of curd soap, a very small quantity of which he had dissolved in equal parts of water and alcohol and poured on like collodion. Without this precaution the paste, penetrating the photograph, caused it to adhere to the glass.

Mr. HENDERSON suggested that wax dissolved in benzoline one grain to the ounce would answer the same purpose.

Mr. W. E. DEBENHAM said that he had tried gum on the back of the print. He found that with a solution so thick that the brush would scarcely move in it the print came away from the glass satisfactorily; with a thinner solution the print stuck to the glass.

Mr. HENDERSON showed two enamels from negatives, taken by Mr. W. Cobb, of the unveiling of the statue of the late Prince Imperial at Woolwich.

Mr. COBB said that the enamels were far superior as photographs to the silver prints which the same negatives yielded.

Mr. A. MACKIE exhibited a plate coated with a mixture of one part of varnish to seven of collodion. Dried cold the surface was matt, but where warmed, either while coating or after drying, the surface was bright.

Mr. COBB showed an unexposed gelatine plate which had rough patches on the surface. He did not find that these patches made any difference in the negative, but would like the opinion of the members as to their origin.

Mr. HENDERSON attributed them to dirt not filtered out of the emulsion.

Mr. BROWN thought they were due to particles of coarse bromide.

Mr. DEBENHAM considered that if they consisted of bromide in a different state from that of the rest of the plate, they would show some difference of development.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Society was held at the Free Library, William Brown-street, on Thursday, the 22nd ult.—Mr. B. Boothroyd, President, in the chair.

The minutes of the January meeting having been read and confirmed, Messrs. R. G. Hall, E. Major, W. Rogers, H. Simpson, R. H. Simpson, and L. Wynne were elected members of the Association.

The HONORARY SECRETARY then read letters from the Librarian of the Free Library, the Keeper of the Royal Institution, and the Curator of the Mayer Museum.

The CHAIRMAN announced the following donations to the Library:— Four volumes of the *Photographic News*, from the Rev. G. J. Banner, and twelve lantern slides from negatives by the late President, Mr. E. Roberts, by the Rev. H. J. Palmer.

A discussion ensued on the proposal to change the place of meeting to the Royal Institution.

The Rev. G. J. BANNER proposed, and Mr. J. H. T. ELLERBECK seconded, a resolution to the effect that the present arrangements be continued till the end of the year. After some debate the resolution was carried unanimously.

Mr. J. A. FORREST made some complimentary remarks on the arrangements at the Association's photographic exhibition at the recent *soirée* at St. George's Hall, and proposed a cordial vote of thanks to the Hon. Secretary, the Rev. H. J. Palmer, for his successful efforts on that occasion. Mr. J. L. CORKHILL seconded the proposal, and the members present passed the resolution with much applause.

The Rev. H. J. PALMER, in offering his hearty thanks to the gentlemen who had brought the resolution forward, and to the meeting generally for the cordial manner in which the vote had been given, remarked that he was afraid that Mr. Forrest and himself might be accused of belonging to a mutual admiration society if he asserted, as he was honestly bound to do, that very much of the great success of the Association's exhibition on the occasion referred to was due to Mr Forrest himself. After having been kept waiting during the whole day, when at 5.30, at last, the sitting judge vacated the court in which the exhibition was to take place, he (the Secretary) had felt utterly beaten, and in despair at the thought of the amount of work to be done in the single hour at their disposal for the preparation of their exhibition. But Mr. Forrest bravely and kindly rushed into the breach, and, after efforts almost superhuman, by 7 p.m. one of the finest displays of photographs and apparatus was opened to the throngs who crowded the Liverpool Amateur Photographic Association's department of St. George's Hall on the night of the *soirée*.

Mr. W. H. Kirkby exhibited a print from a negative of the transformation scene at the pantomime at the Alexandra Theatre, taken during the performance, with an exposure of one minute.

The Chairman passed round some transparencies made on Chapman's new gelatine and albumen plates, and commented with approval on the clearness of the shadows obtainable with them.

Mr. H. A. Wharmby wished to remind the members of the duty which devolved upon each of them, of presenting his portrait to the album of the Association.

The Rev. H. J. Palmer pointed out the historic value of this book, especially in connection with the series of portraits of past presidents of the Society. This series was far from complete, and it was very important that the gaps should be filled up speedily.

The Chairman announced that the presentation print for last year, from Mr. Ellerbeck's negative, would be ready for distribution in ten days or a fortnight. A companion picture had been printed, and could be obtained by the members on application at 54, Bold-street.

The Honorary Secretary called the attention of members to the gratifying fact that after the elections made at that meeting the number of members of the Society had now reached one hundred.

Mr. J. Knott then gave a lantern exhibition of slides contributed by Messrs. Ellerbeck, Forrest, Phillips, and Palmer.

Messrs. Newton and Co. exhibited a new enlarging lantern with condensers six inches in diameter. Mr. Ellerbeck presented a selection of prints to the Society's album.

The meeting was shortly afterwards adjourned to the last Thursday in March.

Correspondence.

THE SENSITIVENESS OF IODIDE EMULSIONS.

To the Editors.

Genlemen,—In a recent number of The British Journal of Photography I am afraid I may unwittingly have done Herr Schumann an injustice. According to his ideas, expressed at page 95, vol. xxx. (16th February), it seems that he means that iodide and bromide mixed are more sensitive to colour than bromide alone.

With this I agree to a certain limit, as my recent paper *On the Effect of the Spectrum on the Haloid Salts of Silver, and on Mixtures of the Same*, read at the Royal Society, fully shows. A reference to figures 60, 61, and 62 will demonstrate this. The iodide shortens the limit towards the least refrangible end of the spectrum which can be reached, but pushes the maximum nearer to the red. The extra-sensitiveness of the bromo iodide emulsion to petroleum light might have been expected.

At the same time, the bromide emulsion used by Herr Schumann behaved in an extraordinary manner if it was insensitive to the ultra-violet—a case I have never met with. The emulsions I prepared were made by the boiling process, and also by the ammonia process.—I am, yours, &c., W. de W. Abney.

February 26, 1883.

DENSITY IN GELATINE PLATES.

To the Editors.

Gentlemen,—In company with other amateurs I have been pursuing a continuous course of experiments with a view to establish what is the element in gelatine plate making which gives density. I have tried all sorts of methods, different kinds of salts, boiling five minutes up to half-an-hour, mixing at high temperature, and various makes of gelatines, but up to the present have failed to get the desired density in the finished negatives, though I have also varied the development, much or little pyro. and ammonia.

Now that so many amateurs make their own plates, the process being so simple, it would be interesting to learn through your columns the experiences of others and how they account for obtaining density. I may say that with chloro-iodide-bromide plates I can get any amount of density, but not extra rapidity, which is what I want.—I am, yours, &c.,

Woking, February 26, 1883. Wm. Wainwright, Jun.

SULPHITE OF SODA IN THE DEVELOPER.

To the Editors.

Gentlemen,—May I offer my mite of experience as to "use" and "abuse" of sulphite of soda in the development of gelatine plates?

I have used it in varying proportions for over a hundred plates during last summer, purposely experimenting with proportions from five to fifty grains to the full dose of developer; plates all $8\frac{1}{2} \times 6\frac{1}{2}$, by various well-known commercial makers; subjects in all cases landscape, with exposures from five seconds to sixty.

My plan of procedure is to add *one ounce* of the salt to *ten ounces* of water in a stock-bottle, which gives within a fraction of five grains to each fluid drachm. To develope a plate $8\frac{1}{2} \times 6\frac{1}{2}$ I require five ounces of water, to which, after soaking, I add fifteen grains of dry pyrogallic acid and two or two and a-half drachms of the soda sulphite; then develope in the usual way, commencing with ten to fifteen drachms of the usual formula for ammonia and bromide.

I have used as much as fifty grains of sulphite to the dose, and the chief difference in its action I find to be this:—The larger the quantity of sulphite the blacker the colour of the developed negative and the slower the process of development. But I have established the opinion, for my own working, that there is no advantage in the cleanliness of the developed image by adding a larger dose of sulphite than one grain of it to each grain of pyrogallic acid used, and with a well-timed exposure of the plate I consider that ten grains of sulphite (*i.e.*, two drachms of the stock solution) is better than any larger quantity. It preserves the clearness of the shadows as well as the larger doses recommended, and the delay in development is very slightly perceptible. If I have reason to suppose that the plate is rather over-exposed I would use fifteen grains of sulphite instead of ten.

A great deal has been said and written about the colour of a wet collodion plate being taken as the perfect standard for a negative. I rather disagree with this accepted doctrine. I have developed a large number of 12×10 collodion negatives by the old iron process, and have produced work as good as it is possible by it; but I fail to see that the colour was any real advantage in printing over the browner tint of the old collodio-albumen plates we used to consider the *best dry plates* in the same period.

The advantage of the small dose of sulphite in the present dry-plate method is that you can *regulate* the *colour* of your negative film to anything you like. If five grains only be used you get a darker brown than by ammonia alone. Ten to fifteen grains give a beautiful *olive-brown* tint, very excellent for density, without blackness, and, I think, a better printing colour than either the reddish tint of ammonia only or the black tint of much sulphite. I believe that if photographers will try the effect of *small* doses of sulphite they will find it very efficient in preserving the clearness of the shadows, no perceptible loss of time in development, and a more beautiful tint in the negative.—I am, yours, &c., Lux.

February 27, 1883.

IODIDE IN GELATINE EMULSION.

To the Editors.

Gentlemen,—Permit me, in reply to Captain Abney's letter, to say that in my former communication I claimed only to have proved, and published, the value of iodide in gelatine emulsion *in the stage in which the process was at that date.* Had I professed to have done in 1877 what others have done in later years, there might have been some excuse for Captain Abney's complaint. Let each one have due credit for his share in the work of bringing any process to perfection. I willingly recognise and appreciate the labours of *all* who have had a hand in perfecting the process in question.

The value of iodide being now recognised is, in my opinion, a valid reason for desiring the record of progress to be a correct one. Mr. E. H. Farmer has honourably acknowledged the error, and I beg to thank him for his candour. To take up Captain Abney's metaphor, I may say:—The valiant defence of the "child," asserted by Captain Abney, I am not going to dispute, for, however "welcome my help would have been," I have never recognised any *special responsibility* in its "bringing up." If he has of his own free will taken to it I make no complaint; but, logically, that gives him no title beyond that of foster-father. It does not invalidate *my* claim to be its parent, nor does it justify a charge of neglect against *me*.

Yet I find myself indicted upon a novel charge of child desertion, and by it, I am told, I have forfeited the privilege of paternity. That the father should relinquish his rights in the "child" in favour of another who claims to "have brought it up properly" is an amusing *non sequitur*. From Captain Abney's pathetic complaint it might really be supposed that he had found the "child" deserted on a door-step; in his compassion for the forsaken one had hugged it to his bosom, rescued it from death by coldness and neglect, had fed and nurtured it, and taught it to run in the way it should go, when—oh! horror of horrors!—a claimant appears upon the scene to snatch the darling from his arms!

If Captain Abney has acted the part of a foster-father to the "child" I am willing to give him credit for all his care, but I cannot confess to having forsaken it. In truth, is not this child, iodide, precious to all of us—so to say, a "child of the regiment" of photographers—who has had, and should still have, many foster-parents, all contentedly sharing a common interest in its growth and prosperity?—I am, yours, &c., G. S. Penny.

Cheltenham, February 24, 1883.

THE FIXING BATH FOR NEGATIVES.

To the Editors.

Gentlemen,—I have this morning been informed, by a professional photographer of eminence and a distinguished amateur, that any number of negatives may be fixed in one bath of hyposulphite of soda twelve months old, whether saturated with sulphide or bromide of silver; that no deposit of sulphide of silver will take place on the film; and that they will fix out bright and clear.

If this be so, why should we be continually told to "use a fresh solution of hypo. to fix your negatives," as prescribed by all the published formulæ ?

I shall be obliged by your allowing this letter to appear in the next number of your Journal, as it is of importance, and I should like to know if it be so or not.—I am, yours, &c., W. HARDING WARNER.

Clyde Park, Bristol, February 28, 1883.

THE PHOTOGRAPHIC CLUB AND PUBLICATION.

To the EDITORS.

GENTLEMEN,—The committee of the Photographic Club have requested me to state that the Club does not officially publish its proceedings except in its annual report. The statements of Mr. A. L. Henderson, in his letter of the 19th ult., respecting publication are therefore incorrect.

For the convenience of members a subject for discussion is announced weekly in the photographic press.—I am, yours, &c.,

28, *Oseney Crescent, N. W., Feb.* 28, 1883. E. DUNMORE, *Hon. Sec.*

EXCHANGE COLUMN.

I will exchange a sea view, by Marion and Co , for a cloud background.—Address, H. CROOK, Newington-butts, London.

I will exchange a portable 12 × 10 folding camera, with two dark slides, all in good condition, for a light 10 × 8 ditto, with three double dark slides.—Address, J. W. MOOR, 16, Arwenack-street, Falmouth.

I will exchange a 10 × 8 bellows-body folding camera, rising and sliding front, one double and one single slide, in leather case, for a good half-plate ditto and lens.—Address, F. T. P., 84, St. Paul's-road, Canonbury, N

I will exchange my 5 × 4 camera, with Tench's view lens and four double backs, equal to new, for a 7½ × 5 or whole-plate bellows-body camera with one double back.—Address, Dr. BAHIN, Stanley House, Heatonmoor, Stockport.

I will exchange, for anything useful in photography, a quarter-plate view lens and folding camera, with double dark slide, and a half-plate changing-box; also electric coil with brass pillars and five lifts. Photograph sent if required.—Address, R. READ, 109, Ribbleton-lane, Preston.

I will exchange a first-class bench lathe, with back gear, slide rest, three and a-quarter inch centres, hand rests, face plates, chucks, &c., complete, for a good landscape stereo. camera and extra backs, or useful photographic apparatus on approval.—Address, F. W. CHEETHAM, Hyde, near Manchester.

I will exchange a first-class lock-stitch, European sewing-machine, with fall leaf, arm, cover, instruction-book, all extras, in perfect condition, only used a few times, cost nine guineas. What offers in photographic lenses? landscape preferred.—Address, R. LEATHER, 43, Chapel-street. Leigh, near Manchester.

Lots of surplus apparatus, &c., will be exchanged for backgrounds, old stone balustrade, Haddon Hall steps, grass mats, and other accessories, head-rest, or anything useful in the studio ; list sent. Send photographs and description, which will be returned.—Address, W. S. DOWNES, Rembrandt Studio, Sleaford, Lincolnshire.

Wanted to exchange, a 5 × 4 mahogany camera and half-plate Lerebours' lens, and a pair of bells, telephones, (one not complete), and a four-power electrical coil, in parts, for a half-plate dry-plate camera and Ross's rapid symmetrical or Dallmeyer's rapid rectilinear; difference in cash.—Address, J. EDWARDS, 79, Ashford-road, Eastbourne.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

William Starkey Downes, Rembrandt Studio, 16, Northgate-street, Sleaford.—*Photograph of Thomas Garry, otherwise "Irish Joe."*

STEPHEN.—Copal or amber varnish may be procured as articles of commerce from any varnish manufacturer.

A. Z. B. Y.—We will make inquiries and let you know in a future number, or possibly write to you privately.

A. J. WALLACE.—The excessive bronzing of the shadows is due to the paper being sensitised on too strong a silver bath. As you do not sensitise your own paper we advise you to obtain a supply from another source.

YORKSHIRE.—We do not fancy you will better your position much by coming to London. You appear to think that the "club system has not been worked to any extent in the metropolis." You could not well labour under a greater misapprehension.

PERPLEXED JACK.—We have already many complaints of the spotting coming off the prints in the burnishing. There is nothing better to use than ordinary water-colour. See that the prints and the spotting are thoroughly dry before burnishing. Of course you use the alcoholic solution of soap as a lubricant.

W. B. ALLISON —Collodion iodised solely with iodide of cadmium is very prone to behave in the manner you describe. The only plan is to add a few drops of tincture of iodine a few hours before use. If in place of iodising with cadmium only you add a little iodide of ammonium or potassium you will avoid the trouble in future.

GEO. R.—The cause of the collodion "going jellyfied" is that the greater portion of the solvents have evaporated. The only remedy is to add fresh Three parts of sulphuric ether to two of alcohol will be a good proportion to employ. From what you say, however, of its age, we think you had better throw it away and procure fresh.

H. J H.—1. Add an excess of carbonate of silver and expose the solution to strong light, in a white glass bottle, for a few days; then filter, and the colour will have disappeared.—2. The material mentioned is very good indeed for the purpose.—3. Study Mr. E. Howard Farmer's articles in the last and current number of the Journal, and you will find what you require.

MIGNONETTE.—We can scarcely advise as to salary from the single example of your colouring. It is very delicately tinted, and we should say you ought to have no difficulty in obtaining an appointment as assistant colourist. But, if you can undertake highly-finished work, of course you can then command a much higher salary than you can for simply tinting, such as the specimen you have enclosed.

SEESTIC.—1. There is no good work on the subject in print now. Bigelow's *Album*, which is out of print, is very good ; you might possibly be able to get a second-hand copy by advertising for it.—2. We fear you will have great difficulty in disposing of old quarter-plate glass. The best plan will be to advertise it for sale.—3. No doubt Mr. J. J. Atkinson, of Liverpool, will supply you with the American photographic publications.

FORFAR BRAIDIE.—If you repeat the experiment quoted by your old professional friend you will find he is practically correct in what he says—the longer exposure is necessary under the altered conditions of the larger image being obtained. Your theory and figures do not disprove what is found to be correct in *practice*. The terms "equivalent focus" and "back focus" are well understood by the majority of our readers. What would be the use of introducing a new "back focus" which is not the "opticians'?"

PATIENCE SCIENCE PASSE.—You cannot do better than employ one of the so-called "pocket cameras," as you appear only to require the views for lantern purposes. If you wish for a larger size take a seven and a-half by five camera. This, with a partition, such as are supplied with these instruments, will enable you to take two views on the same plate for lantern purposes, or one view the full size, as you may require. There is no good work on the subject at present, but you will find much useful information distributed throughout the back numbers of the Journal.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—On Wednesday next, the 7th inst., the subject for discussion will be *On Lenses Most Suitable for Producing Enlargements.*

PHOTOGRAPHIC COPYRIGHT PROTECTION ASSOCIATION.—We have received a copy of the rules of this Association, recently established for the purpose indicated in its title. Any photographers, whether amateur or professional, who are interested in the matter may obtain a copy of the rules and all particulars from the Hon. Secretary, Mr. E. A. Cade, 339, Clapham-road, S.W.

THE QUEEN AND JESSIE ACE.—A telegram from Pontypridd says:—The Queen, in acknowledging the receipt of a portrait of Miss Jessie Ace, the heroic rescuer of two of the shipwrecked crew of the barque "Prinz Adelbert," on the 27th of last month, states that she is greatly pleased with the photograph, both as a work of art and as a memento of a noble act. The photograph was supplied at the express request of Her Majesty.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician

For the Week ending February 28, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Feb.	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
22	30·37	W	52	50	—	56	44	Overcast.
23	30·80	W	40	38	—	51	34	Hazy.
24	30·63	W	40	39	—	53	33	Overcast.
26	30·62	W	40	39	—	48	37	Foggy.
27	30·45	WNW	42	40	—	51	36	Foggy.
21	30·49	NW	49	48	—	56	39	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1192. Vol. XXX.—MARCH 9, 1883.

OUR ILLUSTRATION.

Some few months ago we devoted a series of articles to the subject of amateur portraiture, with a view of showing that the orthodox "glass room" is not a necessity to the production of pleasing and artistic portraits. The picture which accompanies the present number is an admirable example of what can be done in "an ordinary room," and, moreover, under difficulties. The portrait is taken by Mr. William Adcock, of Melton Mowbray—an enthusiastic amateur, whose interiors and figure studies have been noticed in connection with the last three exhibitions in Pall Mall. It is printed the actual size of the negative—that is, it is a *direct* portrait, not an enlargement; and, when we state that the term just applied—"an ordinary room"—should be modified to an ordinary room *in an hotel*, our readers will possibly be able to conceive the difficulties that had to be surmounted by the artist. The picture was, in fact, taken while Mr. Adcock was travelling, and shows how thoroughly the lighting can be mastered with a little care. The negative, we may also say, is entirely innocent of retouching in any shape or form.

VARIATIONS IN DEVELOPMENT.

A fresh interest has been revived recently on the subject of the tone of developed images in connection with the application of printing by development, to the production of transparencies, opal and paper positives. Since the introduction of gelatino-bromide emulsion paper the importance and value of the new medium to the enlarger has been fully recognised, as with no more powerful light than a paraffine lamp a few seconds only will suffice to produce a picture amplified to several diameters.

These enlarged images are for the most part intended for colouring or, at least, for finishing in indian ink; hence the cold, black tone is of little consequence. But for smaller work or for transparencies a richer or warmer tint is required; and here, unfortunately, gelatino-bromide has hitherto failed to give satisfaction. Though we have seen many very fine examples of enlargements and opal work produced by means of gelatino-bromide, and exhibiting rich, warm, black tones, there is no denying the fact that public taste has not yet been sufficiently educated in that direction to render such productions universally popular. It has been, and still is, the fashion to look to the purple and other warm tones of albumenised paper prints as the standard of excellence, and it will be long, probably, ere this fashion will entirely change, for which reason it behoves us to endeavour as far as possible to mould to our purposes the means we have at command.

In the days of developed prints, when silver development with gallic or pyrogallic acid was the rule, very wide differences could be obtained in the colour of the resulting prints by simply varying the exposure and development. In these days of gelatino-bromide developed prints how little is this done! The universal practice appears to be to employ a standard exposure and a standard ferrous oxalate developer, and the only variety in the tones is the result of the greater or less suitability of the negatives to the requirements of the process. It is doubtful, indeed, whether any variations in the mode of using this particular developer—as by giving short exposures and powerful development, and *vice versâ*—would result in any very great modification of the prevailing blackness of tone; but it is possible that by adopting other means greater success may be achieved.

As we have said, silver or physical development presents greater facilities in the production of a wide range of tones than does the more modern "chemical" system, under which form are reckoned alkaline pyro. as well as the ferrous oxalate *et id genus omne*. But even with chemical development something may be done to vary the colour of the image, and we believe that it is not beyond possibility that a great deal more may be effected.

Some years ago Mr. William Brooks, in the course of a paper read before the South London Photographic Society, published the interesting fact that by the addition of certain comparatively inert (so far as development goes) substances to the alkaline pyro. a variety of pleasing tones were obtainable with collodio-bromide plates. True, the same rule does not necessarily apply in the case of gelatino-bromide; but, reasoning by analogy, there is no reason to doubt the existence of the principle. A familiar instance of such alteration in the tone of a gelatine image is to be found in the behaviour of sulphite of soda, which, as all gelatine workers are aware, in addition to rendering the developer cleaner changes the colour of the image from brown to black. If the sulphite act in this manner why should not the acetate, phosphate, tungstate, and other similar salts of soda, as proposed by Mr. Brooks, not have their specific action?

Besides these substances, many others—such as albumen, honey, glucose, sugar, and indeed almost any apparently inert material, if added to the alkaline developer—produce more or less variety in the colour of the image; while it is well known that the alkali used has a similar effect. It is not, perhaps, so generally known, however, that other substances may be substituted for pyrogallol in the alkaline developer—such as gallic acid, tannin, coffee, tea, and many others—each bringing with it its own peculiarities. Most of our readers whose dry-plate experience dates back as far as the tannin process, or who have used the more recent "Liverpool dry plates" (which were collodio-bromide plates with a tannin preservative), will remember the magnificent crimson, claret, and purple tones which were obtained in the negatives under certain conditions of exposure and development. These, if they could be obtained with certainty upon gelatine films, would constitute all that is required—at least for transparencies—for it is possible that the colour by reflected light would not be much altered.

Turning to ferrous oxalate: though the ground has not yet been "exploited" in that direction, there is very little reason to doubt the efficacy of similar additions in modifying the colour and character of the image, the chief question for solution being whether such modification can be made of the desired character—that is, whether the tone can be rendered warmer. If this be the case, then we have little doubt that ferrous oxalate (or at least a ferrous developer) will remain in vogue for gelatino-bromide paper work, and, moreover, that the latter will gain much in popularity. The objection to pyro. for this class of work is its great liability to stain not only the gelatine film, but, worse, the paper basis of the print. The first form of stain may be removed without difficulty when glass is the basis of the picture, but paper retains most obstinately any discolouration that may occur; and it is needless to say that it requires

but the slightest degradation of the lights to utterly spoil the effect of the picture.

There is one other direction in which variety of tone may be sought, and this, in conjunction with suitable modifications in the preparation of the films themselves, will probably be found the most fruitful—as it is the least trodden—ground. We allude to the employment of ferrous salts other than the oxalate and citrate, which are the only two that have hitherto acquired any practical application. Some five or six years ago Mr. M. Carey Lea pointed out that a great many, if not all, the organic ferrous salts possessed more or less developing power, the oxalate being the one which at the time he preferred, and which has retained its position up to the present. A little less than three years ago, however (in June, 1880), Mr. Lea published the results of further investigations, the result of which had been to convince him that many of the inorganic ferrous salts possessed developing powers, and, further, that the oxalate was not the best salt to employ. In fact, three inorganic developers were named, all of which were said to surpass the ferrous oxalate in vigour as well as quality of result; these were the phosphate, the borate, and the sulphite developers, in which the ferrous salts are dissolved, as in the case of the oxalate, in solutions of neutral potassium or ammonium oxalate. A fourth—the boro-tartrate—was described as possessing "this singular property—that with a film containing silver bromide, chloride, and iodide (with, of course, bromide largely preponderating), it gives red-brown images when employed alone and olive-black when a little soluble bromide is added as a restrainer."

The following is the formula:—

Neutral ammonium tartrate	200 grains.
Borax	50 „
Water	3 ounces.

When fully dissolved add—

Ferrous sulphate	50 grains.

Let stand six hours; then filter.

Now, for any of those who are interested in the production of positive images by means of gelatino-bromide we have indicated the direction in which they may find plenty of food for research, and we hope that others will take up the subject and work it to a successful issue.

A PLEA ONCE MORE FOR THE STEREOSCOPE.

The forthcoming spring will, without doubt, see many new recruits in the army of amateur photographers. These, and many others who have enlisted under the banner of our art-science since the introduction of gelatine plates, are doubtless yet somewhat undecided as to what size and kind of apparatus they shall adopt for outdoor work during the approaching season.

There is no question that the taste for the lantern is still on the increase, and many will therefore content themselves with taking negatives from which slides may be printed direct, by superposition, without the trouble of having to reduce them from a larger size, trusting to the enlargement of the small picture in the event of other sizes being required. Others, on the contrary, will prefer to employ such apparatus as will enable them to secure larger pictures direct, and rely upon their subsequent reduction for lantern slides.

The suggestion we are about to make to those who may adopt either system is nothing less than a plea for the stereoscope, which of late years has gone so much out of fashion. Why it should have done so is difficult to explain. Certainly it was not because the stereoscope did not meet with universal approbation. In proof of this we may mention that, about a quarter of a century back, a stereoscopic magazine was published each number of which was illustrated with stereoscopic pictures, and there also existed a club for the exchange of slides amongst amateurs. At the period to which we allude few drawing-room tables were without one or more stereoscopes and a collection of slides; now they are seldom seen. If, perchance, they are met with, more frequently than not they are in a most dilapidated condition, the instrument itself being broken or otherwise out of order, and the slides in a faded and woefully soiled condition, clearly indicating that no addition has been made to and little interest taken in the collection for the last twenty years or more. If further evidence of the state of desuetude of the stereoscope be required we have only to attend the periodical sales of scientific apparatus, when it will be seen that when stereoscopic cameras or lenses are submitted for sale by auction they realise an exceedingly small amount, and stereoscopes and several dozen slides often command only a sum so small as to appear ridiculous.

The introduction of *carte-de-visite* pictures and albums to contain them appeared to oust the stereoscope and its interest from public favour. Yet we feel assured that if this favourite instrument of a former period were once again fairly introduced—particularly with transparent slides on gelatino-chloride plates—it would once more become popular; and, now that a new generation of amateurs have sprung up who work under totally different conditions than did their predecessors, we throw out the suggestion that they should be provided with the means of obtaining stereoscopic pictures. This they may be with little or no increase in their *impedimenta*, whatever form of apparatus may be adopted.

Most of the popular sizes of cameras ($7\frac{1}{2} \times 5$ and similar sizes) are already provided with a central partition (though seldom used now), so that all that is necessary in this case is the addition of a pair of lenses which, if they be of the single or landscape form, may be purchased for a small sum, and this is the only additional outlay that need be incurred. The weight and bulk of this addition will be very trifling, particularly if the plan suggested by us many years ago be adopted, namely, that of fixing all the lenses on the one front, having that for pictures the full size of the plate in the centre and the stereoscopic ones on either side of it, a piece being cut from the sides of the flanges, if necessary, to allow of their being brought sufficiently close together.

By adopting this method the lenses will occupy the proper position for use, as we have only to uncap the middle one for pictures the full size of the plate, or to introduce the partition in the camera and use the outer ones for stereoscopic work. Single lenses, if worked with a large aperture (and small ones, maybe) will, with gelatine plates, enable landscapes with figures or cattle to be successfully obtained. One advantage that will be gained by taking pictures for the stereoscope is that lantern transparencies may be printed from them direct without further trouble, as the two sizes are identical.

As a hint to those who at present are only provided with the means of taking pictures of the lantern size we may mention that they also may take stereoscopic pictures without difficulty, for all that is necessary is to secure two negatives of the same subject from slightly different points of sight. If, after the first negative is taken, the camera be shifted laterally two and a-half or three inches and a second one secured, these two pictures will be equally as good, in stereoscopic effect, as if they were taken with twin lenses on the one plate. All the earlier stereoscopic pictures were produced with one lens and two exposures. The objection to this method of working was that, when the exposures were long and the light changeable, the two halves of the negative were frequently not identical; also, there was the risk, in hot weather, of the plate (wet collodion) partially drying between the two exposures, which would also tend to make the two halves dissimilar.

Now, with gelatine plates this is not liable to occur, the exposure being of such brief duration, and with double slides the second plate can very quickly be made to take the place of the first; then, if the two negatives be developed in the same dish, little difference will be found between them. Even if a slight difference should exist it is practically of little moment; for in the stereoscope, when the two pictures are combined, it will not be observable, as the instrument assimilates the discrepancy, showing the mean of the two. Thus, if one picture be a trifle too light, and the other a shade too dark, a picture of the proper depth will be apparent in the stereoscope. As it is, many who employ "pocket cameras" expose their plates in duplicate in order to ensure one perfect negative; therefore why should not the camera be slightly shifted between the two exposures? Then stereoscopic negatives would result, should both turn out satisfactorily.

The best plan for ensuring that both negatives are taken from parallel positions with a pocket camera, is to have a small mahogany

ard a little longer than the width of the bottom of the camera, hich may be screwed on to the stand. This board should have a -shaped groove in it—say three or four inches long. On the bottom the camera must be fixed a piece of wood or metal to fit this oove and slide easily in it. By this means the camera will be held firmly as if it were screwed to the stand itself. After the first gative is taken the camera is shifted along the groove two and half or three inches, and the second one exposed. To those who nploy cameras of the size only for lantern slides, this is all the lditional trouble incurred in securing pictures suitable for the ereoscope.

PHOTOGRAPHIC TRUTH AND DISTORTION.

It is a photograph, and so must be true." How often this remark as been made and its untrustworthiness shown we should be sorry) have to estimate. Or, again, how often has a picture been shown nd said to be "exaggerated or distorted through having been iken with a short-focus lens!" Upon no aspect of photography—mong professionals and amateurs—do more erroneous notions exist han upon this question of truthfulness and untruthfulness of photo-raphy, both qualities being claimed for the art almost at the ame moment. There are some instances which are seen at a glance o be greatly-distorted representations of a face or a landscape, while, again, other examples of apparent distortion prove upon xamination to be legitimate and truthful delineations of the objects efore the camera, though seen under conditions so unusual that one but an expert could vouch for their correctness.

While, however, there are so many cases of doubt as to the haracter of records produced by photography, there are certain nodes of working which are bound to produce distortion. It is o these we would now more especially call attention, particularly n portraiture, where departure from truth is perhaps more readily erceived than in any other department of photography.

We have already drawn attention to the singular effect produced y the expansion of albumenised paper while wet, the expansion aking place in one direction only, and becoming stereotyped, as it were, by the mounting of the damp print upon the stiff, unyielding card. This effect is sufficiently marked in many instances to cause the instant rejection of the portrait in which it occurs; for the print so metamorphosed is perceived by a complete stranger to the subject of the portrait to be contrary to all possibilities.

A very fruitful source of distortion lies in the inconsiderate use of the swing-back—an adjunct to the camera, by the way, of whose use, strange to say, many clever men seem to be quite ignorant. For groups where, full apertures being used, the figures at the side or lying upon the ground, though far from being disposed upon a plane, can be brought into focus by the judicious inclination of the side and upright swings, and nothing can be more useful or less likely to produce distortion. But when a whole- or half-length figure is represented alone, the full aperture being used, the swing-back may readily bring error in its train. That hand nicely posed yet so out of focus, that trimming of a specially-chosen head-gear so indistinct, the lace on a sleeve and the hat upon the knee can, by one slant of the back, be made to come so crisp and clear that the operator gives way to the use of the seductive swing. The sitter departs, the plate is put away and developed at the close of the day, and then, when too late, it is discovered that the hand is made large, the face elongated, the figure made "dumpy," or some other distortions produced that more than counterbalance the gain in sharpness in any particular direction.

Another very grave effect follows the employment of the swing-back if, when the fatal facility with which it aids the focussing is not guarded against, it is used for assisting to bring into sharp definition the train of a lady's dress—say for a promenade portrait, when the lens is strained to cover well. In such cases, unless the lens be well stopped down, the outer edge of the train will not focus with full aperture; but if the upright swing be used the train can be made fairly sharp, and the temptation is strong to use the means at hand to produce the effect desired.

Disaster of a sort is, however, sure to follow, and we have before us as we write two pictures of a lady taken in one studio—the first by a short-focus lens, the swing being used; and the second by a longer-focus lens, and the swing kept upright. In comparison the former of the two can only be termed ludicrous. It is a good photograph of a carefully-posed figure, yet, through the thoughtless use of the swing and the undue height of camera, the lady's height is so reduced in proportion to the size of her head that the portrait suggests a photograph from a doll rather than from life; while the other picture, in which the swing was not brought into play, forms a pleasing representation that in no sense whatever suggests the doll-like effect of the former. Yet the pose is almost identical in each.

To produce good focus in the face and in the train of the dress, when a longer-focus lens is employed, the same amount of care in the use of the swing would not require to be expended, seeing that only a comparatively trifling alteration in the position of the swing is needed to bring both points into good definition; from which fact another argument will be derived to show the advantage of long-focus lenses in the studio.

But, *per contra*, a short-focus lens enables many variations to be produced in what might be termed the aspect of the sitters, which, though distortions at one time, may yet be made to possess an opposite character at another. Thus, a sitter with a short nose and expanded nostrils desires to be taken. It is quite certain that if he be taken as he is he will say his face is distorted. Let, however, the photographer persuade him to sit rather than stand, and he may then with the aid of a short-focus lens produce very excellent results. The camera, placed as high as the stand will permit, and the whole brought fairly near to the sitter, the peculiarities of his nasal organ will be minimised in no slight degree. It will be lengthened, while the nostrils will be made less prominent. No one could be able to say the portrait was devoid of truth, nor, on the other hand, would any one bring in connection with it a charge of distortion.

Yet with a low-browed subject with deeply-sunken eye, or, again, one with a long nose, the subject being placed in exactly the same position, and the camera at the same height and distance from him, "distortion" would not be considered a sufficiently strong word to describe the effect.

Let us take another case. A tall gentleman with rapidly-fading hair wishes to be photographed. A glance shows that his locks are few, and a knowledge of human nature teaches that he will not wish to have them diminished in the picture by one hair. If, now, the photographer give him a standing pose at a short distance from the camera, the cherished hairs that cover (or at anyrate that exist at) the highest part of the scalp will be quite invisible, and the bald forehead below will alone show in the picture. He may then very justly say the picture is untruthful, and will most likely give way to anger. A tall camera-stand, or the figure posed in a sitting position, would have put matters right in a moment, thus showing how judgment as well as knowledge is required to produce pictures characterised by truth and absence of distortion.

A knowledge of the various means by which distortion is brought about in a photographic portrait will help in other ways, inasmuch as it will enable the practised hand to absolutely make them serve his own purpose. If he know how a picture gets unduly lengthened or a limb improperly magnified, the converse of those means will enable him to shorten and diminish in cases where he may think such alterations advisable. In fact, it may be said the greatest possible amount of knowledge of instrumental and optical peculiarities should be sought in order that in every picture produced the nearest approach to truth may be presented and any appreciable distortion avoided.

We are glad to find, from Mr. Edwin Banks's article in another column, that collodion dry plates are not altogether forsaken, for we must confess to a decided leaning in their favour, if only they could be made as rapid, or even nearly as rapid, as gelatine. Mr. Banks's suggestions are good, but we fear nothing in the shape of a process will satisfy the photographic public nowadays if it involves more than the single operation of coating the plate. However, that might be only a matter for the consideration of the manufacturer, if the desired degree of sensitiveness could be obtained. That a very high degree of rapidity (for collodion) is attainable with

collodio-bromide is well known, but whether it can be made to approach sufficiently near to gelatine to satisfy modern requirements remains to be seen.

We have to announce the formation of two new societies, namely, the Glasgow and West of Scotland Amateur Photographic Association, of which Mr. Edwin Smithells, 154, West George-street, is Secretary, and the North Staffordshire Photographic Association, whose head-quarters are at Burslem, the Secretary being Mr. W. B. Alison, Hartshill, Stoke-on-Trent.

The value of asphalte or bitumen is as well known for photographic purposes as is its treacherous seductiveness in the painters' craft, wherein are produced rich and beautiful effects, but as evanescent as beautiful. Most of our readers have heard of the eyes of a celebrated portrait in the National Gallery which, through being painted with asphalte slipped down gradually on to the cheek, the said portrait being now hung up out of sight wrong end upwards, in the hope that the eyes will slide back again into their original and proper place. In photography, however, all that has to be guarded against is the presence of impurity in the substance in question. A German chemist gives details of a method for ascertaining the purity of any sample before taking it into use. He dissolves a small quantity in bisulphide of carbon, filters, and evaporates to dryness; then rubs it into a fine powder, one grain of which he mixes with a drachm of fuming sulphuric acid, and leaves the whole to digest for a day. Then, adding double the bulk of water (which, of course, causes the mixture to heat), he cools the liquid, and, finally, makes up to two ounces with more water. If the liquid then give a colourless or pale yellow liquid the asphalte may be assumed to be free from pitch or coal-tar—impurities which would interfere with its employment for photographic purposes. Another writer detects tar pitch by heating the sample to 392° Fahr. and shaking it with alcohol. If only two per cent. be present it gives a distinct yellow colour, with a green fluorescence, increasing with the intensity of the colour.

Pure water, too, as we need not explain, is a necessity to the photographer in a number of operations, though not to the extent that is often stated. Rain water frequently forms an effective substitute for the distilled product; but in the neighbourhood of towns it is usually too much contaminated by atmospheric impurities to answer all purposes. An examination of water from various sources has recently been made by a French chemist, and he found that a sample from Algeria was entirely free from ammonia. He had previously shown how the action of solar light caused the ammonia present to diminish, and he states that organic matter in water tended to increase its absorbing power towards that gas. He further found the greater the amount of rain the less the ammonia present; hence, when rain water is the only available source of pure water, it will be advisable, when it is required as pure as possible, to reject the first portion collected, and to wait till the fall has continued some time before "bottling it off."

The first comet of the season is now out. After many false starts the astronomers have their quarry in view at last, and are doing their best to run it down. Until something of a definite nature is learnt of the path and progress of a new comet, it has a letter of the alphabet provisionally given to it. Just as a convict is known as number 20, 30, or whatever it may be, a new comet is for the time being *a*, *b*, or *c*, 1883, &c., according to the order of its discovery in the given year. The unfortunate little wanderer, be it said, however, that was discovered in the apparent vicinity of the sun last year during the eclipse, made so little impression that it was not found worthy of a letter at all. We are not yet told much about comet *a*, 1883; but very soon it will be above the horizon constantly, though, during the night, so low down for some time to come as to be almost invisible. Its motion is towards the east.

As a sort of set off against Mr. Edison's dismal vaticinations about he fading usefulness of accumulators (it must not be forgotten that Mr. Edison himself patented an accumulator!), it is well known that the highly-successful little electric lights worn by the "fairies" at the Savoy Theatre were lighted by miniature accumulators or secondary batteries placed like knapsacks on their backs, the current being turned on or off at the pleasure of the wearer by a small "switch." This theatre has been lighted for a year by electricity, and so much can be said in favour of this method of illumination that we believe it is likely to be continued. One very important advantage it possesses is its freedom from smoke and fumes, which results in an immense saving in painters' and decorators' bills.

Theorising is sometimes the soul of progress, though more often it has acted like a load of lead to deter rather than advance. The most singular theory recently put forth is one that uses all the facts of light effects so familiar to photographers as analogous to certain peculiar actions of foreign agents upon the human body, apart from the eye. Last week we showed how it had been proved that the skin of the earthworm is sensitive to colour; and now an English writer brings forward the theory that, just as rays of light when interfered with by thin plates or the edges of objects cause effects of colour, so by similar vibrations we may explain "the arrest of the functions of a structure or organ by the action upon it of another!"

The contributions of M. Chevreul to our knowledge of colour, and the laws governing its various effects, are well known to all scientific students, and we have to congratulate ourselves that the learned philosopher is still in our midst. What vast changes in the views held upon light and colour have occurred in his single lifetime could not be better supported than by an observation he made at a recent meeting of the Paris Academy of Sciences:—"Moreover, gentlemen, the observation is not a new one. I had the honour to mention it here at the Academy of Sciences on the 10th of May, 1812!" A philosopher referring to his own communications of over seventy years ago! Long may he yet live to grace the annals of science by his contributions!

PICTURES IN VAPOUR.

I was going to write "photographs in vapour," but, on consideration, it appeared to me that to be strictly accurate it would be advisable to make use of the more general term, although, in the production of the kind of pictures about to be described, photography plays so important a part as to justify their being so particularised.

Pictures in vapour are not entirely new, for many of us have seen the result of laying a coin on a newly-polished surface, or have noticed the effect on the face of a clean glass after it has been in contact with a sheet of printed matter for a short time. The variations in the evident deposition of moisture on the latter is, without doubt, due to a transfer of greasy matter, while in the former the probability is that its explanation lies beyond mere grease in some change of molecular state induced at the points of contact of the metal. Ghosts of images are also exhibited by moisture upon glasses which have been stained by chemicals (this every man of wet-plate experience knows to his cost), and also when they have only been used for the support of a carbon transparency.

A very marked case of this last kind came under my notice only a few months ago, but up to the present I have not been able to second it. The glass in question had been used for a transparency in carbon for enlarging from, and, besides having been passed through the camera, had stood exposed to a moderate light till the time arrived for it to go into the copper, where its film was scoured off in boiling soda water. No peculiarity was noticed till it came to the polishing board and was tested for cleanliness by breathing upon it; then a strongly-marked and fairly-graduated portrait became visible. Why one appeared on that particular glass and not on any other in the same batch was not divined, and, as no other has appeared either by design or otherwise, its method of production cannot be discussed.

The way to make pictures in vapour with certainty was discovered in the following manner:—In developing a batch of carbon transparencies upon collodionised plates for the purpose of permanganate intensification, there were some in duplicate. The first print from one of these negatives, of which two had been printed, having turned out very successfully, the second was not proceeded with, but left under pressure till all had been developed. The plate in

question was then taken up, and, to save trouble in scouring off, was stripped and placed on the shelf to dry. In the morning the glossy surface of the collodion attracted attention, and led to the plate being carried into another room for examination, where the difference of temperature, in causing a condensation of the moisture, produced a picture in that on the plate of great delicacy resembling a daguerreotype, which vanished on drying, and again appeared in the presence of dampness or by breathing upon it—the better effect, however, arising on carrying the cool glass into a warmer room.

The above being only an outline, I will now give a few details and endeavour to explain the *rationale* of the process. In making a selection of the tissue, that of the ordinary transparency kind may be chosen if the negative to be printed be a rather dense one, and one less loaded with colouring matter if the negative be weaker in character. The reason for such discrimination will be apparent later. The bichromate bath should not exceed the strength of five per cent. In making the tissue sensitive all the conditions for producing vigorous and brilliant transparencies—such as short immersion in the solution, squeegeeing off, quick drying, and speedy use—must be observed. A state of solubility excessive for ordinary work will, in the present case, be found favourable, provided it be capable of giving results just escaping rawness.

Expose as for a lantern transparency, and on taking the tissue from the frame collodionise it in the usual way with a collodion composed of five grains of pyroxyline dissolved in an ounce of a mixture of equal parts of methylated spirits and methylated ether, and allow it to partially dry. A clean glass is then taken and coated with the same, and washed in clean water until the greasiness has disappeared, when it is ready to receive the tissue. That may now be plunged into the water and left for a minute or so, but not till it begins to curl outwards, otherwise its absorptive nature will have been too much satisfied to the detriment of its power of giving a good vapour picture.

When ready the glass and superposed tissue are lifted out of the water, squeegeed in the usual way, covered with two or three folds of blotting-paper, and placed under a weight for an hour or more, after which the glass is taken and stripped (that is, the tissue is pulled away from the layer of collodion), and placed to dry. That the layer of collodion on the tissue should not be too horny or dried too much, nor the tissue allowed to absorb too much water, are important points; in fact, upon the latter condition being correctly observed much of the success depends, apparent under- or over-exposure of the final result arising as the tissue is capable of disposing more or less of the moisture the film on the glass has taken up. When the plate has become quite dry its surface will have a glossy appearance, which will not exhibit any peculiarity until a little moisture is condensed upon it, and then it will be found that the film is capable of disposing of what would on a clean plate of glass be an even layer of fog in such a way that a picture possessing the most delicate gradations of the original will be presented to view, which disappears as the dampness evaporates, and is again renewed when subjected to its influence. The phenomenon is a very singular and pleasing one, and is both curious and interesting.

As a positive is shown upon the film, I take the explanation of the peculiar property it has acquired to be this:—On the tissue being squeegeed into contact with the film of collodion a little bichromate solution is forced into the latter, and is re-absorbed by the gelatine in the act of its still further expanding, those parts of it which have scarcely been exposed to light taking up all—almost amounting to drying the collodion—while others which have been rendered insoluble, and thereby having their absorptive power greatly reduced, allow the collodion to retain the weak solution of bichromate, and so in proportion with every gradation of the light's action. A film of such a character having become dry, on again being subjected to moisture the following takes place:—Where a residuum of salt is retained it remains clear, because the moisture is absorbed by the salt, which it partially dissolves, while in other places, having none or very little salt enveloped, the dampness is condensed in minute globules, which impart a clouded or ground appearance to the glass, enabling it to reflect a portion of the light incident upon it; the general effect of the clear and clouded portions being that of a picture on glass or daguerreotype plate.

Although there may be no practical application at present of these delicate variations of absorptive power as here exemplified, yet it appears to me to be a point worth noting; for, besides its giving a means of producing magic mirrors and such kinds of ware for amusement, it is just possible that such a method of getting a variation in a layer of any salt may yield fruit at some future time. It is at any rate manifest that salts of various deliquescing qualities, or those capable of being reduced, might be employed to impregnate the collodion film and regulated in respect of quantity to almost any extent by proceeding as described. Be that as it may, however, the method is none the less worth recording, if only on account of its being a curiosity.

JOHN HARMER.

THE HYPO. FIXING BATH.

It might have been supposed that the question of the employment of fresh, or much-used, solutions of hyposulphite of soda for the purpose of removing the silver compounds that have not been acted upon by light or development had been settled long ago; but, since a photographer of the long experience of Mr. W. Harding Warner expresses himself as wishing for information on the point, and refers to "a professional photographer of eminence and a distinguished amateur" as stating that "any number of negatives may be fixed in one bath of hyposulphite of soda twelve months' old, whether saturated with sulphide or bromide of silver; that no deposit of sulphide of silver will take place on the film; and that they will fix out bright and clear," it would seem that a little space may not inappropriately be given to a few more words upon the subject.

It is now nearly thirty years since Mr. F. Hardwich published the result of his investigations into the changes that a solution of hyposulphite of soda undergoes whilst in use as a fixing bath, but that lapse of time has not caused the theory and practice then laid down to become obsolete; for, as with other subjects that he undertook, his experiments were so complete, and his reasoning so sound, that Hardwich's *Photographic Chemistry* remains to this day the authority upon those photographic actions and processes which were at that time in use, and have survived to the present time. Mr. Hardwich's researches were conducted with especial reference to the use of the hyposulphite bath in fixing paper prints; but there is no reason on that account to infer any material difference in the result.

It appears from the researches of Mr. T. J. Pearsall, published in The British Journal Photographic Almanac for 1876, that, independent of the changes induced in a hyposulphite solution by the action upon it of the silver compounds, while it dissolves in the process of fixing photographic images it is liable to undergo a change from the time of mixing until it loses its proper effect.

Against these and other authorities, the statement of a professional photographer of eminence and a distinguished amateur, that any number of negatives may be fixed in a solution already saturated with bromide of silver, cannot have much weight—at all events, unless these gentlemen possess the courage of their opinions and will come forward to support with their names the assertions attributed to them. Fortunately, however, the matter is one which any photographer can, by a very simple experiment, demonstrate to his own satisfaction; or the reverse if he make his essay upon a valuable negative. Many readers, no doubt, have accidentally already had the experience which will show the injurious effect of using a much-worn hypo. bath. The experiment is simply this—to leave a negative in an old fixing bath for a night, and in the morning exercise ingenuity in trying by all the means that may suggest themselves to get rid of the universal brown stain with which the negative will be found to be covered.

If any doubt exist as to the cause of the stain being the use of a worn rather than a fresh solution of hypo., the experiment may be repeated with a new bath instead of the old one, when no such stain will be found to be produced.

Since the introduction of iodide of silver into emulsions a longer stay in the fixing bath has been found necessary than was required for plates prepared with bromide only. It has, moreover, been pointed out that it is necessary to leave the plate in the hyposulphite solution for some little time longer than is required to remove the visible haloid silver compounds, since it has been found that, although a plate may appear fixed to the eye, some silver in a transparent or invisible condition may remain, and will put itself in evidence if intensification be resorted to; or by gradual darkening whilst printing, where intensification has not been employed, unless time has been given for complete fixation.

In order to ensure the complete removal of the silver, therefore, it is the custom to leave the plate in the hypo. for some little time longer than is necessary to remove the visible haloids. Now, with the hypo. bath in a good and fresh condition, this may safely be done without fear of the brown stain before referred to, but with an old and much-used solution the stain may commence to set in before fixation is complete, especially as the solvent power of the old solution is so inferior that a much longer time must be given to the plate before it can be removed with safety.

The soundness of the advice so generally given to use fresh hypo. need not be called in question. Not only is the danger of the deposit of a brown stain done away with, but the complete fixing of the unreduced silver is more likely to be attained; and it would be a wiser course rather to work in the direction indicated by Mr. G. Watmough Webster, and to endeavour to effect the more perfect removal of the last traces of this unreduced silver, either by the use of a sulphocyanide bath, as suggested by that gentleman, or by any other means that experiment may indicate, than to run the risk of damaging the plate to begin with, and have its permanency endangered at the same time, by attempting to fix the image in a bath which has become too much deteriorated to be relied upon to do its work properly. W. E. Debenham.

ON A METHOD OF INCREASING THE SENSITIVENESS OF COLLODION EMULSIONS.

That the introduction of the rapid gelatine process into the everyday practice of the photographer has proved a great boon no one will deny. Good and reliable plates, ready for instant use, are now to be had from so many of our makers and at such moderate prices that there is small wonder at their general adoption. In careful and skilful hands results are obtained which leave little to be desired in all that constitutes a perfect picture, whilst for subjects requiring rapid exposures they have become an absolute necessity. The patient and careful investigation of so many minds as to the best methods of compounding, so as to ensure uniformity and success, has also so much enlarged our knowledge of the conditions necessary in emulsion making that, if no other purpose had been served by their introduction, no one would regret either the time or trouble which has been expended upon them. Whether, considering all the advantages they possess, the average quality of work has advanced in a commensurate degree is, however, open to doubt. There are many photographers who bring so much skill and experience into their manipulation of these plates that perfect negatives are produced with very few failures, whilst even for those who have not had much practice the ease and facility of the various operations puts a new power into their hands. It may be said that the photographer of today buys his photography, as he does his optics, ready made. Is the resulting work produced better or worse for the change?

I had an opportunity, a few weeks ago, of inspecting a large number of negatives, chiefly landscape, taken by an amateur during a period extending over ten or twelve years, and was forcibly struck by the great beauty and delicacy of many of those taken upon collodio-bromide plates. There was a bloom and pluck about them to which, somehow or other, gelatine has not yet attained, or only in very rare instances. Whether it is the staining or discolouration of the gelatine film itself, or the slight veiling over the shadows that seems an inevitable accompaniment of extreme sensitiveness, certain it is that the collodion negatives taken as a whole were far superior to the gelatine. It is not that the gelatine negatives were faulty. If looked at alone they would be pronounced perfect; but, if examined side by side with those on collodion, a certain inferiority was manifest. In conversation with a leading professional photographer upon the subject, he expressed the opinion that the best gelatine negative was inferior to the best collodion one, and, if it were not for appearing to be behind the times in not having the so-called "instantaneous process," he would adhere entirely to the collodion. The collodion process certainly has the advantage in the easy preparation of any sized plate as required, and if used as emulsion all the attendant evils of bath, &c., are dispensed with.

Considering what advances have been made in our knowledge of the physical and chemical conditions necessary to attain great sensitiveness—conditions which were not understood when collodion was the mainstay of the photographer—might it not be worth while to try and increase the sensitiveness of collodion emulsion, and to make it at anyrate a nearer approach to gelatine? If the silver bromide in collodion were brought as near as possible into the same physical condition as that in gelatine, the end would be pretty nearly attained. It is evident that the effect of light is produced instantaneously on the silver bromide, whatever the vehicle in which it is formed, provided, of course, that it be neutral in a chemical sense—that is, acting entirely and only as a vehicle for suspension of the bromide. But the difficulty crops up when the development comes on. Here the collodion plate breaks down, for it will not bear the application of a powerful developer without general reduction taking place; while the large proportion of restraining bromide necessary tends to undo what the light has done, and to render longer exposure necessary. A gelatine plate will permit of a far stronger developer being used, and also less restrainer, without any tendency to fog; and in this fact probably lies its apparent greater sensitiveness. But, unfortunately, at the same time, if an extremely-short exposure has been attempted, necessitating prolonged development, a considerable amount of staining or discolouration of the gelatine itself takes place, which is not to be confounded with fog. Nor can this be entirely eradicated by any of the so-called clearing solutions without, at the same time, reducing to some extent the negative as well. Now, if we could so treat a collodion film that it would bear the same or even a more powerful developer than gelatine, it is evident that equal sensitiveness would be attained.

In an emulsion, whether of collodion or of gelatine, the molecules of silver bromide are entirely surrounded by a colloid or glutinous fluid; and if it were possible to separate these molecules from each other and examine them they would appear as if enclosed each in separate vesicles or bladders, the covering being perfectly continuous. In the case of collodion, on coating a plate and allowing it to dry, or on plunging it into water, a considerable amount of contraction takes place throughout the whole film, and the vesicles surrounding the Ag Br are burst, allowing more or less contact to take place with the neighbouring molecules. Gelatine, however, is much more elastic than pyroxyline, and in drying does not lose its continuity, thus completely isolating every individual molecule from its neighbouring one.

Captain Abney has shown that silver bromide cannot exist in contact with freshly-reduced metallic silver, but gives up one atom of its bromine and becomes a sub-bromide, which is itself instantly reduced by the developer; and this action will go on until the whole bromide is reduced, or until some protecting substance interposes to stop the action. Hence a collodion film, with the imperfect isolation of its molecules, has a far greater tendency to universal reduction under the alkaline developer than the more continuous gelatine film. A much weaker developer and larger amount of restraining bromide are thus made absolutely necessary.

If we take a dried collodio-bromide plate and a gelatine one, and simultaneously immerse them in a weak solution of hypo., this difference between the two films is rendered strikingly evident. The collodion plate will be cleared almost instantly, but the gelatine one will require ten or twenty minutes to clear. In the case of collodion, the exposed condition of the silver molecules brings them into immediate contact with the hypo., and they are at once dissolved; but in the gelatine plate the hypo. has to penetrate through a protecting film of gelatine before solution can take place. It is this perfect protection of the molecules that enables us to obtain results with such short exposures, by permitting the use of powerful reducing agents or developers without any fear of fog taking place, and also to dispense in a great measure with retarding bromides, which have a tendency to undo what the light has done. By utilising this protecting power of gelatine or other viscous solutions upon a collodio-bromide film, and so combining, as it were, the two processes, it is quite practicable to produce sensitiveness in collodion far beyond what would be generally supposed.

It might be urged—Why use collodion at all when gelatine is so perfect a restrainer? In the first place, a collodion emulsion is always ready for use, requiring no preparation, and will keep indefinitely if properly prepared. Then the plates may be prepared as required or in advance; they may be worked wet or dry; and, lastly, the resulting picture is not in the gelatine at all but in the collodion, and the application of a little warm water instantly removes the gelatine with all its discolouration and the hypo. which it retains with such avidity, leaving the picture in its film of collodion in every respect like one produced by the ordinary collodion methods. The gelatine has served its purpose when development is complete, and is then dispensed with. To ensure success, however, certain precautions have to be observed. I abstain from giving any definite formulæ, so many good and reliable ones having been repeatedly published. Still a few hints to those desirous of trying may be useful.

The pyroxyline should be reduced to a minimum, only sufficient being used to secure fineness and avoid precipitation of the silver bromide. In an article on collodion emulsion published in The British Journal of Photography for 1878, vol. xxvi., the Editors showed that sensitiveness increased in proportion to the decrease of pyroxyline, but that tendency to fog increased also. An emulsion formed with a minimum of pyroxyline, when flowed over the glass plate, allowed to set and immersed in water to wash away the solvents, then coated with a fifteen- or twenty-grain solution of gelatine, which may contain various sensitising or accelerating substances or may be used plain, will bear the application of a developer as powerful—or even more powerful—than a gelatine plate, without any tendency to fog.

To secure a perfect emulsion use only the most soluble bromides, such as cadmium or zinc, make two separate collodions in the first place—one containing the bromide and the other the silver nitrate—and emulsify by pouring very gradually and with constant agitation the bromised into the silvered collodion; or, better still, by simultaneously filtering the two fluids through separate filters into the same receptacle, always allowing the silvered collodion to have the start so as to keep an excess of silver all the time. It is at any point where the exact balance of equivalents takes place when precipitation is apt to occur. Allow the emulsion to ripen a day or two with excess of silver, and then restore the balance by a few drops of H Cl diluted with alcohol.

After coating with gelatine rear up to drain and dry, or expose wet. If exposed wet and developed at once a developer containing a large proportion of spirit will be required, in order to reach the collodion film under the gelatine, by abstracting the water from it; development then takes place rapidly and evenly. The stronger the solution of gelatine employed the stronger the developer may be be used and the less bromide required; indeed, with a twenty-grain solution it is as well omitted altogether. If the plate be allowed to dry I find the addition of a little gum or sugar facilitates the after-removal of the gelatine, without in any way impairing its protecting properties. A substratum of albumen or a one-grain solution of gelatine should be used in all cases. The whole method is extremely certain and simple if worked with ordinary care, whilst the resulting negatives will considerably reduce the difficulty both printers and enlargers have often to contend with in the opaque coloured films of gelatine so often met with. EDWIN BANKS.

"A PROCESS STILL WANTED."

THE tenor of your article in last issue of THE BRITISH JOURNAL OF PHOTOGRAPHY indicates a direction in which the talents of the many ardent experimentalists numbered in the ranks of photography may find interesting occupation, inasmuch as the ground is as yet comparatively unbroken, lying, as it most undoubtedly does, amongst the chlorides of silver and other analogous salts, either separate or in combination.

Since the introduction of gelatine emulsions bromide has been the king, with its majesty improved or leavened with, at times, a trace of iodide or of chloride, and again with traces of both. Now, for negatives where the image is intended to act as a barrier to the transmission of light for the production of positive pictures, and where the colour of such image is only of importance in regard to its actinic or non-actinic value, bromide of silver or bromo-iodo-chloride is the king of sensitive salts of silver; but when it comes to be a matter of colour by reflected light (such as is required for positive pictures) then bromide of silver must give way to the chloride.

Having got so far, we may now inquire why all attempts at printing by development upon paper sensitised with chloride of silver have up to now resulted in nothing but fog and failure. The reason is not far to seek. In manipulating plates or paper coated with bromide of silver emulsion the utmost precautions are taken against the admission of any light during the process, unless it be perfectly non-actinic; whilst with chloride of silver it is thought quite sufficient to work in dull daylight or by the aid of light transmitted through a single thickness of yellow paper or calico, the consequence being that, whilst all works well when the image is printed out, directly any attempts are made at development fog is the result, for the simple reason that light has made an impression during the preparation and asserts itself directly it is asked to do so by the developing agent. For the successful production of prints by development upon albumenised paper it is, therefore, necessary that the operation of sensitising and drying be conducted in yellow light of about the same character as that usually used for the wet process.

Albumenised paper is sensitised upon a sixty-grain nitrate of silver bath rendered acid with acetic or nitric acid (the former giving blacker and juicier tones); float five minutes, then place between sheets of blotting-paper to absorb all superfluous moisture, as well as to ensure that the sheet be evenly sensitised, which cannot be possible if it be suspended directly it is lifted from the silver solution, as the bottom of the sheet must be of a different character from the top. Now dry in non-actinic light, and in as pure an atmosphere as is considered necessary for dry plates.

When the sheet is dry, expose to light under a negative until a slight image is visible, taking care to examine the progress in the dark room, or, better still, time the operation as the negative exposure is timed. For an ordinary negative from half-a-minute to two minutes will be sufficient in diffused light. The exposure being effected, the image may be developed in—

Pyro	3 grains.
Acetic acid	2 minims.
Citric acid	1 grain.
Water	1 ounce.

This will give a black tone. A browner tone may be obtained by the use of—

Sulphate of iron	12 grains.
Citric acid	5 „
Acetic acid	3 minims.
Water	2 ounces.

Fix in hypo., and if the tone be not exactly right tone in an old acetate bath.

After the paper is sensitised, instead of being at once hung up to dry it may be washed in several changes of clean water and then dried, when, after exposure, it is amenable to the action of Captain Abney's ferrous-citro-oxalate developer; but upon this part I shall have more particulars to give shortly.

With chloride of silver emulsified in gelatine the precautions as regards light during operations must be doubled, as it is far more sensitive than albumenised paper. The following formula will give good results:—

Gelatine (Heinrich's)	10 ounces.
Sugar	1 ounce.
Water	25 ounces.

Dissolve, and churn with one of Kent's egg-whisks for fifteen or twenty minutes; then allow to set as slowly as possible. When set, with boiling water scald off the top scum of froth, slightly warm the vessel, turn out the jelly and cut off the bottom, taking away any sediment that may be there. Now remelt and add 1,700 grains of nitrate of silver dissolved in five ounces of water, and stir well with a strong glass rod so as to thoroughly incorporate the silver with the gelatine. Next dissolve 500 grains of chloride of ammonium in five ounces of hot water, and in the dark room add to the mixture of gelatine and nitrate of silver drop by drop, stirring vigorously with the glass rod all the time. When all the solution of chloride of ammonium is added drop in five drops of pure hydrochloric acid, and allow to digest at about 150° Fahr. for half-an-hour; then pour out to set. When the emulsion is set it is cut into shreds and washed, and after washing is re-melted and poured into a long narrow china or glass dish, which dish is placed in a larger one containing hot water.

To coat paper: cut it into strips (say half sheets) and roll tightly, face outwards, upon a smooth roller. Now, if this roller be placed upon the emulsion, and the two ends held by the thumb and finger of each hand and lifted slowly up, the paper will unroll itself and be covered with a thin, smooth layer of emulsion. If not too hot, or the operation be not carried out too quickly, the emulsion will set almost directly. The sheet is now put into a suitable place to dry, when it is ready for exposure, the development being effected with ferrous-citro-oxalate.

If there be any want of vigour in the resulting print a few drops of a saturated solution of citric acid may be added instead of hydrochloric, but, as a rule, it will not be required. If the emulsion be not washed, direct prints, exactly like albumenised paper prints, may be obtained, and prints may be developed in acid pyro., as directed for albumenised paper.

In case any reader has forgotten the formula for Captain Abney's ferrous-citro-oxalate developer, it is here appended:—

No. 1.

Potassium citrate	700 grains.
Potassium oxalate	200 „
Water	3½ ounces.

No. 2.

Ferrous sulphate	300 grains.
Water	3½ ounces.

Mix in equal parts.

W. T. WILKINSON.

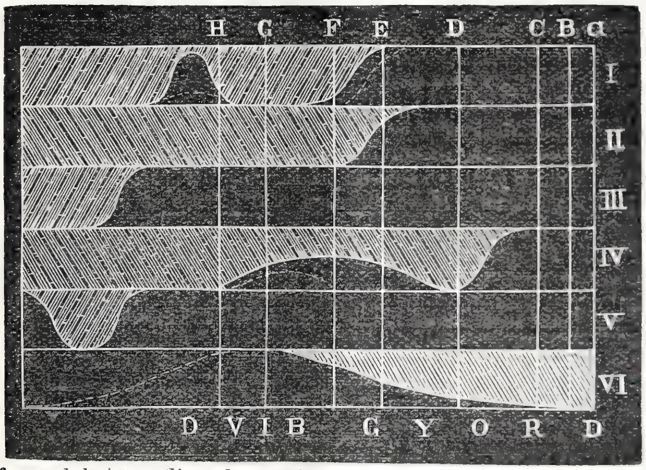
GLASS "SOAKED" WITH SILVER FOR USE WITH THE GELATINE PROCESS.

A communication to the Photographic Society of Great Britain.]

SOME short time ago Mr. Bolton kindly gave me a specimen of some soaked silver glass which had been furnished him by a well-known gentleman in the photographic world. I am led to believe it is prepared by painting white glass with a silver compound, and then firing it. After the first firing it has a lemon-yellow colour; but after three

or four it takes the tint of the glass I show. Its appearance by transmitted light is very similar to that shown by stained orange—a glass which behaved somewhat peculiarly with gelatine plates. By reflected light the glass is *very* remarkable. It presents the appearance of green fog as seen on a gelatine plate, being irridescent and green. As was remarked to me by Mr. Bolton, until he had seen this flashed glass he was an opponent of the theory that I had propounded, that green fog is due to a reduced silver compound. I dare not enter into a discussion of green fog on this occasion, as I have already had my say about it. It is quite sufficient to know, at all events, some causes of its appearance in order to avoid it, and this I hold to be the true scientific method of discovery. Now, as to its suitability for the developing-room:—A piece of the glass was placed before the slit of the spectroscope, the lower half of which was screened, and a photograph with a gelatine plate taken. It was impossible to get the sun as a source of illumination, except on one occasion; hence the electric light was used. The first photograph I show was taken with quartz lenses to the collimator and camera, and a Rowland diffraction grating used for getting dispersion of the spectrum. By this means all the ultra-violet, even that which could not pass through glass, was impressed. It will be seen by the photograph that the rays just beyond the limit of the violet passed through the glass, and rays still more refrangible were stopped. It may be said that rays from wave-length 3,900 to wave-length 3,400 passed through one thickness of flashed silver, giving a very fair image.

The next photograph (*fig.* 1), shows the action of the whole spectrum when transmitted through the flashed glass, and is compared with the action of the spectrum when the unshaded light is used. The spectrum



was formed by two flint glass prisms. It will thus be seen that light is transmitted at both ends of the spectrum, which has an action on a gelatine plate. With an ordinary collodio-bromide emulsion plate the only deleterious light is that in the ultra-violet; at the least refrangible end the light has no effect.

It may be interesting to show the absorption that takes place in ordinary sheet glass. *Fig.* 3 shows the absorption, using a grating, since glass prisms would be inadmissible; the spectrum being taken by quartz lenses, which, as Dr. W. H. Miller and Professor Stokes showed, transmitted all the ultra-violet rays. I think it may be well to remind my hearers that there is no advantage in using quartz lenses for the light they have to deal with. The solar spectrum ends almost at the same point as where absorption by glass in the ultra-violet commences, even at the highest elevations. This cutting-off of the spectrum is apparently not due to our atmosphere, but to something outside it.

Another photograph shows the effect of two thicknesses of the soaked silver glass (dotted curve, *fig.* 1), by which it will be seen that almost all the ultra-violet light is cut off, and also rather more of the green towards the red. The next photograph I show is a comparison between the thickness of this glass and one-eighth inch thickness of a weak solution of bichromate of potash (*fig.* 2). This last photograph was taken on a collodio-bromide plate of green bromide, which I use for the infra-red region. It will be seen that with the bichromate the violet band is entirely absent.

I find that the low rays are nearly as readily transmitted through the flashed glass as through the bichromate; there is a slight absorption, but not much.

I was led to examine whether the non-reflection of certain rays in the ultra-violet by silver had any correspondence with the light transmitted through this compound of silver. *Fig.* 5 shows where silver fails to reflect, and it will be seen that it differs entirely in locality from the place of transmission through the glass.

The deduction to be drawn from this is that soaked silver glass is unsafe to use even for collodion, if only one thickness be used; that, in order to render it safe for gelatine plates, ruby glass should be combined with it, to more entirely cut off the yellow and green. I exhibit a transparency printed on a gelatine plate, with an exposure of three seconds by daylight coming through this glass. The question arises—Is this the only medium which behaves in this manner, viz., in letting the ultra-violet rays through? It is not. Through a thin solution of aurine the same phenomenon is observed; but if the solution be strong, or if a plate coated with varnish containing this dye be examined, the ultra-violet band will be wanting.

If the spectrum of the green light issuing from the irridescent film of the flashed glass be examined, it will be found to absorb the light which it reflects; in other words, the light reflected and that absorbed are complementary. This is not always the case; but, where we have a fluorescent appearance, the reflection of light on such surfaces is quasi-metallic.

My last photograph exhibits the action of the new cherry fabric in the spectrum of the electric light. A piece of the fabric was placed in contact with the gelatine plate, and the spectrum allowed to act through it for five seconds, with the result you see before you (*fig.* 4). The yellow is cut off, but the green, blue, and violet are well shown, as is, of course, the red. This medium by itself, even in two thicknesses, is not a protection against the admission of the kind of light which should be kept out. If it be employed, it should be used with orange paper to cut off the blue and violet, and then nothing but red will pass. Bookbinders' red cloth behaves in a somewhat similar manner, and the same precaution regarding it should be taken. I have thought it right to give this warning, as it might lead to blame being cast on wrong shoulders in the case where foggy plates are met with. *Fig.* 5 is the effect of the spectrum on Ag Br. W. DE W. ABNEY, R.E., F.R.S.

ON IMPROVEMENTS AND NEW APPLICATIONS OF THE PLATINOTYPE PROCESS.

[A communication to the Bristol and West of England Amateur Photographic Association.]

YOUR exacting Secretary has called upon me to tell you "all that is new about platinotype." Well, the platinotype process is much like the Irishman's knife. It is never precisely new; it is never exactly old; and it is from time to time receiving, so to speak, new blades and renovated handles.

Though my position in coming before you (by proxy) is somewhat analogous to that of the man who was wont to express his firm conviction that to his mind "there is nothing like leather," yet I may hope that the process of which I sing the praises is, like leather, sufficiently well known at the present time for its good qualities to warrant my eulogiums and your attention this evening.

Since the time when the Platinotype Company were honoured by this Association by the award of a silver medal great improvement has gradually been effected—not, however, by altering the operations of the process, but through the more perfect knowledge gained by means of prolonged and assiduous study of the principles and peculiarities of the method.

Perhaps the most important improvement in the process as applied to paper is to be found in the increased stability of the sensitive surface, making it more secure against the action of moist air, with the accompanying advantage of additional capabilities for brilliancy, so that negatives need no longer be so vigorous as was formerly the case. At the same time, when vigour and richness are required, it is in vain to seek them by the aid of a thin, flimsy negative, whose detail leaves a great deal for the imagination to supply, and whose high lights are nowhere to be found. Vigour, however, is a quality not always aimed at by artists; but photographers generally will condone almost any defect—or, shall we say, "effect?"—in preference to that of absence of vigour.

After all, one of the strong points of platinotype is the vigour of which it is capable when the photographer calls it forth by the aid of a suitable negative. Let silver prints and platinotype be hung side by side; then let them be viewed from a little distance. The result is that the silver print pales and the subject becomes indistinct and meaningless, while the platinotype tells its tale, though placed at the other end of the room. And when harmony, softness, and atmospheric effect are desired, how well platinotype can render these! The atmospheric effect of a silver print is not comparable to that of a platinotype, the luminosity of which is many degrees in advance. It is these qualities which render platinotype so much in favour with the artists of the brush. But in my pardonable admiration for the art-capabilities of the process I am forgetting that I was requested to describe to you the process in its possible and actual applications.

It may be useful to some of the members to know how best to reproduce an etching as nearly as possible in the approved manner of a high-class original. A negative is made in the usual manner. If on a gelatine plate, it will be well to add to its brilliancy by treatment with ferric oxalate and subsequent redevelopment by ferrous oxalate—the method originally introduced by Mr. W. Willis. Thin Japanese paper is then sensitised by the platinotype method through its entire thickness; this, when dry, is printed under the negative until the lines show through at the back of the sheet. The print is then developed in the usual manner, except that, previously to floating, or, rather, immersion—for the print is allowed to sink under the surface—a tray of gauze muslin is placed in the bath in order to permit of the print

being withdrawn without tearing or creasing. The tray and print are then transferred to the acid baths; and when completed the print is taken up on a sheet of paper and dried between blotting-paper, when it will be found that the lines possess considerable depth and richness—an effect you cannot have failed to have observed in all good etchings. Platinotype is very suitable for producing prints from an "etching" on a bitumenised glass plate. The method of proceeding will be evident.

It is very possible that an analogous method to the above might be utilised for producing burnt-in photographs on glass and porcelain; but it would be necessary that the image should consist of a considerably greater depth of metallic platinum, for, on firing, a deposit giving full vigour on paper becomes but a ghost of what it originally was. That a method founded upon the lines I have indicated would be valuable there can be little doubt; but at present I cannot do more than express a hope that the platinotype process may some day help us to a simple method for popularising this but little-known application of photography.

Very excellent paper transparencies may be produced by printing on a specially-prepared platinotype paper, in which the image is carried in the shadows through to the back of the paper in the manner just referred to. The print, when thoroughly dry, is treated with paraffine wax by immersion in a dish heated to a sufficient high temperature to make this wax fluid. After a short time the prints may be taken out and placed between blotting-paper, over which a hot flat-iron is passed. Paraffine is preferable to bees'-wax only on account of its stable character. The transparencies so produced are remarkably vigorous, of fine detail and gradation, and of a rich brown colour. They may be used for reproducing negatives.

A purely amateur Association, such as this is, scarcely numbers one interested in engraving on wood amongst its members; hence the application of platinotype to wood-blocks will hardly prove the matter for congratulation it would be in a community of engravers. But ever since photography was first applied to wood-blocks, supplanting the draughtsman's pencil, the film or medium necessary for carrying the photographic image has proved a serious drawback and impediment to rapid and effective work. The film will often split off the block under the action of the graver just where it is most important to retain it! To sensitise a wood-block it is rubbed with a pad of cotton wool moistened with strong alcohol; the surface is then smeared over with a tuft of wool containing the sensitiser. The block is then dried, printed upon, developed, and rinsed rapidly for a few seconds in the acid bath; it is then dried off with methylated spirit, and is ready for the engraver.

The recent application of the process to textile fabrics I believe to be more important than many might suppose it to be; for, putting aside the various more or less fanciful articles which may be produced by materials so decorated, there yet remain solid worth and art-capabilities which ought to render fabrics of great value to the photographer whose ideas are not entirely guided by the fixed rules of conventionality, who is able to use discrimination, and has the courage of his convictions. In reproductions of oil paintings the result is sometimes remarkable; the texture adds much to the effect, and to the eye of an artist considerably enhances the value of the photograph. Photographs from nature, both portraits and landscapes, may also be most effectively printed on textile fabrics. Some portraits I have seen were exceedingly pleasing, rich, and vigorous, yet in harmony and softness like a mezzotint engraving.

When developing prints on textile fabrics it is of the utmost importance to heat the bath to a temperature exceeding that necessary for paper, in order that the reduction of the platinum shall take place as quickly as possible after contact with the fluid. The resulting image will then have a richness and "bloom" not obtainable by any other means. Care must be taken not to print too deeply, because a cooler bath as a means of correction of errors of exposure is scarcely desirable; moreover, the very hot bath (say 200° Fahr.) developes detail after a shorter exposure than is necessary when a cooler bath is used. This reminds me that it is a very common fault of beginners, noticing how rapidly the image appears, to act on the supposition that the whole action is complete in "less than no time," and the prints are taken off the hot solution (often not hot enough) and placed in the acid bath before the shadows have had time to gather strength and homogeneity. The result is a coarse, poor print. It is well to remember that *the development cannot be too long*. The *exposure* may be too long, after which the bath may be too hot; but the *best* results are produced by a fully hot bath and a properly-regulated exposure.

Another important point in connection with textile fabrics is the use of plenty of acid bath, for, naturally, the quantity of iron and platinum salts, and also of potassic oxalate, transferred to the baths is much greater with these materials than is the case with the less absorbent papers.

I must now bring this, I am afraid, disappointing paper to a close, and must thank your Hon. Secretary for so kindly reading it in my absence.

HERBERT B. BERKELEY.

NOTES ON PHOTOGRAPHY.

LECTURE XIV.—THE GELATINE PROCESS—(CONTINUED.)

DEFECTS AND THEIR REMEDIES.—The principal causes of failure may be classified under three headings according to the results they give rise to:—1. Those which produce *grey fog*, or a reduction of the silver bromide to the metallic state. 2. Those which produce a colouration of the film, called *pink and green fog*, usually with the alkaline developer. 3. Those which produce *frilling*. Besides these there are others, such as want of density, spots of various kinds, &c.

I. GREY FOG.

Cause.	*Preventive or Remedy.*
Decomposition of gelatine by atmospheric changes or by keeping. Cooking too long. Temperature too high. In alkaline condition, or with insufficient excess of bromide. Too much ammonia. Excess of silver nitrate. Faulty mixing. Actinic light at some stage of the operation. Plates too long drying. Fumes from gas or other sources. Plates kept in damp or packed in unsuitable materials. Over-exposure or forcing in development.	By adding an antiseptic to the emulsion. Plates or emulsion which fog can generally be cured by soaking in dilute bichromate of potash or very dilute bromine water, and subsequent washing.

II. PINK AND GREEN FOG.

Using a faulty sample of gelatine. Decomposition of gelatine by ammonia or other alkali during preparation. Nitric acid in the emulsion. Plates imperfectly cleaned, or which have been kept some time between cleaning and coating. Ammonia in the developer.	Use ferrous oxalate development or give full exposure, and use as little ammonia as possible with pyro. development. Treat the well-washed plate with— Ferric chloride… .. 30 grains, Potassium bromide 30 ,, Ag .... 1 ounce, until bleached, and reduce with ferrous oxalate.

III. FRILLING.

Too soft gelatine. Decomposed gelatine or other soluble matter in the emulsion. Improperly-cleaned plates. Unequal drying. Long setting in warm weather. Warm water for developing. Too strong fixing bath. Water from tap impinging on one portion of the film. Too long or too short drying. Drying with alcohol. Treating plates with acid or alkaline solutions. Too much alkali in developer.	Add a small quantity of chrome alum to the emulsion. Coat the plates with a substratum of albumen or gelatine and chrome alum. Coat the plates before developing with plain collodion, and give an edging of wax or rubber. If slight, soak the plates in alum before and after fixing.

YELLOW FOG.

Inferior pyrogallic acid. Excess of ammonia in developer. Prolonged immersion in pyro. developer. Use of discoloured pyro.	Use sulphite of soda in developer, or soak after fixing and washing in alum and acid.

RED FOG.

Excess of silver nitrate in the emulsion, or leaving the silver nitrate for some time in contact with the gelatine. Nitric acid in the emulsion. Silver intensification by the acid method. Contact of damp sensitised paper with unvarnished film.	Soak in dilute potassium cyanide.

WHITE OPALESCENT FOG.

Salts of lime in gelatine and water coming in contact with oxalate developer.	Alum and acid.

HALATION, OR BLURRING,

Is seen as fog round the image of bright objects. Occurs generally with thin films.	Thickly-coated plates, either brom- or brom-iodide. Back the plates with Brunswick black. Read *Instruction in Photography*, page 25.

WANT OF DENSITY.

Over - exposure. Insufficient emulsion on the plate. Partially-exhausted developer. Hardness of the film, due to chrome alum or tannin in the emulsion. Use of ferrous oxalate developer prepared with potassium oxalate in an alkaline condition. Too great a proportion of silver iodide in the emulsion.	Use a small quantity of silver chloride in the emulsion. As soft a gelatine as is consistent with safety. Freshly-mixed developer. Intensification. *Note.* — Rapid emulsions generally give less density than slow ones.

SPOTS.

Opaque spots of irregular outline are due to reduction of silver bromide, caused by particles of dirt settling on the film during coating or

drying. Semi-transparent spots are due to grease in the gelatine. Spots ("pits"), which are observed to be indentations in the film, are also due to grease, and generally occur with Coignet's gelatine. Small pinholes are produced by particles of dust settling on the dry plate, so as to prevent the light (forming the image) acting on the film. Round spots with sharp outline are caused either by air-bubbles adhering to the film during development, or air-bells in the emulsion when the plates were coated. E. H. FARMER.

COMMERCIAL SUCCESS IN PHOTOGRAPHY.

[A communication to the Dundee and East of Scotland Photographic Association.]

In meditating over a topic for tonight my difficulty lay in choosing something to which I could lay claim to at least a small degree of originality. Abler exponents, however, than I, coupled with the limited time at my disposal, decided against me; and while attempting to give advice to my fellow-workers in the "black art" I frankly confess I am as willing to receive advice as to give it, and fully admit I am as far from being a model in regard to what I am about to discourse upon as any member of this Association. It is my consciousness of shortcomings on that point which has led me more fully into this subject than I otherwise would have gone.

Every year finds photography entering some new field of existence, and the number of workers correspondingly increasing. Public taste is not so easily satisfied now as formerly. There are thousands nowadays in no way connected with photography who can judge photographs with as much good taste and knowledge as professional workers. The standard of excellence is year by year improving, and the photographer who has almost reached the goal of human perfection (photographically speaking) this year finds by the next that the goal is still as far off as ever. The more successful the photographer becomes as a worker the more successful will be his trade commercially. Customers patronise those only from whom they receive the greatest satisfaction, and it is simply a question of pounds, shillings, and pence that photographers should do their best to secure the respect and esteem of all their patrons. Success in business depends mainly upon the class of work given out, and good work will always speak for itself. A good word spoken in the photographer's favour regarding his method of producing work will go a long way in establishing that success.

First, then, to succeed in business you must be successful in the management of your sitter. Many have a preconceived idea that they take well only in a certain position, possibly from the fact that they once got a good photograph in that position, which at the time had flattered them to their heart's content. Well, if there be nothing outrageous in that position, by all means take them in it. You can at the same time, if necessary, suggest a position which you may be allowed to place them in, and as "*gif gaf* makes good friends" they will as readily accept your suggestion as you have accepted theirs, and think all the more of you when they find, after they have seen the proofs, that your position is the best after all.

Then there are others who have no idea in their heads at all. They are at your mercy and ask advice. A lady, for instance, wishes to know if *you* think she would look best standing or sitting, front face or side face, with bonnet and cloak on or with bonnet and cloak off. This is a hard nut to crack with many a photographer. The true way out of the difficulty would be to say that you make it a rule to offer no advice in respect to what customers should or should not wear, or whether they should stand or sit, &c.; but this does not always please, and they press you to say something, backing it up with a remark to the effect that you ought to know best, having had such a large experience in that line. Little do they know that it is just this large experience which keeps a photographer from venturing a suggestion at all. Customers are apt to make your suggestion an excuse for not liking their photograph, whatever the fault may be. But there is still another way out of the difficulty, and this I call humouring your customers. Make suggestions until you get at their ideas, and while you are supposed to be giving advice you are only in reality acting upon the hints they are throwing out. Then, if two positions or modes of dressing will settle the matter, by all means take them in two ways; this will not only please best, but to my mind will pay best.

Then, in the management of the sitter, a great deal depends upon the manner of posing. Never appear to be in a hurry, work quietly, quickly, and neatly. Do not flurry about your customer or you will give him a flurried look in the photograph, and do not put your subjects into a thousand different attitudes before you finally take them, or the result at the best will be a failure. Avoid screwing them into the head-rest until the last moment (in fact, with the rapid plates of the present day head-rests are almost unnecessary, or if used the slightest possible touch is sufficient to inspire confidence in your sitters' steadiness); not till then bid them look at a particular object.

Do not talk too much, but if your sitter be of a talkative disposition let him have it all his own way. Never appear nervous or excited under any condition, or you are sure to impart that to your sitter. Never lose your temper and never exhibit ill-nature. Customers are not slow to notice this. Always assume a cheerful expression, be happy in your remarks, try and put your customers as much at their ease as possible, and I am confident the result will be success. If children be your subjects study them all the while you are getting things ready. If they are of the "squalling" kind do not hurry on your work, but let them have time to feel easy in their situation and the squalling will stop. If they are of the familiar kind do not encourage them until the last moment. Something attractive will then do "the needful" at the proper time. I am perhaps making a hap-hazard remark when I say that married photographers who have families of their own are the most successful with children. They understand children's ways best, or, at least, they ought to do so, and they can successfully apply that knowledge to their little customers. JOHN GEDDES.

(To be concluded in our next.)

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 13	Great Britain	5A, Pall Mall East.
,, 13	Newcastle-on-Tyne	College of Science.
,, 14	Cheltenham Amateur	
,, 15	London and Provincial	Mason's Hall, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the meeting of this Society, held on Tuesday, the 13th ult., the Assistant Secretary (Mr. Edwin Cocking) read the following annual report for 1882:—

Report of the Council.

Considering the work brought under our notice during the past year, it must be characterised as a period of extreme activity, indicating a state of progress which will leave its mark on the future of photography.

The variety of subjects treated in the papers brought before the Society have been greater than in any recent year; and the value of these papers has also been great, not only in their scientific aspect but in their practical results, and have led to many animated discussions upon the various theories and facts brought forward. It is remarkable, though it was to be expected, that the majority of these papers and discussions have been on subjects bearing on the use of gelatine emulsions—a process which, whilst attaining to maturity, must occupy more or less the chief thoughts of experimental photographers.

One event of the year has been the appointment (upon the suggestion of Mr. Léon Warnerke) of a committee for the consideration of the pitches and sizes of screws which should be given to the mounts of photographic lenses and to camera-screws; and also to the apertures of diaphragms which are most convenient to photographers. This committee, after many sittings, arrived at certain definite resolutions which have been adopted. These have been published in the *Journal* of the Society, and the standards they recommend will henceforth be known as the Photographic Society of Great Britain's standards.

The labours of the committee, it is hoped, will lead in the future to the adoption of these standards. If opticians consent to do so, the convenience of the photographic public will be materially aided, since the diaphragms will tell their own tale as to the relative exposures necessary to be given when using different apertures. The introduction of a system of standard flanges will also considerably assist the daily use of lenses without disturbing the camera arrangements; and the use of the Whitworth screw for photographic apparatus will prevent much vexation, by similar screws being obtainable on any emergency.

The extra meetings, which are now designated "monthly technical meetings," have been extended to every month throughout the year. The reports of their proceedings which have appeared in the Society's *Journal* show how great their practical value has been, and the information supplied could only be elicited by semi-formal meetings such as these.

The following papers have been read during the past year:—

About Drying Cupboards. By Captain Abney, R.E., F.R.S.
Photography in Russia. By Léon Warnerke.
On the Rapidity of Photographic Lenses. By Léon Warnerke.
Photographing on Copper. By Major Waterhouse, B.S.C.
On the Relation of the Human Eye to the Photographic Camera. By William Peek.
A Suggestion for Improving the Clearness and Printing Quality of Gelatine Negatives. By W. Willis, Jun.
Development in Connection with Density and Brilliancy. By T. Sebastian Davis, F.C.S.
On a New Developer. By Captain Abney, R.E., F.R.S.
On the Sensitometric Sensitiveness of Gelatine and other Plates. By Captain Abney, R.E., F.R.S.
A Cure for Green Fog. By Captain Abney, R.E., F.R.S.
Easy Method of Preparing Ferrous-Citro-Oxalate Developer. By Captain Abney, R.E., F.R.S.
A New Automatic Adjustable Exposer. By G. L. Addenbrooke.
Relative Spectrum Sensitiveness of Printing Processes, and a New Form of Silver Printing Process. By Captain Abney, R.E., F.R.S.
A Knapsack Tent. By William England.
With the Eclipse Expedition. By C. Ray Woods.
On the Comparative Efficiency of Various Instantaneous Shutters. By James Cadett.
Apparatus for Testing Short Exposures. By G. L. Addenbrooke.
On a Modified Gelatine Emulsion Process. By W. K. Burton.
On the Rowland Diffraction Grating. By Captain Abney, R.E., F.R.S.

The annual exhibition for 1882 is remarkable from the fact that the revolution begun two years ago in the dethronement of collodion was last

year almost completed, as the statistics show that the exhibits were almost entirely from gelatine negatine negatives; and, although the number was less than hitherto, yet it must be admitted that the quality of the work was exceedingly satisfactory and very promising for the future of gelatine.

It is a matter of congratulation that year after year the exhibition attracts an increasing number of visitors. The total number in 1882 was 7,439, being 1,217 more than in 1881, and 2,439 more than in 1880. The experiment of opening the exhibition upon another evening of the week—making three altogether—has resulted in a success, and many hundreds of visitors availed themselves of this extra opportunity of making acquaintance with an aspect of photography quite new to them.

The Council, in reference to the exhibition, must congratulate the Society upon this portion of the year's work, the value of which, from an educational as well as from a technical point of view, must not be overlooked.

The following is the usual analysis of the exhibition:—

There were 134 exhibitors, comprising 65 members and 69 non-members. Of the 66 members 31 were resident in London, 34 in the country. Of the 69 non-members 30 were from London, 36 from the country, and 3 from Germany. There were 61 London exhibitors and 70 country exhibitors. The 134 exhibitors comprised 71 professionals and 63 amateurs. Of the 71 professionals 35 were members and 36 non-members; of the 63 amateurs 28 were members and 35 non-members.

446 frames were hung, containing 1,437 separate photographs. Of these 1,407 were from gelatine plates, 21 from collodion, and 9 gelatine and collodion.

There were 422 portrait and figure subjects, 696 landscape and architectural, 56 marine views, and 263 miscellaneous subjects; and, with photographs on the table, a total of 1,507 photographic pictorial works were exhibited.

The silver progress medal for 1883 has been awarded to Mr. W. B. Woodbury for his stannotype process—an improvement of much importance lately perfected by Mr. Woodbury in connection with the process that has for so many years borne his name.

It may not be out of place here to refer to the fact that the Royal Society have during the past year conferred the Rumford medal upon Captain Abney, R.E., F.R.S., for his photographic and spectroscopic researches. His papers, which embody so much patient perseverance in the most elaborate researches connected with the theory and practice of photography, have greatly conduced to the prestige of this Society.

In conclusion: the Council can refer with much satisfaction to another proof of activity in the ranks of photography—the fact that during the past year thirty-nine new members have been elected. These new members, in addition to the existing body of old members, comprise some of the most competent investigators and practical workers of our time, and whilst the Society finds such recruits its position as a body representing photographic science and art will be maintained in the future as it has been in the past.

The following financial statement was then read by Mr. W. S. Bird (Hon. Treasurer):—

BALANCE SHEET OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN

For the Year ending 31st December, 1882.

CASH ACCOUNT.

1882. Receipts.	£	s.	d.	1882. Payments.	£	s.	d.
To Balance from last year....	£242	17	0	By General Expenses and Rent of Gallery..............	£197	18	10
,, Entrance Fees and Subscriptions	269	17	0	,, Refreshments at *Soirées* and Meetings	23	10	8
,, Sales of Journal and Advertisements	67	5	2	,, Printing and Publishing the Journal	129	1	6
,, Admissions to Exhibition, Sale of Catalogues, and Wall Space Rental......	203	5	6	,, Assistant Secretary's Salary	50	0	0
				,, Exhibition Expenses, including Medals, Advertisements, and Printing the Catalogue	146	7	6
				,, Balance at the Bankers ..	236	6	2
	£783	4	8		£783	4	8

ASSETS AND LIABILITIES.

1882. Assets.	£	s.	d.	1882. Liabilities.	£	s.	d.
Entrance Fees and Subscriptions due, less deductions..	£63	16	0	None	£—	—	—
Advertisements & Wall Space outstanding	56	4	0	Balance in favour of the Society......................	378	6	2
Furniture	22	0	0				
Cash Balance brought down..	236	6	2				
	£378	6	2		£378	6	2

Audited and found to be correct.

W. S. Bird, *Treasurer.*
February 7th, 1883.

W. Ackland,
G. L. Addenbrooke, } *Auditors.*

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of the above Society was held at the House of the Society of Arts, John-street, Adelphi, on Thursday, the 1st inst.,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. G. A. Garrett was elected a member of the Society.

The Chairman expressed satisfaction that the change in the arrangements for the prize competition made at their previous meeting seemed to have been attended with satisfactory results, and thought that the competition for which pictures had been sent in since their last meeting was perhaps the most successful one they had ever had. He announced that they had had another discussion in Committee as to the best mode of decision upon the relative merits of the examples sent in, and it had been further decided that, instead of waiting until the end of the year for the arbitrators to give their decision, the relative merits of the pictures should be decided at each monthly meeting by the members themselves in the following manner:—All the pictures sent in for competition would be hung round the walls and numbered consecutively. Two pieces of paper would be handed round to the members—one headed "landscape" the other "figure"—and each member would put on the paper the number borne by that picture in each group which he considered to possess the highest merit. From these lists the average of merit would be estimated, and every month that picture in each group which was so adjudged to be the best would be set aside, and from these the arbitrators would make their decision at the end of the year. He (the Chairman) thought they ought to congratulate Mr. Dunmore on his improved suggestion, as he believed they had now a system of adjudication which would preclude all jealousy on the part of competitors.

The subjects for the next month's competition were then balloted for as at the last meeting, and the results were, for landscape, "Sunshine," and for figures, "Always in Trouble."

Through the kindness of Mr. H. Trueman Wood, the Secretary of the Society of Arts, the members had an opportunity of seeing several interesting arrangements illustrative of the applications of electricity to the daily work of the photographer. The incandescent lamp, as adapted for dark-room use, was exhibited. One lamp was actuated by a five-cell Bunsen battery, and an arrangement for switching on the current by a kind of knee-push or button was exhibited. A hand dynamo—constructed on the Pacinotti principle—served also to work a dark-room lamp. One point to which attention was called was the facility with which the light of the incandescent lamp could be rendered non-actinic, either by enveloping it in the new cherry fabric or in paper of a suitable colour. Small dynamo machines, adapted for such electro depositions as are involved in the Waterhouse photo-engraving process, were also shown in action. The new electric light—plant of which has been fitted up in the House of the Society of Arts—was next described. The motive power is provided by an eight-horse nominal Crossley gas-engine, while the electric generator is a Siemens' S.D. dynamo, wound on the shunt principle. Fifty-one Edison incandescent lamps are fitted in the lecture theatre and the council room, but an arrangement exists by which two lights, each of nearly 2,000 candle power, can be brought into circuit.

Mr. G. Davenport, the chief clerk of the Society of Arts, has taken great interest in the fitting up of the electric light plant, and on the present occasion he undertook the running of the gas engine and the management of the dynamo machine.

Mr. F. A. Bridge made some remarks as to the magnesium light, and pointed out that it might often advantageously replace the electric light.

The Chairman said he thought they must all feel indebted to Mr. Wood for his interesting exhibition, the great merit of which seemed to be the economy with which the electric light might be applied to photographic purposes. He had had an idea that for such uses very costly machinery indeed was required, and he would like to know the relative expenses of these machines and processes. Something had been mentioned about the necessity of keeping a "small boy" on the premises for the purpose of turning the handle of the machine, but he thought someone might be found amongst the members of every household to do it, without the expense of extra assistance. With regard to the battery: of course that would have to be kept out of doors when not in use, on account of the fumes produced by the acid.

Mr. E. W. Foxlee said he rather expected something would have been said about secondary batteries.

Mr. Bolas thought it was doubtful if there would be any advantage in using a secondary battery, as it would have to be charged with about four times as much as could be got out of it. The public generally were beginning to find out that secondary batteries were not worth anything from an industrial point of view.

Mr. Wm. Brooks had an idea that it might be used in the Woodburytype process. He did not think electricity in connection with photography had yet received sufficient attention. He had given up his batteries years ago; there were so many different ones used that he was quite at sea. He would like to mention that if a picture was taken on gelatine plate and dried with a great heat a sufficient amount of relief was obtained for electrotyping.

Mr. Foxlee had not used gelatino-bromide films, but he had employed bichromate films for that purpose.

Mr. S. Fry said that attention had been justly drawn to the material known as "cherry fabric," and it had been mentioned that it was desirable to use two thicknesses. He himself thought that if a sheet of tissue paper were used, together with one thickness of cherry fabric, it would be found to answer the purpose. He considered the latter more suitable than ruby glass for photographic purposes. Under the spectroscope he found the blue to be much better neutralised with the cherry fabric than with anything else, and the most sensitive plates might be developed with safety under this light. He had no doubt the electric light would come into universal use, and was quite sure artificial light was preferable in this country to the light of day.

The Chairman said Mr. Fry seemed to adhere to the belief that the electric light could only be used with very powerful machinery, but he thought the contrary had been shown.

Votes of thanks were then passed to the Society of Arts and to Mr. H. Trueman Wood for the use of their electrical apparatus.

It was announced that at the next meeting a paper will be read, by Mr. H. Trueman Wood, on *The Methods by Which the Vocal Organs have been Photographed*, and the meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on the 1st instant, the chair was occupied by Mr. J. B. B. Wellington.

Mr. W. M. Ashman showed some negatives produced in the camera upon argentic gelatino-bromide paper. To keep the paper flat during exposure

it had been first wetted and then laid down upon glass plates. The development was with alkaline pyro., and the speed he estimated as about double that of collodion. He had endeavoured to make the paper transparent by various means, but only with imperfect success. He had tried wax and spermaceti, but the grain of the paper was still very evident. Some which he showed were more transparent than the others, and had been immersed for twenty-four hours in castor oil. He found that a shorter immersion was insufficient to cause complete penetration of the paper. Heat could not safely be employed, as, if the oil bath were warmed to over 85°, yellowness set in. He wished for the opinion of the members on the best means of rendering paper transparent. He had also observed that paper negatives which had been waxed sometimes deteriorated in transparency; the wax after a time becomes semi-opaque in patches.

Mr. W. E. Debenham suggested Canada balsam with turpentine and a little castor oil to preserve the pliability of the paper. He also said that, if paper were intended to be used for taking negatives upon, it should be of much finer quality—such as the Saxe or Rive photographic paper. Castor oil by itself could not be expected to answer well, as, if left in the paper in sufficient quantity to render it transparent, it would probably grease the printing paper, and cause the negative itself to pick up dust and dirt.

Mr. J. Barker remarked that some commercial gelatino-bromide paper would develope with either pyro. or iron, whilst another make would only work satisfactorily with the ferrous oxalate. When preparing paper for negatives with gelatine emulsion he had used albumen paper, coating upon the back.

Mr. W. Coles said that a friend of his who was very particular as to the quality of his work desired to make reproduced negatives. He had tried the plan of printing the transparencies upon gelatine emulsion plates but the results did not satisfy him, and he had eventually settled upon the use of albumen paper prints—printing very deeply and then rendering the paper transparent with wax.

Mr. W. H. Prestwich raised a question as to whether bromide emulsion plates which had been spoiled could be advantageously converted into chloride ones, and what would be the best method of proceeding.

It was suggested that a solution of chloride of copper should be used for the purpose; but it was thought by some that the result would, to a great extent, depend upon whether iodide had been used in the emulsion.

Mr. A. J. Brown expressed doubts as to the decomposition of one of the silver haloids by the action of another haloid. He found that if in an emulsion the silver had been thoroughly converted into bromide the addition of a soluble iodide did not suffice to change any of the silver bromide. If the alkaline iodide were added to an emulsion freshly mixed, and before the nitrate had been all converted into bromide, then iodide of silver was formed.

Mr. Debenham's experience of iodide in emulsion was similar to Mr. Brown's.

Mr. A. Haddon said that if iodide of potassium were added to the ferrous citrate developer, and a chloride plate immersed therein, a portion of the chloride of silver would be converted into iodide during the time development was going on. This was shown by the yellow colour imparted to the emulsion on the plate, and the length of time which the plate now containing iodide of silver took to fix.

Mr. Ashman suggested that, as chloride of copper was not always at hand, it would suffice to mix solutions of sulphate of copper and chloride of ammonia.

The Chairman showed a negative in which the deepest shadows were reversed, the high lights not being altered.

Mr. Debenham considered that the reversal was in this case only a violent case of red fog. Where there was any image the fog had not set in, but where the glass was free from image the fog was so strong as to overpower the fainter half-tones. The fogging had probably been much intensified by the exposure of the plate to light before fixing.

A question was asked whether there was any means of removing from a gelatine negative silver stains that had been contracted from the sensitised paper.

A Member said that, only if the stain were quite fresh, would cyanide of potassium prove of service, and the general opinion was that the removal of the stains was hopeless.

An article was read from The British Journal Photographic Almanac for 1881 (by Dr. G. Kemp), describing a method of preparing a solution of decomposition products of gelatine for making emulsion with, which appeared to be identical in principle and results with the preparation lately re-introduced by Mr. Henderson, and called by him "leucine."

Mr. A. L. Henderson admitted the similarity of the preparation, but said that he was unaware of the prior publication.

Mr. J. J. Adams was elected a member of the Association.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting was held at the Studio, on Wednesday, the 28th ult.,—Mr. T. Davey, Vice-President, in the chair.

The minutes having been confirmed, Messrs. Bush and Francis, of Bristol, were elected ordinary members.

The Chairman assumed that the next business was the election of officers.

The Rev. H. B. Hare said that if everybody was agreeable he would propose that all the officers be re-elected. He was glad to see that the Association *Journal* would contain each month a notice of what was to take place at the ensuing meeting, as this would save the Hon. Secretary some of the work which devolved upon him.

Mr. W. Tribe seconded the proposition, which was carried unanimously.

The Chairman, in thanking the members for re-electing the President and Vice-President, said he was sure they appreciated the honour; and, although some of those gentlemen were not amongst them as often as they should like, still he hoped the members felt that they all endeavoured to do their duty.

Mr. H. A. Hood Daniel begged to thank the members for re-electing him as Hon. Secretary, and said that personally he would have preferred some other gentleman being elected for the year, so that he (Mr. Daniel) might have a holiday. It might surprise some of them if they knew the many things there were to be done in a Society such as that; nevertheless, he did not feel at all wishful to give up those duties while the Association continued to flourish as at present, which could only be the case if members kept up their energy and spirit in its meetings and doings.

The Hon. Secretary then presented the annual report, which, after a slight addition, was, on the motion of the Chairman, seconded by Mr. Phillips, adopted.

Annual Report.

Your Council is pleased to be able to present an annual report of as satisfactory a nature as any that has preceded it. It is also a matter for much congratulation that the addition of new members during the past year has more than reached the average, the result being that, notwithstanding deaths and resignations, the size of the Association steadily increases. A great loss has, however, been sustained by the Association in the removal by death of Mr. Robert Biggs, a much-valued member, and who, had he lived, purposed carrying out some experiments in connection with the periodical photographing of subjects suffering from increasing idiotcy, and which experiments would have proved most interesting and highly instructive to the medical profession.

The following meetings have been held and communications contributed during the session:—

Notes on the Use of Luminous Paint in Photography, Part I. By Mr. E. Brightman.

On Different Kinds of Lantern Slides. By Messrs. Davey, Powell, and Daniel.

Notes on Lantern Apparatus. By Mr. H. A. Hood Daniel.

A Retrospect of Photographic Experiences. By the President (Colonel Biggs).

How to Dry Gelatine Plates Rapidly. By the Rev. J. J. Strutt Bird.

Excursion meeting to Castle Coombe.

Ditto to Froom Glen.

On the Effect of Light Upon Certain Kinds of Ordinary Paper. By the Rev. J. J. Strutt Bird.

The monthly meetings have been fairly well attended, although there are some members that the Council would like to see taking a greater interest in them. The excursion meetings have been well attended, and have proved very enjoyable and productive of a considerable amount of work.

Your Council cannot but feel it to be a subject for much regret that there were not enough pictures sent in to form a competition in either class for the Association medals, this want of energy amongst the members causing the benefits intended by such competitions to be quite lost.

The studio is still in good working order, and your Council hopes to see an increase in the number of subscribers during the next year, as the advantages offered by such an institution are invaluable to those partial to portrait and life studies.

The financial position of the Association is satisfactory, there being a balance in its favour.

The thanks of the Society are accorded to Messrs. T. Davey, E. Brightman, and H. A. H. Daniel, for contributions of books and photographic publications, and to the Secretary of the Photographic Society of Great Britain for its monthly journal; also to Mr. J. Traill Taylor for monthly copies of the *Photographic Times;* to Mr. W. B. Bolton, the Editor, for The British Journal Photographic Almanac for 1883; and last, but not least, to the gentlemen who have so willingly contributed to the success of the monthly evening meetings.

Your Council, in conclusion, would once more urge the members individually to make special efforts to attend regularly every meeting they possibly can; to influence every amateur they hear of in the West of England to make application for admission to the Association; and, finally, to make a point of making one contribution at least to the monthly meetings during each session, as without such individual effort the meetings cannot be made either so interesting or instructive as they should be.

Your Council would also direct special attention to the Association's triennial international exhibition, for which extensive arrrngements have been made for it to be held, as in the year 1880, at the Academy of Arts, Queen's-road, which bids fair to be surpassed in success. It is hoped the Association will be well represented.

Mr. Daniel proposed to rescind the resolution adopted at a previous meeting, which altered the date of the annual meeting from October to January, notice having been given at the previous meeting.

It being generally considered that the original date was more convenient,

Mr. E. Brightman seconded Mr. Daniel's motion, which was carried *nem. con.*

The Hon. Secretary then read a paper, by Mr. H. B. Berkeley, on *Improvements and New Applications of the Platinotype Process.* [See page 134.]

The paper evoked much interest and caused some discussion.

The Chairman asked if there was any difficulty in keeping at an even temperature the developing solution.

Mr. Daniel replied in the negative.

Mr. Phillips inquired the best way of keeping the temperature of the solution equal all over the dish.

Mr. Daniel replied that there were many very good ways of doing so, but that a convenient one was to have the dish of developer some distance —say a foot—above an atmospheric burner, enclosing the space between all round. It was perfectly under control.

Mr. Brightman suggested a sand bath.

Rev. H. B. Hare said he did not admire the coldness of the platinotype pictures.

Mr. Daniel suggested an India tint which the pictures could be printed pon, and which would slightly warm the whites. He was very proud of he process.

Mr. Tribe thought the paper, being slightly India-tinted, would make he pictures still more beautiful.

Rev. H. B. Hare exhibited a filtering machine for gelatine, which had he advantage of keeping the gelatine warm without any trouble. The op part contained a socket for a funnel, which was jacketed with hot rater; the lower part contained a holder for the receptacle for the emulion to drop into, the receptacle being surrounded by hot water. One part itted on the other, with a cover on the top, the whole being of tin and erfectly light tight. It was considered a very useful and complete arangement.

Votes of thanks to Mr. H. B. Berkeley and the Rev. H. B. Hare closed he meeting.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The sixth regular meeting of this Society was held at Lamb's Hotel, on Thursday evening, the 1st instant,—Mr. James C. Cox, President, in the chair.

The nomination of office-bearers for election at the annual meeting on April 5th was duly made.

Mr. J. Geddes, of Arbroath, then read a paper entitled *Commercial Success in Photography* [see page 136], in which he argued that the highest and best efforts would meet the surest reward, and gave some good advice as to photographic practice.

A hearty vote of thanks was awarded to Mr. Geddes for his paper.

The question-box afforded material for discussion. Two queries on photographic chemistry were answered with considerable ability by several of the members present.

The Chairman exhibited an interesting series of photographs on linen fabrics both of coarse and fine texture, from oatmeal cloth to fine sateen, which were permanent and washable, showing the further development of the art to ornamental and decorative purposes.

A vote of thanks to the Chairman brought the meeting to a close.

LEEDS PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 1st instant,—Mr. Washington Teasdale, F.R.M.S., President, in the chair. There was an excellent attendance of members.

Mr. Smith gave a demonstration of the carbon process. Intimating that the members through the medium of the Journal and Almanac must be (theoretically at all events) acquainted with the carbon process, he said he intended to spend the time allotted to him in giving a practical demonstration of the various manipulations required in working the process. He (Mr. Smith) then proceeded with his demonstrations, and in a very practical and skilful way illustrated his method of sensitising, exposing, and developing carbon tissue, both by single and double transfer. Having provided himself with several pieces of exposed tissue he was enabled to develope and pass round for the inspection of the members some beautiful portraits and views, which were much admired.

The Chairman gave a very interesting and exhaustive account of some experiments he had made more than twenty years ago in a similar direction, and exhibited microphotographs he had taken at that time.

The discussion was continued by Mr. Fairley, F.I.C., F.R.S.E., Messrs. Ramsden, Thornton, Rodwell, and others.

A letter from the Librarian of the Leeds Free Library was read by the Hon. Secretary, intimating that the committee of that institution were willing to provide an album and arrange for the mounting, &c., of any views of old buildings in or near Leeds that the members might be disposed to place at their disposal. The idea was very favourably received, and several members promised to send in views.

The meeting was shortly afterwards adjourned.

Correspondence.

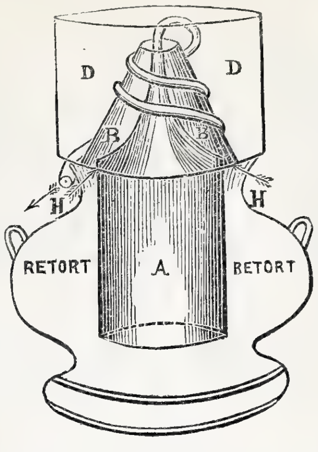
March Meeting of the Photographic Society of France: Presentation of Carbon Proofs by M. Braun.—Sensitised Albumenised Paper by M. Mey. — A New Still. — Professor Stebbing on a Modified Plan of Herr Obernetter's Emulsifying Process.—Remarks on Mr. W. K. Burton's System.—A Table Showing the Amount of Ammoniacal Gas in Water.—Examination of Candidates by the "Chambre Syndicale de la Photographie."—M. Vidal's Lecture.—A New Italian Photographic Journal.—Banquet of the Photographic Society of France.

The monthly meeting of the Photographic Society of France was held on Friday evening last, the 2nd instant,—M. Peligot in the chair.

After a review of foreign photographic journals and taking into consideration claims from correspondents, the members inspected some very remarkable carbon proofs. They were sent by MM. Braun and Cie., and were reproductions of pictures in the museums of St. Petersburg. I may safely say that I never before saw such a fine display of carbon work; the proofs measured 18 × 24 inches.

MM. Mey and Cie. presented some albumenised paper sensitised by silver chloride; the manufacturers wished the Society to try a piece every month and report upon its keeping qualities.

M. Broquet presented a new model of a portable still invented by M. Valyn, a gentleman well known in Paris for his valuable communications to *Le Petit Journal*, called *Tablettes du Travail*, which means useful formulæ on subjects likely to be of service to the working class. His still was invented with the object of teaching the peasants to make a living by extracting the essence of flowers, &c. As it succeeded beyond the expectation of the inventor, larger sizes were made and found superior to the old-fashioned ones. The reason is that a simple "dodge" thought of by M. Valyn secured great economy in fuel by bringing into aid the cooling properties of a current of air to condense the vapours. This he obtained by a double inverted funnel—A and B. A forms the lid of the still, and is connected with the tube which carries the steam to the condenser. This tube is wound round the inverted funnel B B. Instead of being fixed to a separate apparatus it is thus fixed in the recipient D D holding the cold water.



Between the lid of the still and the inverted funnel B B is a hollow space, which has been made use of in this wise:—Holes have been made in the lower part so that the air can enter at H H; when vapour of steam begins to rise the heat produces a current of air in the direction of the arrows, and cools the sides of the inverted funnel B B. These new stills will render great service to photographers and makers of emulsion by the precipitating system with alcohol, as they take up very little room and, above all, are very cheap. The still costs about £4, and holds about twelve litres.

The meeting was then adjourned. There was nothing new and very little to glean.

Since my first experiments on Obernetter's emulsifying process, which I gave in a former letter to this Journal, I have been able to modify my opinion thereon. By taking certain precautions and introducing slight changes I can now obtain the most trustworthy and, at the same time, rapid emulsions that I ever experimented with.

As to changes: the most radical is I employ ammonio-nitrate of silver. As to precautions to take: the principal is to allow the silver to be in contact with the gelatine as short a time as possible, and to mix the two only in red light.

After many experiments I find the following plan succeeds better in my hands than any other. For a given quantity of silver (say)—

Silver nitrate	54 grammes,
Liquid	250 c.c.,
Gelatine	75 grammes,

I take—

Distilled water	252 c.c.
Bromide of potassium	50 grammes.

That is the formula. Now for the method of working:—

I dissolve fifty-four grammes of silver in fifty c.c. of distilled water. I then add about forty c.c. of ammonia, s.g. ·900 (stronger ammonia being very difficult to obtain in France). I continue to add the ammonia until all the precipitate is dissolved. This is put aside.

I then take seventy grammes of gelatine and wash it in rain water. For the last wash I employ distilled water. When well washed I weigh it to ascertain the quantity of liquid absorbed. Say I then require 250 c.c. of liquid. I have with the silver solution set apart about 100 c.c.; the gelatine has absorbed (suppose) 100 c.c. I must now add fifty c.c. to make it up to the required amount, 250 c.c. I now put the gelatine, with its 150 c.c. of water, into a mug (with a large flat bottom, if possible). I thoroughly dissolve the gelatine and then allow it to cool nearly to setting point. I now pour in the ammonio-nitrate of silver solution, and that in the dark, and after having stirred it up most thoroughly I put the mug into cold water—iced, if possible. As soon as set I take ten c.c. of distilled water and put into it a few drops of the solution of bromide. I then pour it upon the hard cake of gelatine. This weak solution of bromide is intended to obtain a fine deposit of silver bromide to begin with (I have always observed that if a concentrated solution be employed at first a very granulous and cakey surface is obtained). After a lapse of a few minutes the whole of the bromide solution can be poured into the mug. The chemical action can be maintained for about five hours without touching the products. After that time it may without danger be aided by pulling out the glass stirrer (which I suppose to have been left in the cake), then pushing it through the middle of the cake, and if possible detaching the latter from the bottom of the mug, so that it can swim freely in the solution. From the time that I pour the concentrated solution upon the nitrated gelatine until I believe the chemical action has terminated I generally allow ten hours to elapse.

I now put the mug into warm water and dissolve the whole, without pouring out the solution containing potassium bromide and nitrate (as is recommended by Obernetter), as peradventure there might be some silver nitrate yet unconverted in the centre of the gelatine cake. When thoroughly dissolved, and that by the slighest heat possible, I pour in a solution of two grammes of potassium iodide, and when well mixed ten c.c. of a five-per-cent. solution of bichromate of potash; the mug

is again put into cold water, and when the product is set it is cut up and washed in the usual way, dissolved, made up to the required thickness, filtered, and employed. I generally obtain between eighteen and twenty degrees of rapidity by Warnerke's actinometer.

As I said before, this method of working leaves nothing to be desired in my hands, but can one guarantee that it should act the same with other manipulators? Impossible. As an instance of this: since Mr. W. K. Burton published his formula for precipitating silver bromide I have made more than twenty batches without being able to get a precipitate, even after standing more than a week in the hope of obtaining one. Being disappointed in doing so, I have been obliged to add the full quantity of gelatine and make my emulsion by the washed system, which, bye-the-bye, succeeded admirably; but this is not the result I wish to arrive at, and it annoys me. Why will it not precipitate? That is the question.

I cannot bring forward any other cause than the bad ammonia with which we are supplied here. I see in English formulæ that ·880 is the density of ammoniacal solutions generally recommended. We cannot obtain ammonia at forty per cent., as this seems to infer. The strongest I have had here contains only about thirty per cent. of ammoniacal gas; indeed, is it wise to keep in stock such a concentrated solution? and can it be done with any degree of certainty? The heat of the room alone must cause a loss of strength if not hermetically sealed. I find it is preferable to bring a stock solution down to ·900; it can then be kept at that strength without extra care for any length of time.

I will now give a very useful table showing the percentage of ammoniacal gas in water according to its density, by which operators can bring their ammoniacal solutions to any strength required:—

A_3H_3 %	Density.	A_3H_3 %	Density.	A_3H_3 %	Density.
1	0,9959	14	0,9449	27	0,9052
2	0,9915	15	0,9414	28	0,9026
3	0,9873	16	0,9380	29	0,9001
4	0,9831	17	0,9347	30	0,8976
5	0,9790	18	0,9314	31	0,8953
6	0,9749	19	0,9283	32	0,8929
7	0,9709	20	0,9251	33	0,8907
8	0,9670	21	0,9221	34	0,8885
9	0,9631	22	0,9191	35	0,8864
10	0,9593	23	0,9162	36	0,8844
11	0,9556	24	0,9133	37	0,8824
12	0,9520	25	0,9106	38	0,8803
13	0,9484	26	0,9078	39	0,8800

"La Chambre Syndicale de la Photographie" will soon begin the examination of operators in order to grant diplomas. Ten candidates have already applied to undergo the ordeal.

M. Vidal has begun his course of lectures—"a l'Ecole des Arts Decoratif." This gentleman, in his last lecture, pointed out the great necessity for knowing to a nicety the speed of rapid shutters in use. In order to attain this knowledge he proposes that a large clock face shall be painted about a yard high, or even higher; the figures, instead of being from 1 to 12, are to be from 1 to 100, painted in white upon a black ground. A hand is to be put on painted white, and attached to an axis passing through the dial face. The hand is turned round from the back by means of a crank which turns, so that every revolution takes one second for the hand to go from 1 to 100. Very little practice is required to obtain a regular motion. A negative is then made with a plate of a known rapidity; the hand flies round and round, the shutter is set to work, and the impression is made. When developed the rapidity of the shutter can be seen as it is measured on the plate. If the shadow of the hand goes from 1 to 25 the exposure was a-quarter of a second; if from 30 to 40 the time was $\frac{1}{10}$th of a second, and so on. A great number of prints were passed round which were made by a photographer in the north of France, and who highly recommends the "dodge."

Professor Borlinetto, of Padone, has edited a new journal, *La Camera Oscura*, being a general review of the progress of photography. If the well-known merits of the editor can command success the subscribers to the new journal will not be wanting. I wish the learned Professor every possible success in his new enterprise.

The Photographic Society of France intends to meet at a friendly banquet on Saturday evening next. If any foreign photographer or amateur visiting Paris on that date would like to join he must apply to the Secretary, 20, Rue Louis le Grand. E. STEBBING, *Prof.*

25, *Rue des Apennins, Paris, March* 5, 1883.

THE HYPO. FIXING BATH.

To the EDITORS.

GENTLEMEN,—I observe a few notes on the fixing bath for negatives by Mr. W. Harding Warner. I beg to say for his information that I always use my hypo. fixing bath, and have used the same bath for two years, in the following manner:—I keep a few crystals at one end of the bath, and as the absorption goes on and hypo. is extracted the crystals supply its place and keep the solution saturated.

I always pour the solution back into the stock bottle, which also contains some undissolved crystals at the bottom, and it is always ready for use. I simply pour off the top.—I am, yours, &c.,

15, *New Bond-street, Halifax, March* 2, 1883. EDW. GLEDHILL.

ADAMS'S "BRILLIANT."

To the EDITORS.

GENTLEMEN,—In connection with your notice of our "Brilliant," we beg to ask your attention to the following remarks:—There is no oxalic acid or any oxalate compound in the solution. The ferrous [query *ferric*?—EDS.] salt we use is unique, and not in any chemists' list. There will be no crystallising in the film, *for certain*, if properly washed, as we have used it two years and have found no such objection in any one of the negatives so treated. Of course it is quite needless to remind you that *any* salt left in the film would ultimately destroy or damage it.

Being enlargers to the trade we have had the work of hundreds of photographers pass through our hands, and it is really amazing to find the large number of negatives which suffer from imperfect washing, the dense portions being spotted with hypo. crystals.

It is a singular fact that our "Brilliant" *reduces* the danger arising from imperfect washing, as it converts the hypo. into a much more harmless salt; but whatever the system or chemicals used *thorough* washing is essential,—We are, yours, &c., ADAMS AND CO.

309, *West Derby-road, Liverpool, March* 2, 1883.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

William Henry Broadhead, 82, Thomas-street, Manchester.—*Photograph of Egyptian Slave.*

Edmund Eccles, Broad-street, Bury, Lancashire.—*Two Photographs of the Rev. John Sampson, the Cornish Evangelist.*

Messrs. Brown, Barnes, and Bell, 44, Kirkgate, Bradford.—*Group Photograph of the "Yorkshire County F.B. Team."*

EXCHANGES.—In our next.

HARRY GARDNER.—A "wide-angle" lens would be the *least* suitable for your purpose. One of the class known as "rapid" is what you want.

S. BROOKE.—Over-exposure is the cause of your failure. The more general fault in collodion transfers is under-exposure, but you have erred in the opposite direction.

C. H. S.—You will find an article on the subject, by Mr. E. W. Foxlee, in our ALMANAC for 1876. Read that, and if you require any further information write again.

R. P.—As far as we can judge from the appearance of the sample film, the reticulation is due to the collodion solely; it is either too old and partially decomposed or contains too much water.

HYPO.—1. You will find several formulæ for toning baths in our ALMANAC. —2. Sufficient to neutralise the free acid. As an excess does no harm, the quantity added is of no consequence. So long as some is undissolved sufficient has been added.

PATENT FOCUS.—Any horticultural builder will construct a studio for you if you furnish him with a design. We do not know of any builder who makes a speciality of constructing photographic studios.

YOUNG IRELAND; SEMPER FIDELIS; POOHWEST; POTASH.—These correspondents have not conformed to our rules by sending their names and addresses; hence their queries remain unanswered. We must insist upon correspondents conforming to this rule when answers are required.

J. W. KING.—1. Immerse the gelatine in strong alcohol to abstract the major part of the water; it will then dry more rapidly.—2. You are employing an unsuitable gelatine; the spots are what are known as "pits."—3. Use plumbago; it is better than the bronze powder.—4. You will be able to procure moderately-thick sheets of gelatine at any lithographic material dealer's.

A. RATHJENS.—You will not get rid of the lead in the nitrate of silver solution by precipitating the silver as carbonate, as the lead will also be precipitated as a carbonate. This will be converted into nitrate of lead at the same time as the carbonate of silver is converted into the nitrate of silver on the addition of nitric acid. It *is* possible to get rid of the lead, but it is not worth the trouble if the solution is to be used, as you say, for printing. The small proportion will do no harm whatever.

SYDNEY G. LYDFORD.—1. The water you employed for the development of the prints evidently, as most rain water collected in the neighbourhood of large towns does, contains ammonia, which will, no doubt, fully account for your experience.—2. The prints proving darker after keeping than those developed at once has been fully explained several times in the Journal. The property is known as the "continuating action of light" amongst carbon printers. There is no absolute necessity to use alum; but it is looked upon as a safeguard more than anything else, as it renders the partially-soluble gelatine which exists in a print, unless it be very fully exposed, quite insoluble.

RECEIVED.—George Smith; John Nicol, Ph.D.; "F. M. S." In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—On Wednesday next, the 14th instant, the subject for discussion will be *On Silver Printing and the Means Adopted to Secure Permancy.*

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1193. Vol. XXX.—MARCH 16, 1883.

THE REMOVAL OF SOLUBLE MATTER FROM GELATINE EMULSION.

In another column will be found an interesting paper by Mr. A. Haddon on the subject of *Freeing Emulsion from Soluble Colloids.* This question has arisen in consequence of a doubt having been expressed as to whether any decomposed gelatine is removed from the emulsion during the operation of washing.

Theoretically, assuming "decomposed" gelatine—that is, gelatine whose setting power has been destroyed by the action of heat or of alkalies, which seems to be what is chiefly meant—to be a colloid substance in the soluble condition, one would imagine the doubt to be well founded, inasmuch as, according to the researches of Graham, insoluble colloids arrest the diffusion of soluble colloids. For instance: in the case of a gelatino-bromide emulsion which has been allowed to set and has been then divided into fragments by one of the methods in general use, any portion of the gelatine which has become permanently soluble in cold water would be nevertheless retained in the gelatine, in spite of any length of washing, by the arrestive power of the insoluble or undestroyed gelatine.

Thus Mr. Haddon was justified in expressing a belief that such decomposed gelatine was not got rid of in the operation of washing; but his carefully-conducted experiments tend to show that the contrary is the case—at anyrate in a great measure, and, strange to say, theory would seem to be contradicted not only by those experiments but also by actual practice. Two or three examples may be given in evidence to support the popular belief that gelatino-bromide is to a great extent freed by washing from at least a large portion of the gelatine which may have become decomposed or permanently soluble in cold water.

The first mention, so far as we are aware, of the matter occurred as early as 1876, in a letter in our columns from one of the earlier workers of gelatine emulsion. Writing on the subject of *Dialysis versus Washing*, in the number for April 21, 1876, page 191, "F. S. K." says—"If gelatine be soaked in cold water for an hour or so, on shaking the bottle the liquid will froth, thus showing that there is some gelatinous substance in gelatine which seems to be distinct from the portion which is insoluble in cold water. It appears desirable, therefore, to ascertain whether this should be retained in the finished emulsion, and whether the working and, above all, *keeping* qualities of the emulsion are in any way affected by its retention. By 'dialysing' this substance is retained; by washing it is removed."

Here is a direct statement by a careful, practical man to the effect that dialysis and washing do not produce identical results on an emulsion; and it would seem to prove at first sight that theory is incorrect in stating that the diffusion of soluble colloids *out of* a mass of insoluble colloidal substance is arrested in the same manner as it is *through* a thin septum.

In the following number (April 28, 1876, page 203) Mr. Herbert B. Berkeley, commenting on the above, says:—"'F. S. K.' suggests the possibility of the soluble portion of gelatine" [query, "gelatine emulsion"] "affecting its 'keeping' property. I notice that from less than a drachm of wash water a very large quantity of flocculent precipitate is thrown down by tannin, which has a brown colour." Here, again, is corroboration of the statement that some soluble substance is removed from gelatine by "washing," but whether the same would pass the dialytic septum is not stated. On a subsequent occasion another writer, whose name we have forgotten, and whose reference we cannot at the moment find, actually traced certain defects which he had experienced with dialysed emulsion to the presence of a flocculent substance which would not pass through the septum, but which was apparently removed by washing the broken jelly.

Our impression is, and always has been, that this difference exists between dialysis and washing, and the truth may readily be proved. For instance: if a quantity of set emulsion be cut into cubes not less than a-quarter of an inch in diameter, and digested for a few minutes in perfectly-cold and carefully-filtered distilled water, it will be found on careful examination that something which can scarcely be described as flocculent, and which certainly is not silver bromide, has been dissolved or washed out of the jelly. If the lumps of emulsion be removed and the water evaporated a syrupy residue is left. Again: if before washing an emulsion a few plates be coated and allowed to set thoroughly, and then soaked in perfectly-cold water to remove the decomposition salts and other soluble matter, it will be found upon comparing them after drying with other plates coated from the same emulsion *after* it has been washed that there is a great difference between their respective surfaces. The plates made from the washed emulsion will have a much more homogeneous and glossy appearance, while the others will be matt and spongy as if from the removal of some substance from the pores of the gelatine. This might to a certain extent be ascribed to the soluble nitrates removed; but an examination with a powerful magnifier will show a sort of honeycombed appearance, which leads to the impression that some of the gelatine itself has been washed away. In both these instances the absence of silver bromide from the wash water proves that the action is not one of simple solution of the whole surface, but rather a diffusion of the soluble portion of the film.

But perhaps the most remarkable proof that could be adduced of the possibility of the separation of soluble gelatine from the insoluble is the following chapter from our own experience:—A washed gelatine emulsion was inadvertently left draining in a funnel in the dark room prior to remelting. It was overlooked, and remained for some days—the weather at the time being warm—without the protective influence of alcohol or any other antiseptic, the result being that it decomposed, passed through the funnel, and was found in a permanently-liquid state when subsequently discovered. As the light had not reached it, and it contained a mixture of haloids we were desirous of trying, it was resolved to utilise it by adding a fresh quantity of gelatine and rewashing.

This was done, the washing being rather prolonged. After allowing the new gelatine to soak in the liquid emulsion for about an hour heat was applied to dissolve it, and a portion was poured on to glass in order to examine the colour and fineness of the silver particles. After washing and remelting, plates were coated, and these behaved in every way as any ordinary emulsion, except for a tendency to frill not usually experienced with the same gelatine. But the portion of test emulsion poured out previous to the second washing was

found to have set into a tacky film, which, even if dried by heat, rapidly reabsorbed moisture from the atmosphere and became again tacky. This could not be due to the presence of deliquescent *nitrates*, as these had been removed in the first washing; hence it is only reasonable to believe that the decomposed gelatine was the cause, and that this was subsequently removed in the second washing.

Mr. Haddon is, no doubt, correct in his suggestion that the soluble matter is removed by washing from the surface exposed, and not from the interior of the shreds or particles of emulsion; and this forms one more argument in favour of dividing the emulsion into fine shreds before washing.

PORTRAITURE FOR AMATEURS.—HINTS ON THE MANAGEMENT OF THE SITTER.

The admirable illustration of what may be accomplished in the way of portraiture by an amateur in an ordinary room which we presented with our last issue will, no doubt, stimulate many others to follow in the wake of Mr. William Adcock. We shall be somewhat surprised if we do not find portraiture and figure studies well represented in future photographic exhibitions, instead of being, as in late years, conspicuous by their absence.

We have already had several inquiries from new subscribers for the numbers of the Journal in which the series of articles on *Portraiture for Amateurs* appeared in our last volume. Since those articles were written we have received numerous examples of portraits and studies produced by amateurs in ordinary rooms and with apparatus specially designed for landscape work, many of which would do credit to any professional artist working in a studio of the most approved design and with apparatus of the most modern construction made specially for portraiture.

The increased interest which appears to be taken in indoor photography just now induces us to supplement what was written last year on this subject, by giving a few practical hints on the management of the sitter, as it is on the tact and judgment displayed in this matter that success in portraiture or figure studies in a great measure depends, although it is one that is too often neglected, even by the professional artist.

There can be no question whatever that the amateur is placed at a considerable advantage over the professional photographer with regard to his sitters, inasmuch as it is rarely that they are strangers to him; hence he has ample opportunity of studying their general characteristics well beforehand. Thus he is enabled to select a pose that is well suited to them and to secure an expression most natural, while the professional frequently has only the opportunity of seeing and conversing with his sitter for a few minutes before the portrait is actually taken. Again: the sitter will always feel more at ease in sitting for a portrait (often for "the fun of the thing") in the room of a friend or acquaintance than he will in the studio of a total stranger.

All this places the amateur at a great advantage; but, on the contrary, there are other points in which the professional has the advantage. One (and it is no mean advantage) is that, as a rule, he has greater command over his sitters, and can, therefore, the more easily induce them to conform to his wishes; whilst with the amateur there is a greater inclination with sitters to have their own way and to enforce their own opinions, which more frequently than not leads to an unsatisfactory result. Again: the professional possesses more appliances and greater choice of accessories, and if an accessory or background may appear unsuitable he can easily substitute another. Still, on the whole, the balance is in favour of the amateur securing the most natural pose and pleasing expression when the picture is confined to bust or half-length only.

Now for a few practical hints. In the first place, the artist, having had full opportunity of studying his model, should determine in his mind the pose to be adopted before any preparations are made with the sitter. The camera should be placed *in situ*, with the plate in the slide close at hand, and the background and reflector arranged as nearly as can be judged in the proper position, so that the sitter may not become wearied unnecessarily. It will be found a good plan to get someone to act as a model, so that all the preliminary arrangements may be completed before the sitter is introduced into the extemporised studio at all. One difficulty the amateur will frequently have to contend with, if a number of friends are in the room, is that all will be making suggestions, and will also wish to assist in the posing and arrangement of the drapery, as well as give instructions to the sitter as to the expression, &c. All this is fatal to securing a result that will be at all satisfactory. If a number of persons be present when the exposure is made the chances are ten to one that the sitter either moves or smiles at the time, and thus spoils the picture. The best way is to request all, save one of the company, to retire for the time being.

If perchance the sitter should demur to the position selected by the artist, and request one of his own in preference, the best method of meeting this difficulty is by a promise to take a second picture in accordance with his ideas, provided he permit the artist to have *his* own way in the first. This little "dodge" generally succeeds admirably and has the desired effect; for it is never wise to thwart the wishes of a sitter, even in a friendly way, when a pleasing expression is desired.

While posing and arranging the light a pleasant conversation should be maintained on some topic known to be an agreeable one to the model, and this will generally ensure a natural as well as a pleasing expression at the time of exposure. When the pose and lighting are satisfactorily obtained the drapery must be looked to and arranged so that the folds compose artistically. The picture is then focussed and the lens capped. The dark slide is now placed in the camera and the shutter drawn, and not until all this is done should immobility be requested. If this be done at an earlier stage the chances are that the sitter has to an extent become wearied, and a slight movement will result during the exposure, or the figure will have a constrained appearance. Whenever sitters are desired to direct the eyes to any particular object while the picture is being taken it should be impressed upon them that they may blink them as much as they choose, and that there is no advantage whatever in their trying to avoid doing so. This will inspire confidence, and tend to prevent the unnatural stare one so often sees in photographic portraits.

We cannot too strongly impress upon the tyro in portraiture the necessity of "fidgeting" or wearying the sitter in the posing and arranging as little as possible, otherwise a satisfactory picture will be an impossibility, as every professional portraitist is fully aware. In all instances the picture should be fully exposed. We mention this again, as in the examples of failure that have come under our notice the chief fault in the majority of cases has been that the negative has received an insufficient exposure.

In concluding the series of articles on portraiture for amateurs we promised to recur to the subject and to give some practical hints on taking groups, &c., in the open air. Press of other matter prevented our doing so until the season was too far advanced to permit of outdoor operation in this direction. We shall, however, redeem our promise on an early occasion during the coming spring.

VARNISH AND GELATINE.

Signs are not wanting that the reign of gelatine will be signalised by an average above the common of negatives ruined by keeping, or spoiled, as it is termed, by "time," which is but a poor mode of describing the natural sequence of cause and effect that requires time to enable it to be developed. Imperfectly-treated, badly-washed, improperly-mercurialised negatives, and a host of others in the production of which recognised and familiar canons of chemistry have been defied and set at naught, increase to an unusual extent the tale of utterly-damaged negatives, and it is evident that as time progresses it will continue to increase. The wise photographer will be he who, as his negatives accumulate, leaves no stone unturned to discover the best means of counteracting known evils; and he who so mixes brains with his processes will be able to anticipate and prevent evils of which others will only become aware when they are face to face with them.

Difficulties with varnishing have not been ignored since the popularisation of gelatine; but in a great many instances the transition from the old to the new has been so gradual that the very important

fference between the operation of varnishing a collodion and a gelaıe negative is not likely to have presented itself to many workers. ıat a difference—and a great difference—does exist cannot be ubted, and the manner in which the question has been already scussed by many eminent photographers proves that they are alive its presence.

Those who have not thoroughly appreciated the difference which ists will see it plainly by performing a simple experiment. Let a llodion and a gelatine negative be taken, and let each be varnished er only one-half of its surface. If the varnish be a pale one there ll, in all probability, be no difference whatever in the gelatine plate tween the varnished and the unvarnished half, either in appearance printing powers. In the collodion negative there will be a most arked difference. The varnished half will print more quickly and e print will have a softer appearance. Going further into the matter, ıd looking at the back part of the plate, the difference will be, if ssible, more striking. That portion which has been varnished—we e speaking of a spirit varnish dried by heat—will be much darker appearance, and, if we may be allowed the expression, more "wetoking." There is the same difference, though in a smaller degree, as ere is between a filter paper wet and dry, and we cannot doubt ıat the appearance is owing to similar causes. Collodion acts in the ıanner of a completely porous substance, so that when a varnish is oured upon it its interstitial spaces are filled up throughout the hole film; and a varnished collodion film becomes practically a ughened coat of varnish, amenable only to such influences (and to ıese in a minor degree) as affect a plain coat of varnish itself.

Turn we now to gelatine, and the conditions change entirely. A ry gelatine film is impermeable by pure spirit of wine; hence a soluon of some resin in spirit, when applied to such a film and dried, mply deposits upon it—not within it—a thin layer of that resin, ıt in a very coherent form. Now comes the important question—o what extent do these two films (gelatine and resin) agree with ıch other, and is there any danger of one interfering with the ther? The precautions recommended and the plans of procedure iven by some photographers of great experience and large practice rgue strongly that such interference does take place. To prevent , one favourite recommendation is the preliminary coating of the elatine with collodion, so as to form, as it were, a medium between he two—a sort of photographic buffer to lessen the effect that ight be produced by expansion or contraction.

This part of the question is so much pure theory that some practical ıformation would be of great value, and we invite those of our eaders with large stores of negatives of two or three years' age to ive their experience in our pages. We do not refer to badlyıtensified or imperfectly-washed negatives, but would simply inite a declaration of the results of keeping presumably perfect gelaine negatives varnished with a collodion safeguard, plain varnish, r any other method that may have been chosen from its expected r reported good properties. Such evidence from experts would be ıvaluable, and we earnestly hope it may be offered.

Looking at the matter from a logical standpoint, its aspect would ppear to be somewhat as follows:—Gelatine and varnish behave so ifferently to atmospheric changes of temperature or humidity that it ıay be expected a rupture of continuity would occur, and show itself n the shape of injuries to the surface or separation from the glass.

Let us take the latter consideration first. It has long been stated and such recent evidence has been given that the matter is placed eyond a doubt) that gelatine dried upon porcelain or glass has ometimes sufficient contractive power to tear the glass off the orcelain, or the surface from the glass, while drying; but, so long s the gelatine remains adherent to the glass, that force is ntirely in abeyance, and is never likely to manifest itself by drawng the film away from the glass. May it, then, be considered robable that a substance of such comparatively weak cohesive owers as dried varnish can exercise a coercive force upon the elatine sufficient to overcome the natural strength of the latter? The question answers itself, and it cannot but be remembered that ıny expansion of the gelatine must be, so long as it is adherent to he glass, simply accordant with the expansion of the glass.

Next, we must consider the case of the gelatine acting upon the varnish. But we have just seen how gelatine and glass must be considered as one, and, as the gelatine surface must be more microscopically rough than that of glass, there would be a firmer holding surface for the varnish to adhere to. We certainly think the possibility of greater danger to the varnish on a gelatine negative than would occur to a film of varnish on plain glass remains to be proved.

Finally: there is the question of moisture. A varnish pervious to moisture would be a bad varnish. A film of one that was impervious would evidently leave the most hygroscopic substance in the world quite dry till the surface was ruptured. Then, however, when the surface was broken either by the inability of the varnish (as varnish) to resist the moisture it was subjected to without cracking or lifting, or when the gelatine was laid bare by mechanical means—such as abrasion or scratching—or the edge of the negative not being covered by varnish—as when cut into two, the edge bared, or when the original varnishing did not give cover to the edges—we should be prepared to expect any amount of danger through the alternative actions of drought and moisture upon the gelatinous film, which could then alter its surface and its depth or thickness.

Pure theory, however, is insufficient to teach what is now required to be known, and we repeat our question, hoping to have many responses—"What is the state of the film in gelatine negatives varnished, with no extra precautions, with ordinary varnish—say two or three years ago?"

We have before us a further instance of the increasing employment of photography in other branches of science. Some time ago Dr. William Macewen, of Glasgow, proposed, in connection with the medical school there, to utilise photography in depicting in a truthful and convincing manner the successive stages of an operation. We reprint from this month's number of the *Glasgow Medical Journal* an excellent article by Dr. Whitson on *The Photography of Microscopic Sections* [see page 151]. This is illustrated by a photomicrograph of a section of *Adeno. Sacroma of Mamma*, amputated by Dr. Whitson, printed by the Woodburytype Company from a negative by Mr. Adolf Schulze. The photomicrograph was made with a Carl Zeiss' one-sixth objective, and shows in a peculiarly-sharp and clear manner the distinctive markings of the diseased structure. The time appears to be not far distant when histology and pathology will derive as much benefit from photography as meteorology, astronomy, spectroscopy, and other sciences have already done; indeed, we may look forward in the early future to the recognition of photography as an indispensable aid in wellnigh every branch of scientific research. Dr. Whitson and Mr. Schulze are to be congratulated on the success of their efforts in photomicrography as applied to practical surgery.

Our old friend, the radiometer, is coming into favour again as a teaching instrument. Thus, Professor Rovelli, by means of parabolic mirrors, shows the effect of the heat radiated from snow in affecting the revolutions; and again how, by means of the rarefaction of air and sulphuric ether in the exhausted receiver of an air-pump, the difference in temperature causes a change in the direction of the rotation. We read that "8° of dark heat neutralise the effect of the weak light emitted by a common candle at the distance of forty-five centimetres from the radiometer." This does not convey any very exact idea; but photographers who have attempted to use the radiometer as a light-measurer found not long ago that it was useless for their purpose.

Astronomers are already beginnning to discount the first total solar eclipse of the next century. May 17, 1901, will, provided the "menacing comet" have not been the means of causing the utter conflagration of this planet we live on, be in view for a still longer period than the one which our astronomers are now ploughing their way across the ocean to view from the standpoint offered by a wretched little island in the direction of the South Pole, and it will, further, be visible from more accessible quarters.

Spectroscopic observations of the new comet have been made, but so far no photograph has been secured, nor is it probable that any

will be, as the comet is shown to be receding both from the sun and the earth. Its size, too, is so very minute that little can be expected photographically of an object so small as to subtend an angle of only twenty-five minutes, bright and distinct though it is said to be, when viewed in the telescope.

In view of the increased importance of photographic records of spectroscopic experiments, every care should be taken that these records are not themselves liable to misinterpretation. Such a contingency, however, is by no means remote; it is, in truth, a very present danger. Professor Hartley has shown how lines strung in light may through their over-exposure, though the rest of the spectrum be perfectly correctly exposed, become reversed, and so lead to erroneous conclusions being drawn. The metals whose lines are particularly liable to this reversal are magnesium, aluminium, and irridium. Two over-exposed photographs he took showed the triple line *b*, between K and L, as a quadruple, through the doubling of one line by reversal. His recommendation is that, to ensure accuracy, photographs with different exposures should be taken, so that comparisons may be made.

NOTES ON EMULSIONS MADE BY PRECIPITATION AND OTHERWISE.

The Editors were kind enough some time ago to hand me a letter which had been received by them from a correspondent in Ohio, U.S., in which he mentions his failure in attempts to work the precipitation process I described some time ago. I quote from his letter:—

"My present stumbling-block is Mr. Burton's recent precipitation method of preparing emulsion. I am now at work on the fifth batch, according to his plan, and I cannot get the bromide to settle. The first batch has now been standing for sixteen days, and shows no sign of settling. I followed strictly the directions as to formula and treatment. . . . . . He uses what seems to me a great excess of bromide. Is that excess of bromide essential to the precipitation? Again: in my trials I notice that the emulsion after mixing and before heating is very flakey. A drop taken up by a glass rod and deposited on a glass plate looks like water with flakes and grains large enough to be seen with the naked eye, and there is no indication of ruby colour. When the emulsion has been heated to nearly boiling then it has the milky look by reflected light and ruby by transmitted. In mixing, I placed the gelatine (Nelson's No. 1) in the flask, then cold (distilled) water, and at the same time the bromide. After about ten or fifteen minutes I heated the flask just enough to dissolve the gelatine, and then cooled it before putting in the silver nitrate in crystals. I thought the chemical union would take place more slowly in the cold, and gave a finer state of division to start with. I have found that twenty or thirty minutes' boiling caused the red colour to disappear, and in my first experiment of Burton's method I stopped there, because he says you are to be guided by colour.

"Now, is the long boiling which Burton gives (one hour to one and a-half) essential in order to produce the precipitation? Does the sensitive bromide settle because the long boiling (with the ammonia afterwards added) has acted on the gelatine and destroyed its viscidity? or is it that these two causes have acted on the bromide itself and made its granules larger, so that they settle? Again: when the emulsion is set away in the dark to settle, does the temperature of the place have any controlling influence? My dark room is cold—say between 35° and 45° Fahr.—and perhaps this may be the cause of my failure. In subsequent trials I have experimented on the effect of increasing and diminishing the amount of ammonia, and it seemed that doubling the ammonia and trebling it produced somewhat more rapid settling. But, then, I don't know but that the increasing ammonia would produce fog in the finished emulsion. I cannot as yet get any finished emulsion to try."

I thus give a long quotation from the letter mentioned, as your correspondent appears to most excellently sum up all the difficulties which, so far as I have heard, various experimenters have found in working the process.

Length of Time of Boiling.—The most important question is the one of the length of time of boiling. Here let me say that I have entirely discarded the use of ammonia, and instead adopt a prolonged period of boiling. By so doing I get not only an improved quality of plate but a greater sensitiveness.

My chief reason for using ammonia besides that it brought about solution of the gelatine, was that it raised the curve of sensitiveness, producing a better gradation of density, and causing a greater increase of sensitiveness in the camera than was made evident by sensitometer tests. At a meeting of the Photographic Society of Great Britain Mr. Cadett pointed out the fact, which I had in the meantime also noticed, that a prolonged period of boiling has the same effect in raising the curve of sensitiveness as has an addition of ammonia to the emulsion; that, in fact, the excessive lowness of curve—which makes itself evident by plentiful detail wanting in printing density when the exposure is short—is only peculiar to plates produced from emulsion boiled for a comparatively short time; whilst, on the other hand, the plates produced by emulsion which has been long boiled exhibit ample density in the detail. The long period of boiling has the same effect as the addition of ammonia in rendering the gelatine soluble.

Now, as to the length of boiling permissible: here we have a point where experience appears to differ enormously. I have heard of sensitiveness gained by ten minutes' boiling. In my experience with proportions such as I have given and solutions slightly alkaline an hour is the shortest time which will give me even tolerable sensitiveness, whilst lately I have tried all periods of boiling up to six hours. Even the last-mentioned time gives me no fog, but I cannot find any advantage in pushing the process beyond three or four hours. With this length of time I find that I get a plate of excellent quality which gives me with certainty the figures 21 or 22 on the standard sensitometer, and sometimes even 25. Longer boiling does not give a higher figure, but gives a plate showing that tendency to reversal of image which is the forerunner of fog. Two hours' boiling appears to be necessary to ensure precipitation.

I imagine that the differences in experience as to time of boiling necessary to gain sensitiveness must be due to slight differences in the purity of the chemicals used. With those which I use at present I find that boiling for an hour and a-half is necessary to make the change of colour from ruby to blue complete, and I find roughly that there is advantage in boiling for at least twice the time necessary for that change to take place. Most experimenters appear afraid of long boiling. They imagine fog is sure to make its appearance if such be resorted to, and yet, if you question them as to the results which they get, you very often hear that they produce a "splendidly clear and plucky" plate, but do not get rapidity. *Now, it cannot be too emphatically stated that a result such as this shows that boiling has not been long enough, and that probably three or four times as long as has been given might be used with advantage.*

If the result of a short period of boiling be a slow emulsion of *poor* quality, then it is a different affair. This shows that either the chemicals are impure or that the quantities are incorrect.

Excess of Bromide.—The next question of importance has relation to the excess of bromide, and this certainly is one of great importance. The Editors pointed out some time ago that the *less* the excess the shorter the time required for settlement of the bromide. Two or three months ago Mr. L. Warnerke, speaking at the London and Provincial Photographic Association, remarked that he had, in connection with the boiling method, made a series of experiments to ascertain what the effect of excess of bromide was on attainment of sensitiveness, and that in his experience increase of excess up to a certain point produced increase of sensitiveness; beyond that the effect was the reverse, and, moreover, thinness of image resulted. The excess recently recommended by most experimenters he considered too great. Acting in accordance with this hint, I have recently used an excess equal to ten per cent. of the bromide necessary to reduce the silver *plus* what results from the use of a quantity of iodide equal to about a thirtieth of the bromide used. With this excess the sensitiveness is at least as great as with the larger one, the quality is quite as good, and precipitation takes place in a shorter time.

Temperature During Precipitation.—The temperature during precipitation has certainly much to do with the time taken. At that mentioned by your correspondent—near the freezing point—there is no appearance of precipitation after a week. On the other hand, at a temperature of 70° or 80° Fahr. it will be complete in twenty-four hours.

Bichromate of Potassium in the Emulsion.—The addition of a grain of bichromate of potassium to each ounce of emulsion immediately after boiling is finished keeps it very clear, and appears to somewhat accelerate precipitation. *It does not in the least reduce sensitiveness.* The addition of a quantity of bichromate to coagulate the gelatine and produce rapid precipitation does. There appears to be a much exaggerated idea of the time necessary to wash by the ordinary method an emulsion which has been treated with bichromate. Recently I had a light-spoiled emulsion. I squeezed it through wire gauze in the usual method into water containing two grains of bichromate to each ounce. It was afterwards washed in a hair sieve in running water. After ten minutes it had regained its former sensitiveness, and showed no further change after ten hours of washing. With the excess of bromide mentioned—which would be represented

y 100 of silver nitrate, 77 of potassium bromide, two and a-half f potassium iodide, with the addition of bichromate and a fairly igh temperature—precipitation will be complete in twenty-four ours, and the emulsion may be ready for use within forty-eight ours of the time that the process commences.

Temperature of Mixing.—Your correspondent mentions that, mixng at a low temperature, he got a coarse and flakey emulsion, but hat it turned red on heating. This is exactly my own experience, nd I consider that the hotter the solution of bromide is made the etter. I wish it to be understood that I consider the particular nethod of mixing by the use of nitrate of silver in crystals by no neans essential to the process. I merely use it for convenience. I stated that when the proportion of water is high the method of mixing matters little. In mixing quantities for over half-a-gallon of emulsion I dissolve the silver nitrate in water, and pour into the bromide of silver in two or three quantities, simply stirring with a glass rod.

As to whether precipitation takes place on account of increase of size of bromide grains or destruction of the viscosity of the gelatine, I venture to say *both.* Very fine bromide of silver in presence of a large excess of soluble bromide takes long to settle, even in pure water. On the other hand, the increase of size of particle does not require to amount to what is usually called "granularity" to ensure comparatively rapid precipitation.

Agitation of the Emulsion when Complete.—I wish to take this opportunity of pointing out the necessity for a process which I never omit in practice, but which, I fear, I have forgotten to mention, or at least to emphasise, before now, namely, the agitation of the emulsion after it is otherwise complete, so as to thoroughly break up the particles of bromide of silver and incorporate it with the gelatine. Shaking in a bottle or flask for several minutes brings about a distinct, if slight, change in colour, and a great difference in the behaviour of the resulting plates under the developer. The plates coated with shaken emulsion give denser images and stand more ammonia without fogging than the others.

Acid in Finished Emulsion.—I have several times described the occurrence of a superficial fog which has attacked plates produced from emulsion otherwise perfect. I mentioned that in most cases an antiseptic added to the emulsion cures this. Dr. A. Conan Doyle mentioned that the addition of a small quantity of acid is a certain cure. I tried hydrochloric acid, but found that it greatly reduced sensitiveness. This is curious, as hydrochloric acid is volatile. I find that the same result does not arise from the use of acetic acid, whilst the effect produced is so good that I recommend its adoption in the case of emulsion made by any method. Five or six drops of the glacial acid may be added to each pint of emulsion, and the result will be plates of extraordinary brilliance and clearness.

Keeping Emulsion.—I stated that I could find no rule to account for the fact that at one time sensitiveness increases by keeping an emulsion, but not at another; nor can I yet account for it. I find, however, that with the long boiling I now adopt no increase takes place, whilst, on the other hand, the emulsion immediately after mixing is more sensitive than it is with the use of ammonia after a week's keeping. This I consider a great advantage, as the emulsion may be used immediately after it is complete without the reflection that we are thereby using material less sensitive than it would be after some keeping.

I hoped to write a few words on several points suggested by Mr. Archer Clarke's interesting article, but I find my communication is reaching extraordinary length. With the Editors' permission I shall take up this subject again at an early date.

W. K. Burton.

THE HYPO. FIXING BATH.

Your contributor, Mr. W. E. Debenham, replying to Mr. Harding Warner in last week's issue, seems to think the question of using an old hypo. bath is so utterly absurd, and to have been so emphatically decided long ago by Mr. F. Hardwich's demonstrations, that the question is not deserving of notice by those who wish to produce good work. As an amateur who has had some little experience in the matter, I should like to give a short statement of the method I have adopted since the month of July, 1882, more especially in response to the call of Mr. Warner, who asks for information—presumably, I suppose, from those who have had actual experience.

Mr. Debenham, by the way, scarcely does justice to the matter in hand, reasoning more from theory than practice, and I should judge that he has not given a fair trial to the system adopted by "the professional photographer of eminence and distinguished amateur" named by Mr. Warner. His illustration of allowing a negative to stand in an old fixing bath "for a night" is a far-fetched one and not to the point, as it is not the rule to take such a course in fixing negatives. I might just as reasonably ask him whether he would get a pleasing result by *developing* a plate "for a night," even by the best developer known. Certainly not. I take it, therefore, that the real question at issue is whether the plan adopted by "the professional photographer of eminence and distinguished amateur," or some similar method, possesses any advantages over and above that which now obtains in using a fresh and clean bath of hyposulphite.

My own experience is decidedly in favour of the former, and I might further add that, after eight months' continuous practice, I would under no circumstances relinquish it for the latter.

It was purely by accident I was led to make the change. Having taken some views of Windsor Castle, in July of last year, I called on a professional photographer in Reading, and, with the well-known courtesy of our brethren, he very graciously permitted me the use of his room for development, and suggested fixing them *unwashed* in an old fixing bath he had had in use for many months. I was naturally horrified at the sight of the liquid, and much more so to think of putting a negative unwashed under such treatment. But my fears were allayed on being told that it was his customary practice, and I could no longer have any doubts after being shown some very fine work free from any objection on the score of discolouration; and, to my astonishment, the negatives when fixed were all that could be desired. Certainly there was a slight brownish stain, but this dissolved out after subjecting them to the usual dose of the alum bath.

From that time, therefore, to the present I have had but one hypo. bath in use, and the only attention it received has been the addition of fresh hypo. in solution when needed—that is, when caused by loss of *quant. suff.* through waste and evaporation.

There is a pecularity in negatives fixed in this manner which is worthy of notice. I refer to the question of density. The rule in development is to secure rather more density in that operation than is needed, so that the negative may be of just sufficient vigour after passing through the fixing and alum baths. This precaution, however, is not necessary, for the negative loses none of its strength in passing through the bath to which I refer. Not being sufficiently versed in the chemistry of this action, I leave the fact for abler minds to expound. It would appear, however, that the small additions of developer contributed by each plate makes the bath a feeble developer also, without retarding its fixing qualities, so that, whatever amount of density be gained in the first development, no reduction takes place whilst in this fixing bath. This, then, is a point of no little importance and a saving of labour and time in the development, to say nothing of much less water being required.

I find also a further advantage from the non-actinic qualities of the solution, the colour being of the deepest ruby; and hence, when once the plate is immersed, white light may be freely admitted to the dark room without the slightest fear of fog. It sometimes occurs that there is a little more discolouration than usual, but there is no difficulty on this score if the following clearing solution be used, which I have found a most useful "brilliant," and is a modification of Mr. W. Hanson's method described on page 210 of The British Journal Photographic Almanac, 1882 :—

Chloralum	1 part.
Water	4 parts.

It may be acceptable to your readers if I give the developer used in connection with the above, and which, after I have tried every other known form, eclipses them all in my own practice. It is a modification of Mr. G. H. Martyn's formula, given in The British Journal of Photography, June 30, 1882. In using Mr. Martyn's exact formula, however, I found the strength of the ammonia to lose much of its power before the Winchester had all been used, caused, doubtless, by the frequent opening of the stopper. To overcome this difficulty I now mix the ammonia fresh, and no more than is required for each lot of plates I may have to develope, the proportions being slightly altered from those of Mr. Martyn :—

No. 1.

Sulphite of soda	½ ounce.
Citric acid	30 grains.
Bromide of potassium	2 drachms.
Filtered rain water (Winchester)	80 ounces.

No. 2.

Liquid ammonia, ·880	100 minims.
Filtered rain water	5 ounces.

Take one and a-half ounce of No. 1 to half-an-ounce of No. 2, and to each two ounces thus formed add three grains of dry pyro. No. 1

keeps indefinitely, is a valuable stock solution, and ensures the plate from any discolouration, even after the most lengthy development.

CHAS. J. HALL.

LANTERNS AND SLIDES.

No. V.

THE optical lantern is an enlarging apparatus. The principal point of difference between it and what is generally known as such is that for pictures on the screen extreme sharpness is of less moment than a maximum of light. In all respects the principles involved are the same.

If the front lens be removed the light issuing from the condenser will be found to assume the form of a cone, at the apex of which the rays cross and diverge. The point at which these rays cross (with a condenser of given focus) depends upon the distance at which the source of light is from the other side of the lens. Theoretically, supposing the condenser (generally compound, for optical reasons) to have a focus of three inches—that is, that parallel rays falling on it on one side are brought to a focus at that distance from the other side—then, conversely, if the source of light were placed three inches from the lens the rays should issue from it parallel.

If the light were placed any less distance than three inches from it the rays would diverge, while, if put at any point more distant, they would cross at some point, becoming nearer as the light is further removed, until, when the light is infinitely distant, they would cross at the other principal focus—that is, exactly three inches in front of the condenser. This would, undoubtedly, be true in practice if two conditions could be fulfilled :—1. That the source of light were a point. 2. That the condensing lens could be perfect. These conditions being absolutely unattainable, it is found that nothing approaching parallel rays can be obtained without using lenses of such length of focus that they are unavailable, for reasons presently to be explained. If the light be tried a little inside the principal focus the rays will, of course, diverge. However carefully it be drawn backwards nothing approaching parallelism, or even an elongated cone, can be obtained. The cone, directly it is formed at all distinctly, has about twice the focal length of the condenser.

It will now be advisable to take into consideration the part which the condenser plays. The name, it will be seen, is, to a certain extent, a misnomer. If its object were merely to light the picture it is evident that a greater amount of light would fall upon the transparency if it were placed directly at the position of the back of the condenser, for these lenses are of considerable thickness, and, therefore, must absorb a great amount of light ; but on trying the experiment a very faint image is thrown upon the screen. The real purpose of the condenser is to direct the light towards the front lens, and this at once brings us to the most important point, namely, the position the front lens should occupy.

It is quite certain that only the light which falls upon it can be transmitted to the screen, and that the maximum of light will be obtained when the front lens is somewhere near the apex of the cone, as, if it be placed either too near or too far, it will fail to receive the whole of the light. The front lens, whether simple or compound, has its imperfections. If a single lens were perfect there would be no need for double or triple combinations, while, if any compound lens were perfect, there would be no occasion for the endless varieties of these lenses which the necessity for compromise or correction of one form or other has caused to be created. All of them, if sharpness of definition and flatness of field be desired, require the use of a stop, the position of which depends upon the construction of the lens. Through this aperture all the effective light must pass at this point ; if it be so far reduced, all the rays must cross. It is, therefore, to this point as far as possible that all light should be directed, whether perfect definition or maximum of light are essential.

In the ordinary lantern the foci of the condenser and front lens are so combined that, when the slide is in its position near the condenser, the front lens at the same time focusses the picture and receives the whole of the light. If the condenser were optically perfect the position of the front lens could be shifted to almost any distance, and yet the rays cross in their proper place by varying the distance of the light from the condenser. But we have already seen that this is not really practicable. Besides, as *amount* of light is always important, the maximum is to be obtained by putting the light as near the condenser as possible—that is, close to the principal focus. Therefore, the shorter the focus of the condenser the nearer the light will be to it, and consequently the greater the amount utilised. The *same amount* of light can only be secured with a condenser of longer focus and of proportionately greater diameter, therefore largely enhancing the cost as well as the bulk of the apparatus.

Roughly speaking, the most economical results are obtained with condensers of four inches diameter and about three inches focus, and with these the best point at which to fix the front lens will be six inches in front, at which distance the maximum of light will pass through it. The so-called better class of lime-light lanterns are fitted with sets of front lenses of various foci, so that pictures of a given size may be obtained on the screen at different distances. The pictures are obtained, but, except with the one lens which really suits the focus of the condenser, only with loss both of light and definition. They are, therefore, but sorry makeshift affairs—not *optical* lanterns—when used with these extra lenses.

Practically, there is very little variation of the position of the light allowable ; it must be as near as possible to the principal focus of the condenser, which will allow a front lens of double that focus to be used. The best position is easily ascertained by experiment, judging from the amount of light on the screen. It will be seen at once that the focus of the front lens has nothing to do with the amount of light, but that, these positions being settled, if a large picture be required the transparency must be nearer the front lens than if a small one be wanted from the same slide. These positions must be settled and fixed, as I have already explained, in order to obtain a maximum of definition as well as light. It is, therefore, essential to an *optical* lantern that there should be an arrangement for varying the distance of the transparency from the front lens. I introduced this modification into the sciopticon several years since with great advantage, both as regards amount of effective light upon the screen and definition. The latter is more remarkable the more perfect the source of light, and with the lime light the increased sharpness is very considerable.

The same principle is adopted in high-class enlarging apparatus ; but even in these the mistake is made of making the position of the front lens movable. Perhaps I should rather say that the movement, being there, is used for focussing the picture instead of being confined to its only real use—focussing the light.

The optical lantern, therefore, is an enlarging camera, and, if fitted with a focussing stage for the transparency, can be used with any front lens that may be best suited for the purpose, but of not more than about six inches focus. This would be about the best length if the picture to be enlarged were of such a size that it would be just covered by the condenser—that is, about three inches square, or some such parallelogram as a *carte de visite*, which can be described within a four-inch circle. If, however, the object to be enlarged were of smaller size, then advantage in the amount of light would be found by employing a front lens of shorter focus and bringing the transparency forward into the cone of light, where it would receive greater illumination.

So far we have supposed artificial light to be used. If, instead of this, sunlight be employed—that is, parallel rays—as we have seen, the focus for these is one-half less. In other words : the position of the front lens will be the same if a condenser of half the focal length be substituted. The ordinary condenser is composed of two similar plano-convex lenses mounted with the convex surfaces adjoining. If the back one then be removed we have a condenser of half the focal length in its best position, the convex side towards the parallel rays. Diffused light, being taken from the sky or a brightly-illuminated cloud, will also come under the head of "parallel rays," and be most conveniently used with the same condenser.

The enlargement of negatives of suitable size thus presents very little difficulty, and is immensely facilitated by the size being uniform. I therefore think that three and a-quarter inches square presents unusual facilities—not only for production, but because either the original or a contact-printed positive are within the scope of the ordinary lantern for the purpose of enlargement, according as an enlarged positive or negative may be desired.

Much, of course, depends upon the quality of the negative as well as its sharpness. Most negatives apparently sharp enough to the naked eye are not really so when magnified. More attention is, therefore, required in focussing the original if absolute sharpness of detail be necessary. The ordinary photographic lenses are quite capable of giving the necessary definition. Mr. W. B. Woodbury has a portion of a picture taken by him in Java mounted as a slide for the microscope, in which distant groups, of whose existence at the time of taking the view in question he was not aware, are clearly visible with the microscope. It was, of course, an accident that the focus should have been so exact on this particular part ; but it proves that what may fairly be called "microscopic definition" is within the range of ordinary photographic lenses.

To ensure such accuracy more than usual care in focussing would be required, and possibly a special arrangement, but still a simple one. Take an ordinary focussing eyepiece and adjust it carefully

or the ground glass. If the eyepiece be now reversed and fitted in a little frame in such a way that, when put in the place of the focussing-screen, the outer surface of the lens is in the same plane as the ground surface of the screen would be, and the eye held at the open end of the tube, focussing can be done with the greatest nicety, details being distinctly seen which the finest ground glass would obscure. GEORGE SMITH.

FREEING EMULSION FROM SOLUBLE COLLOIDS.

PART II.

[A communication to the London and Provincial Photographic Association.]

BEFORE giving the details and results of a few experiments I have been making on the removal of soluble from insoluble gelatine, I should like to read a few short extracts on dialysis and the preparation of colloids in a state of purity from Watts's *Dictionary of Chemistry*, page 715, vol iii., second edition, 1872:—

"Membranes and septa of the colloid class possess the property which is very useful in assisting diffusive separations. The jelly of starch, that of animal mucus, of pectin, of Payen's vegetable gelose, and other solid colloidal hydrates, all of which are strictly insoluble in cold water, are themselves permeable when in mass, as water is, by the more highly-diffusive substances. But such jellies greatly resist the passage of the less diffusive substances, and cut off entirely other colloid substances *like themselves that may be in solution.* In this respect they resemble animal membranes. . . . . . A mere film of the colloidal septum produces this separating effect."

And at page 717:—

"The purification of many colloid substances may be effected with great advantage by placing them on the dialyser. Accompanying crystalloids are eliminated and the colloid left behind in a state of purity. The purification of soluble colloids can rarely be effected by any other known means, and dialysis is evidently the appropriate mode of preparing such bodies free from crystalloids."

Again, on page 718:—

"Caramel of sugar, purified by repeated precipitation with alcohol and afterwards by dialysis, contains the proportion of carbon in the highest of the caramelic bodies of Gélis; it forms a tremulous jelly when concentrated, and appears decidedly colloidal. Like all other colloids, it has a soluble and an insoluble modification."

Although no one disputed the quantities I had the pleasure of laying before you in my short communication on the 8th of last month, yet several, from their questions, did not seem convinced that it was impossible to remove decomposed gelatine by dialysing emulsion, or by simply washing it, when set, in threads. In order, therefore, to convince those few belonging to this Association, and any outsiders who may be of this opinion, I have been making a few more experiments in the same direction.

Mr. A. J. Brown thought that blotting-paper coated with gelatine was not a fair septum to use. In order, therefore, to remove any objection that could be made on that head I tried to use thin films of gelatine supported by threads tied across the ends of the glass tubes I employed; but, unfortunately, after the gelatine had been allowed to soak for some time (twelve hours) in water it detached itself from the threads and ends of the glass tubes used. In order to overcome this difficulty of the swelling of the gelatine I added two drops of a ten-per-cent. solution of chrome alum to the gelatine, and used muslin as the support for the film. The muslin was then cemented to the end of the glass tube, using the same mixture of gelatine and chrome alum as above; the whole was then allowed to dry. When this septum was soaked in water it swelled but very little.

To get rid of the solvent action of the ammonia contained in Mr. A. L. Henderson's "leucine" I evaporated 10 c.c. of it to dryness over a water bath, redissolved it in water, and then placed it in the dialyser. The amount of solid matter dried at 100° C. was ·2390 gramme. The glass tube with septum at the bottom containing the "leucine" was placed in 100 c.c. of distilled water. At the end of twenty-four hours this water was replaced by another 100 c.c., and the dialysing allowed to go on for forty-six hours longer. At the end of that time the dialates were evaporated to dryness over a water bath, and the amount of solid matter amounted to ·0750 gramme. This number compares very closely indeed with that which I obtained in my first experiment given in my previous paper, where I found ·0378 gramme as the weight of solid matter in the dialate when 5 c.c. of "leucine" were employed. On evaporating the contents of the dialyser I obtained ·1650 as the weight of colloid left behind. This, added to the weight of solid matter found in the dialate, gives a total of ·2400 gramme, giving a difference of only ·001 gramme between the actual quantity taken and the quantities found in the different vessels. This, I think, proves conclusively that the increase in weight which took place in my previous experiments was due to the action of the ammonia on the gelatine of which the septum was made.

In order to test the effects of other septa of a different nature on the dialysing properties of "leucine," I stretched a piece of vegetable parchment over the end of a glass tube, using the same kind of cementation as before. Again: 10 c.c of "leucine" were evaporated to dryness in order to get rid of the ammonia; the residue amounted to ·2400 gramme. The dialysing was allowed to go on for about the same time and in the same manner as in the case where muslin coated with gelatine was used, and at the expiration of the time both dialates were evaporated; in this case ·0770 gramme was passed through—a number which, I think, you will acknowledge is practically the same as those obtained when septa of blotting-paper and muslin covered with gelatine were used.

I was asked by Mr. Henderson if I had tried the effect of absolute alcohol on his "leucine," so as to ascertain whether anything was thrown down by it. At the time he asked the question I had not made the experiment, but since then I have. If five parts of absolute alcohol be added to one part of "leucine" a white cloud is formed. On heating the mixture in a test tube to the boiling point the cloudiness does not disappear, but by adding cold water after the mixture had cooled to the extent of thirty per cent. the cloudiness was entirely removed. This, I think, points to the fact that the cloudiness was due not to the precipitation of undecomposed gelatine, but to the strong alcohol throwing down the iodide of potassium. All photographers who have practised the wet process know this salt is very much more soluble in weak than in absolute alcohol.

In order to cause my last experiments to resemble as nearly as possible what takes place in the ordinary washing of gelatino-bromide emulsion, I took two portions of gelatine, each weighing one gramme. These were soaked in 24 c.c. of distilled water so as to make a jelly of the same consistency as is usually employed in emulsions. To one portion I added ·8650 gramme of colloid, obtained from gelatine that had been acted on by caustic potash, as recommended by Dr. G. Kemp in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1881. The other was left just as it was, without any addition. Both were then allowed to set for twenty hours. At the end of that time each jelly was passed once through a metallic syringe, the bottom of which had been perforated with holes $\frac{108}{1000}$ of an inch in diameter, and allowed to soak for fifteen minutes in 50 c.c. of distilled water. This was poured away, another 50 c.c. poured on, the gelatine allowed to soak for another fifteen minutes. Both washing waters were then evaporated in a basin over a water bath, and the residues at 100° C. amounted to ·4330 gramme and ·0220 gramme respectively, so that in half-an-hour 100 c.c. of water extracted from the gelatine pure and simple ·0220 gramme of soluble matter, and the same volume of water extracted ·4330 gramme of solid matter, when ·8650 gramme of a colloid had been added to it. In this way 47·5 per cent. of the whole of the colloid added was removed; this does not include the soluble matter that the gelatine itself gives up. The washing water in each case was passed through a filter paper once, in order to remove any small pieces of insoluble gelatine that would otherwise have been carried over if the washing water had been simply decanted from the beaker into the evaporating dish. The percentage of decomposed gelatine in one case was very much larger than can ever happen in the case of emulsion prepared with ordinary care. At the same time I must say that I was much astonished at the very large quantity removed; but this is undoubtedly due to the fine state into which the jelly was divided, and, therefore, may have come, not from the interior of the small pieces of gelatine, but from the gelatine where fresh surfaces had been exposed, due to the subdivision.

The last experiment I made was in the same direction, only using "leucine" instead of gelatine decomposed by caustic potash. In this case I again took one gramme of gelatine, and added to it the residue from 10 c.c. of "leucine." On washing this in exactly the same manner as I washed the other jellies, filtering the washing water, and evaporating, I obtained a residue of ·1260 gramme. Of this residue ·022 gramme is due to soluble matter in the gelatine, and ·0760 gramme is due to crystalloids in the "leucine," as proved by the dialysing experiments; so that ·0980 gramme must be deducted from the total amount extracted. It leaves ·0280 gramme of "leucine" extracted; but the whole of the colloid in 10 c.c. is ·1760 gramme, therefore 15·9 per cent. of the "leucine" was extracted. Thus it would seem that the less the percentage of soluble colloid that there is in the jelly the more difficult it is to get rid of it; and what is got rid of I am still of opinion is due to the large surface exposed to the action of the water, and not to the passage of the colloid from the interior of the jelly into the water. One thing astonishes me, and that is the very great difference in the percentage removed when a large quantity of soluble colloid is added, and when only a small quantity is present. A. HADDON.

NOTES ON EMULSION.—GELATINE.

No. II.

Now for experiment No. 2. For this we take the test tubes or bottles labelled B. A. 2 and N. S. 2; mix these by pouring the whole of B. A. 2 into N. S. 2 at one operation. A coarse precipitate should at once be thrown down, but the supernatant liquid is generally very milky, showing there is still some fine bromide of silver held in suspension. It may not be much—perhaps only one or one and a-half grain out of the eighty used—but still there is some. This method roughly indicates the modes described by the four gentlemen previously mentioned.

Next try B. A. 3 and N. S. 3. To this remember there are five grains of silver extra, the gelatine having been added to the silver and not to the bromide, as was done on the two previous occasions. Now add, in one lot, B. A. 3 to N. S. 3; that is, add the plain bromide to the gelatinised silver, and a similar result will occur as with No. 2, but *you can treat it differently.* Should there be any fine particles floating about, add drop by drop of a solution of nitrate of silver (any strength will do) until the supernatant liquid is perfectly clear, like pure water; pour off this clear liquid, and add to it, drop by drop from a *pipette*, a ten-grain solution of iodide of potassium. You will notice, as each drop falls in, a dense precipitate goes down; keep on adding till it ceases to precipitate, and it will now be found to have acquired a decided yellow, milky look. Return this to the drained precipitate first formed, shake or stir, and in a few seconds the supernatant liquid is clear again. This is poured off and treated as before; generally one or two drops of the iodide solution is sufficient. Then return to the original precipitate and add some water, the quantity of which is immaterial. Should it be, though there is any free silver present, either add a few drops more of the iodide solution or else throw the first washing water into the residue tub. One change of water is sufficient, but if you were going to make an emulsion from No. 3 doubtless it would be better to have two changes of water.

Let us continue No. 3 and make an emulsion. The precipitate will be found to be very coarse upon pouring off this second washing water; add one and a-half ounce of water, one drachm of a ten-grain solution of bromide of potassium, and the same quantity of gelatine as first used, namely, half-a-grain, and boil for twenty minutes. Remember that we have only a very small quantity here. If a large bulk had been prepared forty minutes' boiling would be about the time required. After boiling add the gelatine, either soaked in water previously to render it soft and easily dissolved, or else prepared as will be described later on, stirring well all the time. Add the gelatine little by little, and now return the jar to the hot water. This will register about 160° Fahr., and half-an-hour in this will go a long way towards producing a very fine emulsion, free from any trace of granularity. Stir once or twice; this helps to produce fineness, and if the lid of the jar can be lifted so that the heat and steam may escape it can remain in the hot water till that has become cold, or the emulsion can be used at once. Mind the lid is slightly raised, otherwise frilling may be the result, and in hot weather decomposition is sure to set in. The emulsion if now tried will register 14 to 15 by Warnerke's sensitometer. If greater sensitiveness be required keep the emulsion a few days, or else see the water is kept about 70° to 80° Fahr. for an hour or so longer than usual. I have omitted spirit, liquid ammonia, or a preservative of any kind, as each will add these as it seemeth best. The fifty grains of silver here indicated should make at least two and a-half ounces of emulsion. If it do not, add water.

Method of Preparing the Gelatine.—The gelatine used for emulsion work should either be washed and soaked previous to using by some plan. The following is easy:—Weigh up the quantity of gelatine required, have a large jug of water standing in the sink, and crumple up each sheet of gelatine as it is thrown into the water. When all the gelatine is in the water pour both into a sieve or a coarse cloth tied over a hoop—anything to drain the water and retain the gelatine. Two or three washings are generally sufficient, but the gelatine should be washed till it no longer shows large bubbles on the top of the water. Most gelatines absorb about seven ounces of water to every 500 grains. Should it be wished to further purify the gelatine, it may be melted and then allowed to set. The particles of dirt, &c., will be found at the bottom, and the grease, if any, at the top. Both portions can be cut away, and used as an adhesive medium, instead of paste or glue, or the whole can be passed through the canvas and washed like an emulsion; only not being a sensitive medium, it can be done in daylight.

My plan of making emulsion is indicated in No. 3 experiment, and I now give it for the benefit of those who do not see the *Journal* of the Photographic Society of Great Britain, where full particulars may be found on page 37, vol. vii., No. 3, new series:—

A.

Set gelatine	100 grains.
Water	3 ounces.

B.

Crystals of nitrate silver	1,010 grains.
Water	40 ounces.
Nitric acid	2 to 5 drops.

C.

Bromide of ammonium	600 grains.

D.

Ten-grain solution of iodide of potassium.

E.

Ten-grain solution of bromide of potassium	2 drachms.

F.

Gelatine soaked and washed	1,000 grains.

A is made by taking 300 to 400 grains, or any smaller quantity, of dry gelatine, washing the same, and dissolving without adding any more water than the gelatine has absorbed. It can be used as soon as set. When required for use, weigh out 100 grains of this set gelatine and dissolve in a little warm water—say three ounces. Note that the 100 grains of set gelatine will be found to contain from twelve and a-half to fourteen grains of gelatine. B is next added—the crystals first and the water afterwards; when dissolved add the nitric acid, though with some samples of silver and bromide this is not needed. C is added also dry, but in the dark room; for, until the boiling has taken place, the emulsion is but slightly sensitive, therefore a very dull light is not necessary. Upon the addition of the bromide of ammonium a heavy precipitate is immediately formed. This is stirred just to break the clots, and upon settling, which it does in a few moments, the supernatant liquid is poured off, but is not to be thrown away; it is reserved for further treatment presently. Should the precipitate not go down, add a few drops of a ten-grain solution of nitrate of silver till it does.

Now we will turn our attention to the supernatant or "mother liquor," as chemists call it; to this add solution D until it ceases to show a precipitate. An excess of D will do no harm, but it is better not to add more than is requisite. Now return this supernatant liquid, together with the precipitate caused by the addition of the iodide of potassium, to the original precipitate, and stir for twenty or thirty seconds; place aside to settle (say) for five to ten minutes, carefully decant the liquid, which may now be thrown away, and add more water. The quantity is immaterial, but not less than forty ounces. When this has settled pour off as before, throwing the liquid away. Now add water to make up to twenty ounces, two drachms of E, and the same quantity of gelatine (A) as previously. Place in warm or hot water, and, after ten to fifteen minutes' immersion, gently raise to boiling point; boil for half-an-hour, turn out the gas, add F a little at a time, and stir well. Make up to fifty ounces, *filter*, and it is ready for use; or it can be put on one side for a day or two to ripen.

The advantage of filtering at the time is that, if you do not use the emulsion at the time of making, you can afterwards take the quantity which the plates to be coated will require, and by simply warming the emulsion it is then ready for use. Less heat will do and much time is saved, besides loss and trouble in washing out the filters. Wash-leather is not at all bad for this purpose, but it goes cold quickly, and if the emulsion happen to be rather hot it shrinks. Two thicknesses of swan's-down forms a useful medium for the same purpose, but the ordinary felt jelly-bags are the nicest things at present obtainable that I know of; and if run through two of these, or if a filter paper be placed inside it, one jelly bag answers nearly as well, although it is astonishing what a perceptible deposit a filter paper will allow to pass. You will find, if you have carefully followed these instructions, a nice smooth emulsion, sensitive, clear, and giving a dense image and free from grit or coarse particles—all made in about two hours. ARCHER CLARKE.

WASHING LEUCINE OUT OF EMULSION.

[A communication to the London and Provincial Photographic Association.]

MR. A. HADDON, a few weeks ago, read a paper here detailing some experiments with a compound called "leucine," which I lately introduced. Since then I have made several experiments which, to a certain extent, disprove the correctness of the theory that all colloids do not pass through gelatine.

If it be recollected, the experiment Mr. Haddon made was to use a piece of filtering paper impregnated with pure gelatine as a septum. This test, as far as the manufacture of gelatine emulsion is concerned, is not conclusive, as an emulsion contains soluble salts as well as the precipitated bromide of silver, which may render the gelatine somewhat porous. I have repeated Mr. Haddon's experiment, substituting emulsion containing its salts in lieu of the pure gelatine; and I find not only does the leucine dialyse out but it will filter through the septum.

I propose to demonstrate to you this evening that leucine will dissolve out of gelatine—that is to say, gelatine that is broken up, as is used in the washing process of emulsion. I have here one drachm of dry gelatine, to which I will add two ounces of leucine solution. I will melt this together, allow the gelatine to set, and will then break it up very finely in three ounces of distilled water; after standing for five minutes I will place a drop or two of the aqueous liquid on a piece of glass and evaporate it over a spirit lamp, and you will find a residue left which is perfectly soluble in cold water, and is a gummy substance.

Mr. Graham states, in Fownes's *Chemistry*, "that diffusion is slow with non-crystalline bodies which, like gelatine, are capable of forming a jelly, though even here exceptions are met with." On behalf of my friend leucine I claim it as an exception.

Since making the above experiments I have tried another, namely, after well washing the gelatine I remelted it, setting and rewashing without finding any residue when a few drops were evaporated on a glass plate. A. L. HENDERSON.

NOTES ON GREEN FOG.

[A communication to the Edinburgh Photographic Society.]

SINCE the general adoption of the gelatine process there are several shortcomings in connection with it that have come prominently forward. Amongst the principal of these are frilling and green fog. I do not intend to discuss the former of these at present, as the cause of

and remedy for frilling are now very well known; but the origin of green fog, being more obscure, I shall have a few words to say as to what is, in my opinion, the cause of it and the means to be taken to correct it. There have been various theories put forward within these few years, but none of them is, in my opinion, altogether correct, some of them being very wide of the mark. I shall, however, at present notice only one of these—that of Captain Abney (at page 227, *Photography with Emulsions*, 2nd edition). He says:—"This fog is due to decomposed gelatine and oxidised pyrogallic acid. Green by reflected light, it is pink by transmitted light, being dichroic. This at once points to the fact that this fog is somewhat of the nature of a dye, and every oxidising agent ought to destroy it."

Now, with regard to the first part of this theory—that it is caused by decomposed gelatine—it is a well-known and admitted fact that decomposed gelatine is soluble in cold water, and that, should there be any of it in the emulsion through being boiled, or in the gelatine itself prior to being made into an emulsion, it is entirely removed or but very little of it is left when the emulsion is washed, so that this is not one of the causes of green fog.

As a further proof of this, I have several times had quantities of emulsion standing for some weeks through want of time to coat the plates; the gelatine then was a good deal decomposed, part of it having even liquefied. On adding a sufficient quantity of a strong-bodied gelatine, plates coated with it turned out as fine as need be, with entire freedom from green fog and other defects. This shows that, even if decomposed gelatine be present in quantity, green fog does not as a consequence result; but when a soft or partially-decomposed gelatine is used frilling will be produced, of which more hereafter. Nor is green fog caused by oxidised pyrogallol, as is easily proved by the fact that, when a plate liable to give green fog is developed with sulphite of soda in the developer, which greatly retards the oxidation of the pyrogallol, green fog will be produced while the developer is still perfectly clear, yet, if the same plate were developed without sulphite, green fog might be absent. This, I have no doubt, is caused by the hardening action of the sulphite on the film; oxidised, otherwise discoloured, pyrogallol acts simply as a dye or stain on the film, and gives the well-known greenish-yellow colour to gelatine negatives. But that this is not the true green fog is proved by the fact that the colour is discharged by immersing the plate in citric or hydrochloric acid and alum, while proper green fog is not cleared away.

In the early day of gelatine emulsions, when a soft gelatine (such as Nelson's No. 1) was used almost exclusively in making emulsion, green fog was never heard of, nor would it yet be if such a soft gelatine were still employed exclusively in making plates; but when using such a gelatine a much worse evil than green fog had to be combated, and this was frilling. To remedy this a harder gelatine is now used. This is no doubt an effectual remedy for frilling; but it is often used in excess, and this is what is, in my opinion, the cause of green fog. This hard gelatine gives a skinny, impenetrable film, which either the developer or fixing permeates very slowly. If we examine the colour of an ordinary bromo-iodide plate we find that it is of a greenish-yellow. If this is a hard film, as I have already spoken of, the hypo. fails to get at all the unused bromide in the film, and the result is green fog. There is no doubt this species of fog can be modified more or less in the development. If, for instance, the plate be under-exposed and the development be forced or prolonged, the maximum of fog will result, the ammonia evidently being the agent that acts most on it, the quantity of pyro. seeming to make no difference as far as the fog is concerned. To remedy as far as is possible in the development the bad effect of plates giving green fog, they should be given as much exposure as is allowable, and developed with an extra quantity of bromide and pyro. and a minimum of ammonia; or the plates should be developed with ferrous oxalate, which gives negatives free from this defect, though, in very bad cases, I have seen plates that gave green fog even with it.

It is in the *making* of the emulsion that we must take care that green and also red fog are not produced. To make gelatine emulsion properly it should not be made with one sample of gelatine, though there are in the market samples of gelatine which will give very fine plates. Two different kinds of gelatine should be used—one a softish kind, such as Nelson's No. 1; this of itself is an excellant gelatine, but too soft to prevent frilling. This should be tempered with a hard sample, such as Heinrich's, Henderson's, or Nelson's amber, but no more of the hard variety should be added than will *just prevent frilling*. This is most important, as the finest and most perfect plates are got when they are just off what I may call the frilling point. The film is then in its best condition for development. It is more porous, the solution gets quicker into it, is therefore more quickly developed, and consequently much time is saved, less washing is required and there is much less danger of retaining hypo. in the finished negative. On no account should chrome alum be used in the emulsion to harden the finished film, as is, I believe, often done. This is a most dangerous practice, as, when even the very softest gelatine is used, the least overdose will make the film too hard and also produce green fog; all the hardening can be done with the judicious use of a harder sample of gelatine, as I have already stated.

I would press the attention of those who make plates to experiment in the direction I have indicated, as I believe that it is only by careful attention being given to such matters (other points, of course, not being neglected) that perfect plates and, therefore, more perfect negatives, can be made.

J. M. TURNBULL.

NOTES ON PHOTOGRAPHY.

LECTURE XV.—THEORY OF SILVER PRINTING.

FOR silver printing it is generally found, in order to get vigorous and brilliant prints, that the following requisites are necessary:—1. A layer of silver chloride. 2. A considerable excess of silver nitrate. 3. A layer of some organic silver compound. 4. That these should be retained on the *very surface* of the paper or other substratum. The functions performed by these four requisites are distinct and important.

Silver chloride alone is reduced by light, darkening to a deep violet colour, with formation of silver subchloride and evolution of chlorine. The chlorine thus set free, however, by its tendency to recombine with the silver, acts as a powerful retarder of the reduction. Silver nitrate, by combining with the chlorine to form fresh silver chloride, prevents its retarding action; hence silver chloride in presence of silver nitrate darkens far more rapidly than when alone.

When an image produced in this way, and consisting of silver subchloride, is placed in the fixing bath to dissolve out the unreduced salt it is decomposed into silver chloride, which dissolves, and metallic silver, $Ag_2 Cl = Ag Cl + Ag$. The consequence of this is that the vigour or density of the image is enormously reduced; in fact, so much so as to render it almost invisible. We must, therefore, look for some additional action to account for the non-reduction of our prints in fixing, and we find this in the organic compound of silver.

Albumen is the organic substance usually employed. When silver nitrate is added to this it combines with it, forming a substance which we may call for convenience "silver albumenate," at the same time producing coagulation or rendering the albumen insoluble in water. The silver albumenate on exposure to light darkens like the chloride; but the colour, instead of violet, is a brick red, or, if the insolation be prolonged, the well-known bronze appearance occurs. The brick-red substance is a suboxide of silver, probably mixed with metallic silver, when bronzing occurs. Silver suboxide alone is, like the subchloride, decomposed by hypo., but when it is produced in presence of organic matter, such as paper, &c., it remains in combination with it and resists the destructive action of hypo. Silver albumenate unreduced is, like the chloride, readily dissolved by hypo.

The image on an ordinary silver print, when it is taken from the printing-frame, consists, then, of a mixture of violet subchloride and red suboxide of silver, and it is owing to the combination of these two that its pleasant colour is due. On immersion in the fixing bath the subchloride is decomposed, leaving a small quantity of metallic silver and the familiar red suboxide, forming the image. If the excess of nitrate of silver be removed from sensitive paper the reduction of the chloride is very much retarded, and on taking a print with such paper a red image is at once obtained having a similar appearance to an ordinary print after fixing. It would appear from this theory that the silver chloride is of little, if any, use in the paper, and according to Hardwich it can be omitted with but little difference in the result, except that the time of printing is *prolonged*.

To render the finest details visible by reflected light and to obtain brilliancy it is found to be of *prime importance* that the sensitive compound should be retained as a smooth layer on the surface of the paper. Here again albumen becomes invaluable; for, owing to its glutinous character, it does not sink into the pores of the paper but remains as a thin film on its surface, forming at the same time a vehicle to retain the silver chloride and nitrate in the same position.

TONING.*

If a thoroughly-washed print be placed in a plain solution of gold chloride it will tone, but at the same time its vigour will be very much reduced. The reason of this is that the chlorine from the reduced gold combines with the silver of the image to form white silver chloride, which dissolves out in the fixing bath—

$$3\ Ag_2\ Cl + Au\ Cl_3 = 6\ Ag\ Cl + Au.$$

In order to avoid this loss of vigour a substance is added to the toning bath which will absorb the chlorine, an example of which we have in sodium acetate, which takes up the chlorine, forming sodium chloracetate. If the toning take place with *silver nitrate* in the paper a retarder, such as a soluble chloride or hydrochloric acid, is also required to be present, or the gold will be immediately thrown out of solution. Prints can be toned in the fixing bath to a colour very much resembling that given with gold by adding to it an acid or oxidising substance. In this case *sulphur* is deposited on the image, and the prints are not permanent.

FIXING.

On fixing a print the unreduced silver chloride and albumenate are dissolved out, and the silver subchloride decomposed into silver and silver chloride, which latter is also dissolved. A bath which has been kept or has already fixed a good many prints is apt to become acid by decomposition of the silver thiosulphate it contains in solution—

$$2\ Ag_2\ S_2\ O_3 + H_2\ O = Ag_2\ S + \overset{\text{Sulphuric Acid.}}{H_2\ S\ O_4}.$$

* *Instruction in Photography.*

This sulphuric acid, by reacting on the hypo., tends to deposit sulphur on the prints and destroy their permanency; hence a small quantity of ammonia should be added to the bath in order to prevent the acidity occurring. E. H. Farmer.

COMMERCIAL SUCCESS IN PHOTOGRAPHY.*

Another thing to be studied is being reasonable and natural in all your positions. The best of photographs may be marred by inartistic treatment—such as a man standing by the seashore with no hat on, unless you can at the same time suggest a gale of wind, with the peculiar physiognomy of the individual in question suggestive of the loss of his hat; another leaning over a rustic bridge or gate with plain background and figured carpet; and another holding on to a velvet chair in the middle of a dense forest, &c., &c.

If you are not busy do not complain to every one at the slackness of business. People are apt to form a wrong impression as to your capabilities consequent upon want of trade; and never, even at your busiest time (if at all in your power) refuse work. The maxim holds good here, "what you won't another will;" and what you refuse to do now is simply like shutting your door upon that customer for all time to come. Tidiness is another means towards success; be always tidy yourself. *Apropos* of this I may say, avoid anything uncommon in your appearance. Gaudy smoking caps and velvet coats give one a seedy-looking appearance at the best. They are a relic of a bygone age. Banish the relic and avoid anything that would tend to make a peculiarity of yourself. Tidiness, however, must not end here. Keep your place of business tidy, especially your studio. Let the samples of your work be always fresh and clean, and do not crowd your studio with accessories like a second-hand furniture dealer's shop.

This brings me to what I would call my second point, namely, to be successful in business you must be successful in workmanship. No workman can turn out good work with bad tools, so that your sheet anchor to success must be good apparatus. Many an amateur might produce better work if he could afford better apparatus, and many a professional photographer turns out wretched work simply because he is working with defective apparatus. It does not fall to the lot of every photographer to be able to purchase the most costly instruments, neither is it necessary. There are many cameras and lenses of the cheaper kind, with less pretensions than their costly brethren, which will side by side beat them hollow, both for substantiality of workmanship and quality of work producible. I do not necessarily advocate cheap goods, but I deprecate extravagance. Have everything substantial and, what is of more importance, suited to the requirements of your trade. I would here take the liberty of speaking a good word for swing-back cameras. To those who do not use them I would certainly say—Go in for them at once; experience alone will enable you to find out their good qualities. They are of service in every photograph you take, both in portraiture and landscape. Then, following these remarks upon good apparatus, I would say always produce good work. I may be told this remark is unnecessary, as every photographer tries to do that. Be this as it may, every photographer does not turn out good work, and the best of photographers will at times be ashamed of the work they are sending out. True, this cannot always be avoided, but I venture to say that in the majority of cases where bad work is sent out it can be avoided. If you have a bad negative, is it reasonable to suppose you can have a good print to cure that? If it be possible to secure a better negative, try again.

I can quote a case in point of a subject—not a living one, certainly—upon which I desired a certain effect in light and shade, and to secure that end I photographed it no fewer than twenty times. Possibly you will say that was due to my inability. Granted. I merely state this to show that if better work can be produced, and if it be in your power to do so, by all means do it. Do not give your retouchers too much work to do upon any single negative; a great deal of this can be effected naturally by a careful arrangement of blinds in the studio. Retouching I certainly advocate. The photographer who does not touch now is undoubtedly behind the age.

I may be accused of treading on tender ground when I say in all cases where practicable give proofs. It is more satisfactory, both to photographer and customer. I will qualify that statement, however, by saying that it is in many cases impossible and unnecessary to give proofs, such as customers from the country, family groups, &c. In these cases it is essential that your customer know the quality of the negative taken before he leaves your studio, and, if satisfactory to yourself, in nine cases out of ten your customer will be pleased with your approval.

Another means of contributing to the success of a photographer is in sending out good prints. The best of negatives can be spoiled by bad printing; in fact, with the printer lies the whole brunt of the battle. I will not attempt to go over all the details of the printer's department, for that would mean a paper of itself, but I will say this much—that a good printer is the backbone of a photographer; for, in spite of care in operating, in exposing, and in development there will be dense negatives and weak negatives, over-exposed negatives and under-exposed negatives, spots, comets, streaks, &c. We look to the printer for a modification of all these evils, and to one who understands his work thoroughly and well we do not look in vain. This is a work in which quality rather than quantity should be the aim. Care in printing means less work in spotting out, and consequently cleaner finished prints. On all orders let the stamp of the true photographer be impressed—the genuine ring of good work. Remember always that according to the work you produce so will be your trade. Good work will always act like the welcome beacon, guiding customers to your door; while bad work may be compared to the sunken reef, of which every one will steer clear. Regarding cheap work: I can only say that the man who issues cheap work or puts out indifferent work does an injustice to himself and the profession to which he belongs. I admit that to a certain extent cheap work may command a trade, for that inherent weakness in human nature—going to the cheapest market—is to be found even among the customers of a photographer. These are not the customers, however, to rely upon in establishing a good trade. Good work will always command a good price, and in photography I believe more than in any other calling the cheapest houses, with possibly the largest rush of business in a season, are the first to "go to the wall." Therefore, I say keep up your prices, and with that keep up the standard of your work.

A word or two now regarding secret processes, patent processes, and suchlike. Success in business does not depend upon these, and I would decidedly say—do not go in for any of them. I do not question the merits of these processes. They may be good or they may be bad, workable or unworkable. If any one has made a discovery which will prove useful to the photographic world let it be made voluntarily, and more will be made by so doing than by any paltry gain commercially. The right to work certain processes is, to my mind, a great mistake. It means that, if I am able and willing to buy the sole right to a certain process for the quarter in which I live, excluding my brother photographers from participating in the same benefit, I am declaring war against the profession. It is generally those who are most unable to afford the amount for these new processes that do so, hoping possibly that they will realise a fortune by their speculation, the result invariably being that they are further from success and fortune than ever. The pioneers of our art deserve our greatest respect and esteem for the free and impartial manner in which they have placed their discoveries from time to time before the public, and it is to their disinterested enthusiasm that we owe our present success as photographers. Following in this line, I would say that success is not to be obtained by going in for all the newest processes, whether secret or otherwise. To master any process means hard study, long labour, and constant practice before confidence can be secured, and to the dry-plate worker the processes of manufacture, of manipulation, and of development are legion; but while advising photographers not to purchase all the newest processes I hope I shall not be accused of advocating a standstill policy. By no means. I say, if you have time try any or all of them, but master one and have it always as a harbour of refuge to which you can steer when you are in danger. Never experiment upon your customer. It is awkward at the best to confess that the photograph is a failure, but more when you have to reflect that it is due to some little experiment of your own that the failure was caused.

In closing this communication I might appropriately have quoted examples from the lives of some of our more eminent photographers, past and present, illustrating wherein lay their success in business; but I fear I have already trespassed sufficiently upon your time and patience without having brought forward anything new, and to continue would only be misappropriating the time at our disposal. Therefore, to sum up all I have said in a word—Wherein lies commercial success in photography? In a thorough knowledge of the art, in assiduous attention to business, in a decided endeavour to put out only the best work, in giving honest value for value received, and last, but not least, in never letting the interests of the photographer be placed before that of his customer. John Geddes.

* Concluded from page 136.

GELATINE PLATES FOR TRANSPARENCIES.

[A communication to the Edinburgh Photographic Society.]

The late exhibition of transparencies by the members of this Society has had several results—some profitable, some unprofitable, and some which may be either the one or the other. The profitable ones may be said to be the attraction of new members, the discovery of unsuspected talent, and the encouragement of those in whom the discovery has been made to persevere. The chief of the unprofitable ones—in my case at least—is the wasting of a great many plates in producing a very few worth showing, while one of the third class has arisen out of the second, and it is on this subject I now address you. You will find it sufficiently indicated in the title of my paper.

My many failures were occasioned by the extreme sensitiveness of the plates which I used, and this led me to consider whether it would not be possible to prepare plates which might be printed in the same manner as ordinary sensitised paper, in which the progress of the printing might be watched, and which would require no development. While cogitating on this subject I came across Captain Abney's description of an emulsion, which seemed to suit all my requirements. I need

not take up your time describing it, as you will find it at full length in page 221 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC. Suffice it to say that it is an emulsion of gelatine, citrate of silver and silver chloride, made with sodium chloride, forty grains; potassium citrate, forty grains; silver nitrate, 150 grains; gelatine, 190 grains; water, altogether about six ounces; and alchohol, three drachms.

I resolved to try a few specimens of these plates; but by accident I, fortunately or unfortunately, added a considerably larger quantity of the sodium chloride than was necessary. The result of this was that the silver having more affinity for the chloride than for the citrate was entirely taken up by the chloride, thus leaving the citrate free to be washed out with the uncombined chloride and other soluble salts. I also added, when remelting, two drachms of liquor ammonia, and boiled the whole for an hour at least. Practically my plates may be called gelatine chloride plates.

When the plates were dry I tried one. It printed, slowly and beautifully, of a fine purple colour. When printed up to about the colour I wanted it when finished I put it into hypo., when the whole image vanished and the plate appeared perfectly clean. I tried another, printed it until all detail was lost in the shadows: half-tones gone, and even the high lights discoloured; fixed in hypo., with almost the same result. Still there was some colour in the film this time, but so little that this was also set aside as a failure. A third plate I tried printed deep, soaked in a borax and chloride of gold toning bath, and fixed with almost the same result as before, but a little more colour. On drying the plates, however, I found the image appeared more clearly, and the plates generally darkened in colour. Still, however, they lacked density, and I set about to intensify. I tried chloride of mercury and ammonia, chloride of mercury and cyanide of silver, Edwards's intensifier, and other things, but all to no purpose. My plates seemed useless.

In my despair I did what the doctor told the miser to do who asked a physician in a friendly way what he should do for a bad cough—I took advice. I went to the nearest photographer (our worthy Secretary), and into his sympathetic ear I poured forth my sorrows. He looked at the plates I showed him (I may tell you I had not then discovered the mistake I had made), and he told me I had evidently not followed Captain Abney's formula. However, after a good many attempts to impart density to the pictures, he tried redeveloping with pyro., with the result of making the plate a deep brown all over, leaving the image, however, as before, perfectly clear and distinct. The application of hypo., however, brought it back very much to its original state, and left us as much puzzled as ever, and after taking up a great deal more of his valuable time than I had any business to do I left him. Discouraged, but not yet beaten, I went home and worked away on the plates until I succeeded in destroying all I had already done.

The most hopeful plan now seemed to be the application of a developer, and after a few more trials I at last succeeded in getting something like what I wanted, and I now propose to show you the results.

Unfortunately, before I hit on this plan of redeveloping I had concluded that the plates were worthless, and accordingly I left them lying about in the dark room till I should find time to clean them, and so they got contaminated with chemical impurities; hence the many imperfections you will observe in the plates. Imperfect as they are, however, they will be sufficient to give you some idea of the capabilities of the process, and enable you to judge of its value.

No. 1. Printed to correct depth, dropped into an old and almost exhausted acetate of soda toning bath, and then fixed with hypo. Image disappeared, but reappeared and darkened on drying. Result of the picture is quite distinct, full of detail, perfectly transparent, but so thin as to be almost invisible by transmitted light without an opaque background. It shows a pale yellow in the lantern in a disc of two feet diameter.

No. 2. Printed till half-tones lost and high lights darkened. Toned in strong fresh borax toning bath and fixed. Picture disappeared, but came out again on drying. Result: picture perfect but transparent and almost invisible; without opaque background shows very pale brown, with tint of purple in lantern.

No. 3. Printed to full depth. Toned in very strong borax bath warm, then put into developer—sat. sol. sulphate of iron, one drachm; oxalate of potassium, three drachms; bromide of potassium, three grains; water, one and a half ounce; sol. cyanide silver, a few drops. There it remained till the sky darkened, and I then fixed it. As usual the picture faded out. I then dropped it into the developer again, when the image immediately began to come up strongly, and I allowed it to remain until it came up fully. Unfortunately the sky stain came up also. Result: the picture is vigorous and full of detail and contrast, shows well by transmitted light with or without a background, and in the lantern is full of a fine dark purple.

No. 4. Was very much under-printed; dropped it into same developer as No. 3, till sky showed signs of darkening, then put it into toning bath four minutes, and fixed. As usual the image disappeared. When dropped into the developer the image reappeared very slowly. I strengthened the bath by the addition of half-an-ounce of ferrous oxalate; the image came up a little quicker, and I added more ferrous oxalate till the image was completely up. Result: picture dense but wants contrast, evidently foggy. In lantern shows rich brown, but very far from being a brilliant picture, the high lights being dark and foggy.

No. 5. Printed a little over full depth, toned in nearly-exhausted toning bath, developed as No. 3 without cyanide, fixed, and redeveloped. Result: a good picture, shows well by transmitted light, full of contrast and detail, and in lantern shows of a fine rich brown, but exhibits evident traces of over-exposure in the high lights.

No. 6. Same as No. 5, but with cyanide of silver and double allowance of bromide in the developer. Result: fine, but much over-developed. Shows too dense with a background, but would do well for a window transparency; shows splendidly in lantern with small disc at a short distance.

No. 7. Printed to full depth, toned in strong new borax bath, developed as No. 6, but with double allowance of cyanide, fixed, and redeveloped. This shows the result I have been aiming at—clear glass in the high lights, fine half-tones, and great depth in the shadows—withal perfect transparency and a fine purple tone; it shows well either with or without a background and in the lantern.

No. 8. Was over-printed, treated as No. 7, but plate being spotted was not carefully treated. Except over-printing and spots the result is very similar to No. 7.

No. 9. Very much over-printed. Toning bath very weak; treated as No. 8. Result: a fine rich brown, but very much over-exposed and over-developed.

The result of these experiments, though not quite conclusive, seems to be that plates coated with gelatino-chloride of silver emulsion are exceedingly suitable for transparencies if printed to full depth, toned with gold, treated with weak solutions of ferrous oxalate with the addition of cyanide of silver and bromide, fixed with hyposulphite of soda, and redeveloped as I have described in Nos. 6 and 7.*

Their greatest advantages seem to be that the whole process of forming the image is perfectly under control in every stage, while the vigour and transparency of Nos. 6 and 9 seem to leave little to be desired, and the operations after printing may be carried on in strong gaslight, as all my experiments were.

I regret that my experiments are not quite so complete as I should have desired. They were not made for the purpose of this paper, nor were they very carefully made. I had intended to complete my experiments before communicating them to the Society, but want of time and opportunity have prevented this; and at the request of our worthy Secretary I now submit the results so far as they have gone for what they are worth, in the hope that others will take the matter up, and have something further to say on the subject, as I myself hope to have on a future occasion.

ANDREW B. STEWART.

EXHIBITION OF THE ASSOCIATION BELGE DE PHOTOGRAPHIE.

THE Association Belge de Photographie is organising, in one of the galleries of the Palais des Beaux Arts at Brussels, its second public exhibition of works appertaining to every branch of the art, to which all photographers, amateurs, and manufacturers of apparatus, Belgian or foreign, are invited to contribute. The exhibition will be opened on the 15th August next, and will remain open until the 1st October ensuing.

Medals in gold, *vermeil*, silver, and bronze, as well as certificates of honourable mention, will be awarded in the following classes:—*A.* Impressions in Fatty Inks from Gelatine Surfaces.—*B.* Heliographic Engraving (Photogravure).—*C.* Woodburytype, Photoglyptie, and Similar Processes.—*D.* Photolithography, Photozincography, and Similar Processes.—*E.* Photographs in Carbon, on Glass or Paper.—*F.* Photographs on Albumenised Paper, Platinotype, &c.—*G.* Cyanotype and Similar Processes applicable to Science, Art, Industry, and Instruction.—*H.* Vitrified Photographs.—*I.* Photographic Apparatus and Instruments applicable to Scientific Works and Expeditions, Instruction, Industrial Purposes, the Arts, &c.—*J.* Photographic Literature, Works and Publications.—*L.* Publications Illustrated by Photomechanical Processes.

The jury will also be authorised to award medals and honourable mentions to meritorious works which cannot be classed under any of the preceding heads, or which are specially distinguished as inventions or by their application (processes, publications, or apparatus).

A "medal of excellence" will be given to the exhibitor whose works show the greatest merit, independent of the class to which they belong.

Intending exhibitors are to give notice not later than 1st June, and all exhibits are to be forwarded, carriage paid, from July 15th to August 1st, to M. A. Geruzet, Palais des Beaux Arts, Rue de la Regence, Bruxelles, who will supply any further information on application.

Contemporary Press.

THE PHOTOGRAPHY OF MICROSCOPIC SECTIONS.

[GLASGOW MEDICAL JOURNAL.]

FOR some time past photography has been made use of as an aid to surgery, not only with the view of furnishing an important accessory in teaching, but as a potent auxiliary towards the more perfect exposition of operative

* It will be observed that these specimens are all much too dense, and this is accounted for by the fact that the density increases greatly in the process of drying.

principles, and recently, though only in a very small degree, as a means for the clearer elucidation of histological research; and in many instances the assistance thus afforded has been of the greatest value. Accurate representations of rare and interesting cases can in this way be obtained for permanent record, where the original is invariably so faithfully maintained that dispute on the point is rendered superfluous. A drawing may and often has only too good reason to be challenged as to the veracity of its details, but a photograph never can belie itself, or be called in question thereon.

During the month of October, 1882, while taking charge of the wards of my friend, Dr. William Macewen, in the Royal Infirmary, a most unusual case of *adeno-sarcoma* of the *mamma* came under my care, and was successfully removed, the report of which I had the honour of reading before the Medico-Chirurgical Society of Glasgow, on 12th January, 1883, and which will shortly appear in the columns of the *Lancet*. Excellent sections of the tumour were prepared for me by Dr. Newman, pathologist to the Infirmary, and I was extremely anxious to obtain a good sketch of one or more of these; but, unfortunately, no one capable of undertaking the task could be found. The only man likely to accomplish it satisfactorily was engaged with Dr. Coats, and would not be at liberty for some months. I may here state that, though to the uninitiated it may appear very simple, it is in reality no easy matter to make a creditable representation with the pencil of microscopic sections, and anyone wishing to acquire proficiency in their delineation must undergo no little previous training in this particular department of histology. Beginners, as a rule, in their earlier attempts frequently give undue prominence to the minor details, while, at the same time, they altogether ignore or glide hastily over the salient and typical points of the specimens which for the time being happen to be placed before them. Under these circumstances, I bethought myself that photography might, if sufficient care were bestowed on the process, be conducted to a successful issue, and make as effective a contributor for the demonstration of microscopy as it has proved advantageous to the interest of surgery; and in conjunction with my friend, Mr. Schulze, set to work at once in order to see for ourselves what could be done in this matter. After a good many attempts we succeeded in obtaining some very fair negatives, transparencies of which were executed for me by Mr. Thomas Swan, of Messrs. George Mason and Co., 180, Sauchiehall-street, and shown by means of the lime light as lantern slides at the meeting of the Medico-Chirurgical Society recently alluded to.* Soon afterwards I gave two similar exhibitions for the benefit of my many student friends in the Royal Infirmary and Andersonian Medical Societies. When well put on the screen the value of these transparencies as a teaching medium is self-evident, from the fact that the lecturer is able to place at once before his whole class, in a brilliant and attractive form, a capital exemplification of his subject, written, so to speak, in the largest and most legible of types. The great drawback to the use of lime light is its expense, while the fitting up of the apparatus, which is necessarily rather bulky, takes some time, and demands a good deal of care in its subsequent management.

Mr. Swan also prepared some excellent silver prints of the tumour sections, which were shown by me in Dr. Macewen's Systematic Class, he being then engaged in the consideration of the *sarcomata*. It was, however, altogether out of the question to get ready a sufficient number of these for the present paper, and I therefore employed the Woodburytype Company, whose resources in this way are practically unlimited, to get ready several hundred copies, specimens of which will be found to accompany each number of the *Journal* for the present month.

The following account of the microscopical characters of the tumour has been kindly supplied me by Dr. Newman, Pathologist to the Infirmary:—Microscopic examination of sections taken from periphery of tumour show it to be composed of spindle-shaped cells imbedded in a homogeneous matrix, in addition to a large number of dilated acini and excretory ducts, the number of which varies, however, in different parts of the growth. The acini and excretory ducts are lined by a single layer of cylindrical epithelium, and in none of the sections examined is there any tendency shown to proliferation of the epithelial elements beyond their normal limits. Immediately surrounding the acini, but distinctly separated from them, there is a layer of large, closely-packed spindle-shaped cells, almost all of which contain well-marked nuclei. These spindle cells are so large that at first sight they appear like, and might easily be mistaken for, epithelial cells. Where the acini are close together the intervening tissue is composed entirely of these large cells, arranged concentrically around them; but where the interacinous tissue is large in quantity it is made up, unless close to the acini, where the cells are always large in size, of small round cells imbedded in a tolerably-abundant homogeneous intercellular substance. Sections from parts of the tumour other than the periphery reveal no difference in its microscopic characters.

The following is a description of the method (read before the Medico-Chirurgical Society of Glasgow, 12th January, 1883), which was adopted in the taking of these photomicrographs, and I must here acknowledge my deep sense of obligation to Mr. Schulze, not only for the use of his valuable instruments but for his indefatigable labours to secure a good result:—

The photographs were taken by means of a large microscope stand, made by Ross and Co., and arranged as now described. The axis was disposed horizontally, and the binocular body was replaced by a short, wide monocular one, the end of which farthest removed from the objective carried a bi-concave amplifying lens of one inch diameter. To the short body was attached a pyramidally-shaped mahogany photographic camera, carrying at the large end the focussing screen of ground glass. The object glass employed was one of Zeiss' D D, equivalent to one-sixth English focus, and giving a magnification of sixty diameters at ten inches, or of three hundred diameters at ten inches distance when combined with the usual lowest, so called "A ocular," of English opticians. The D D of Zeiss is a remarkably fine lens, having an air angle of 105°, or a numerical aperture of 0·79.

*** My best thanks are due to Mr. Swan for the extreme care which he bestowed on the arrangement and subsequent manipulation of the lime light, as well as for the many invaluable services which he rendered in connection with the production of the lantern slides.**

The object was illuminated by a powerful paraffine lamp, having a flat wick one and a-half inch broad, and a bull's eye lens of three inches diameter, which carried on its flat side a disc of dark blue glass for the purpose of obtaining monochromatic blue light, as with the use of it the visual and actinic foci of the objective practically coincide. The lamp is the one designed by the Rev. W. H. Dallinger, F.R.S. It has beautiful vertical and horizontal motions for both lamp and bull's-eye lens, so that the illumination can be adjusted to the greatest nicety. With the D D and the previously-mentioned amplifying lens the object on the negative is magnified one hundred and forty diameters, or about twenty thousand times superficially.

Some negatives were taken with Zeiss' C C, or one-quarter of an inch objective, the object on the negative being magnified seventy diameters, or four thousand nine hundred times superficially.

The light, having passed through the bull's-eye lens, with its convex side turned towards the edge of the flame, was received by one of Ross's Kelner C oculars, which has a large field lens, and which ocular, placed in the substage of the microscope, served as an achromatic condenser. The stand having been arranged as described, a characteristic portion of the object was selected and carefully focussed. Particular attention was paid to an uniform and correct illumination of the field of view—by no means an easy matter when sunlight is not available. The shutter of the camera having been closed, the focussing-screen was withdrawn and replaced by a dark slide containing one of Wratten and Wainwright's instantaneous plates (4 × 4), and after the room had been darkened, leaving only the aforesaid paraffine lamp burning, a time was selected when all tremor had ceased to expose the sensitised plates for ninety seconds, this having been found the correct time of exposure for the plates, apparatus, and object used.

The negatives were developed by Mr. Thomas Swan, who, as before stated, also produced the positive transparencies.

It is, of course, not to be expected that a photograph on the screen should be by any means so sharp and well-defined as the image of the object in the microscope. For we have to consider that, supposing the lantern photograph to be three inches in diameter, and the picture on the screen eight feet in diameter, that the former is further amplified thirty-two times diametrically, or one thousand and twenty-four times superficially. In point of fact, we would then have before us the image of the object magnified four thousand four hundred and eighty diameters, or twenty million times superficially. The sensitive film of both negative and positive being a coarse one, microscopically speaking, causes also the loss of some of the finest details. Besides, a photomicrograph never can possess the same depth of focus as the image projected on the retina, because the eye involuntarily adapts itself to the different foci while viewing an image, the result being increased penetration; but, nevertheless, I feel sanguine, when this method comes to be better understood than it is now, that it wi l be universally used by histologists for producing permanent as well as faithful records of microscopical structures.

In conclusion: I may say that Mr. Schulze and I are still pursuing this subject, and we have every prospect before long of being able to exhibit much better specimens of photomicrography than the one now placed before the numerous readers of the *Glasgow Medical Journal*.

James Whitson, M.D., F.F.P., and S.G.,
Surgeon to the Dispensary of Anderson's College; Late Extra Dispensary Surgeon, Glasgow Royal Infirmary.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 22	London and Provincial	Mason's Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The ordinary monthly meeting of the above Society was held on Tuesday evening, the 13th instant, at 5a, Pall Mall East,—James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. W. E. Debenham and George Renwick were duly elected members of the Society.

Mr. A. Cowan then read a paper entitled *Gelatino-Chloride Emulsion for the Camera*, in the course of which he remarked that, whilst on all hands the beauty of the process was acknowledged, it was still thought to be too slow for the camera; but he quoted from an article in The British Journal of Photography of 23rd February, 1883, in order to show that the process could be rendered as rapid as the gelatino-bromide and still retain the variety of tone obtainable with gelatino-chloride. With regard to the latter process, he was of opinion that no great variety of tone was obtainable by simply altering the exposures when using a fixed developer; but he found that with the ferrous citrate developer, without any oxalate, a great variety of tones could be got by enormously increasing the exposure and very greatly restraining the developer. He had made experiments with ferrous oxalate and had not noticed any change of colour with any amount of exposure, but simply a denser deposit, and he found that the slower the image came up the warmer the colour, and *vice versâ*. He (Mr. Cowan) also handed round for inspection several transparencies illustrating the different varieties of tone he had obtained by the different methods. At the conclusion of the paper,

Captain Abney said that perhaps he himself had worked more with the chloride than anyone present. Last year, when in Switzerland, he took for experimental puposes a lot of gelatine-boiled chloride plates, and he thought they were more brilliant than bromide plates, but there was no difference between the two in rapidity. In summer he found the chloride

plates equally as good as the bromide. Mr. Cowan had only tried the iron developer, but he (Captain Abney) thought the ordinary pyro. developer could be used by diminishing the ammonia in the solution, and it would come up more rapidly than the bromide plate. In relation to the development of plates by the different sorts of iron, he might say that the ferrous-citro-oxalate is twenty times quicker than the citrate of iron developer. Mr. Cowan told him he could develope a plate with the ordinary oxalate of iron, but he must confess that, when he had tried it, it had not been so successful as it ought to have been. The great secret of making the chloride emulsion is to use plenty of hydrochloric acid.

Mr. W. Bedford said he had tried the boiling process and also the simple emulsifying process, and his experience was that when the emulsion is boiled all chance is lost of obtaining that beautiful warm colour which all aim at getting. He thought Mr. Cowan had succeeded in getting a rapid process with warm tones, which he (Mr. Bedford) considered a great advance. He remarked that Captain Abney's process was a splendid one in its results, which are all that are required with regard to colour. He thought Mr. Cowan was much to be commended for his diligent experiments.

Mr. W. K. Burton wished to ask Mr. Cowan what was the guide as to when the boiling had been sufficiently performed, and what was the limit of sensitiveness.

Mr. Cowan said it was scarcely in his power to reply to this question, having only made one boiled emulsion, and that took half-an-hour. He remarked that Mr. Bedford had stated that the boiled emulsion loses the power to get the warm colours, but he himself did not think that this was the case. He would like to ask Captain Abney whether it was correct that exposure only would alter the colour.

Captain Abney said, with regard to colour with ferrous-citro-oxalate, if they reduced the strength of the solutions so as to take the same time as the ferrous citrate they got the same colours. He had sometimes been able to get a perfectly-pink picture with ferrous-citro-oxalate by reducing the strength. With regard to Mr. Burton's question—what was the guide as to sufficiency of boiling—he said that they must judge by the colour. If they went beyond a colour like emerald green they got fog, but the best time to stop was when they arrived at sky-blue colour. That is the point where the emulsion is most free from any tendency to fog, and the safest point after that is when they get the green colour. He thought a quarter-of-an-hour, or at most twenty minutes, was quite a sufficient time for boiling.

At the suggestion of the Chairman a warm vote of thanks was accorded to Mr. Cowan for his paper.

The Chairman announced the receipt of some coloured pictures for exhibition, remarking that as the colouring was mechanical and not photographic they would not perhaps possess much interest. These were handed round for inspection. He also announced that Mr. Cade had written asking him to bring before the notice of the members the proposed Photographic Copyright Protection Association, and said that he had been asked to inform them that a meeting would be held on the subject at Messrs. Elliott and Fry's, on Wednesday evening, the 14th instant, at seven o'clock. He (the Chairman) also appealed to the members for the loan of photographs to cover the walls of the room, as the pictures now hanging would be removed before their technical meeting, on the 27th instant.

Mr. John Spiller asked, with regard to the date of the technical meeting, whether it might not be advisable to pass this meeting over, as it fell on Tuesday in Easter week, and he thought there would be but a meagre attendance on such an occasion.

The Chairman replied that this question had already been considered, and, as the notices of the meeting had already been sent out, it was deemed advisable to adhere to the date fixed.

The meeting was then adjourned to Tuesday, the 10th April.

Some lantern transparencies were afterwards exhibited in the Society's new lantern by Messrs. Cowan, England, and Bedford, illustrative of the various tones obtainable by the different processes for preparing the slides.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 8th instant, the chair was occupied by Mr. W. M. Ashman.

A letter was read from a photographer in the provinces asking for the ideas of the members on the subject of the hypo. bath—whether it could be used to fix with when saturated with bromide of silver.

Mr. A. J. Brown said that the writer could easily settle the question himself by saturating a solution of hyposulphite of soda with bromide of silver, and then seeing whether he could fix a plate in it.

Mr. A. L. Henderson read a paper on *Washing Leucine out of Emulsion.* [See page 148.]

Mr. A. Haddon's communication on *Freeing Emulsion from Soluble Colloids* [see page 147], in continuation of the one which appeared on page 93 of this Journal, was then read, and the discussion on this and Mr. Henderson's paper was taken together.

Mr. Brown said that Mr. Haddon had stated that the addition of absolute alcohol to Mr. Henderson's "leucine" solution had thrown down a precipitate of iodide of potassium. He (Mr. Brown) thought that the precipitate would consist mainly of a form of partially-decomposed gelatine, as he had produced the same effect from a solution which did not contain any iodide. The lower the temperature the more precipitate was formed, and with the alcoholic precipitation method of preparing emulsion he believed that much of this soluble matter—that is, soluble in cold water—would always remain in the finished emulsion.

Mr. Henderson thought that the soluble salts contained in emulsion rendered the gelatine porous, and so allowed the soluble colloids to be washed out.

Mr. W. E. Debenham said that much of the discrepancy observed in the results of dialysis of gelatine solutions might be referred to the action of an imperfect septum. Parchment paper was frequently referred to, but was not by any means to be relied on. He produced two samples of gummy-looking material resulting from one ounce of metagelatine solution. The one which weighed rather more than twice as much as the other was produced by evaporating the liquid which had passed through a septum of parchment paper that had to the eye appeared perfect. The smaller quantity was the dried product of what had remained above the septum.

Mr. Brown inquired whether any of the members had prepared "leucine" from the formula given by Dr. Kemp two years ago, in which potash was employed instead of ammonia as used by Mr. Henderson, and read at the last meeting of the Association. He had done so, and proposed to report the result at the next meeting.

Mr. Henderson asked whether anyone present had experimented with the new reducing agent, called "brilliant."

Mr. W. Cobb had done so, and found it answer the purpose, but not better than, if as well as, the formulæ already known.

Mr. P. J. Neate was elected a member of the Association.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

A Council meeting of this Society was held on Thursday, the 8th inst.,—Mr. James Glashier, F.R.S., in the chair.

The minutes of the last meeting having been read and confirmed, the following members were elected:—J. H. T. Ellerbeck, Esq.; J. W. Baxendale, Esq.; Gerard Smith, Esq.; Mrs. Marian Abbott; R. B. White, Esq.; C. H. James, Esq.; Theodule Perrot, Esq.; G. Minto, Esq.; J. S. Byers, Esq.; H. H. O'Farrell, Esq.; and A. Fagliaferro, Esq.

The Secretary then laid before the meeting the prizes awarded at the annual meeting, which were as follow:—To C. Stephens, Esq., a large silver goblet. S. Norman, Esq., a large album, elegantly bound. F. Beasley, Esq., a water-colour drawing in frame (by Earp). W. S. Hobson, Esq., an album, elegantly bound. F. S. Schwabe, Esq., an oil painting in frame (by Masters). G. Brook, Esq., Jun., a silver goblet. R. Leventhorpe, Esq., a silver goblet. W. Adcock, Esq., an oil painting in frame (by Masters). G. W. Palmer, Esq., an album, elegantly bound. Lieut.-General the Right Hon. the Lord de Ros, an album, elegantly bound. W. Vanner, Esq., an album, elegantly bound. W. Muller, Esq., an oil painting in frame (by McEvoy). These were approved by the meeting.

A vote of thanks to the Chairman was proposed by Captain Lewis, seconded by Mr. Howard, and carried unanimously.

A. J. Melhuish, *Hon. Sec.*

EDINBURGH PHOTOGRAPHIC SOCIETY.

The fifth ordinary meeting of the current session was held in 5, St. Andrew-square, on Wednesday evening, the 7th inst.,—Mr. James Henderson, Vice-President, in the chair.

The minutes of the February meeting having been read and approved, the following gentlemen were unanimously elected ordinary members:—Mr. Charles G. C. Christie, Captain F. F. Parkinson, Mr. Samuel Hunter, and Mr. J. Macnaughten.

The first paper was by Mr. Andrew B. Stewart, on *Gelatine Plates for Transparencies.* [See page 150.]

In proposing a vote of thanks to Mr. Stewart,

Mr. W. T. Bashford said he considered the paper read was of great value as a record of failures—a feature in experiments too often kept in the background. The varying stages in Mr. Stewart's progress towards success were extremely interesting, and the result as to colour, purity of high lights, and wonderful translucency in the dense portions of the prints exhibited were certainly a distinct advance on any gelatine transparencies hitherto brought before the Society.

Mr. J. M. Turnbull advocated collodio-bromide dry plates as peculiarly suitable for lantern transparencies.

The second paper, entitled *Notes on Green Fog*, was read by Mr. J. M. Turnbull [See page 148]

Mr. M'Kean supported Mr. Turnbull in his opinion that much of the evil known as green fog was caused by the employment of a hard, repellent gelatine.

Mr. Tamkin stated that green fog had never occurred in his practice, but he had procured a negative which exhibited the evil in a marked degree.

The negative was passed round, and was examined with interest by several members who had never before seen the occurrence.

Dr. Hunter wondered if the source of the gelatine had anything to do with the production of some of the evils associated with modern dry plates. While in Paris some time ago he was amazed at the distinctions there drawn between the various gelatines derived from bones. In that city he had noticed samples of gelatine from sheep-bones, ox-bones, horse-bones, and bones of other animals. The most beautiful in appearance, and which was used for choice decorative purposes, was the gelatine obtained from the bones of the rat, which animal of an unusually large size was found in enormous numbers in the sewers.

The Chairman tendered the thanks of the meeting to Mr. Turnbull for his paper.

Mr. James Howie exhibited some prints from negatives taken by burning magnesium in oxygen. They were portraits of Mr. Norman Macbeth, R.S.A., and Mr. Alexander Matheson, and were very favourably received.

Mr. A. Craig-Christie, F.L.S., directed attention to the fact that the combustion of magnesium in oxygen was sometimes attended with explosive violence, and recommended that precautions be taken to guard against the possible consequences of such a mishap.

Mr. Robert Murray, C.E., exhibited some exquisite snowscapes taken recently upon coffee plates.

They seemed even to excel Mr. Murray's usually beautiful work. It is hoped that he will be able to provide transparencies from them for a future popular meeting.

After a vote of thanks to the Chairman the meeting terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of the above Society was held at the Mechanics' Institute, on Thursday evening, the 8th instant,—Mr. John Pollitt, Vice-President, in the chair.

The minutes of the previous meeting were read and confirmed, and Messrs. Everett Briggs and Benj. B. Wilson were elected members of the Society.

The HON. SECRETARY described the working of the stannotype process, and passed round a gelatine mould covered with tinfoil and prints from the same. The simplicity of the process was much admired. A discussion followed, in which Mr. A. Brothers, Mr. R. Atherton, and others took part.

Mr. W. J. Chadwick passed round a negative (with print) taken on one of Professor Stebbing's films, the result being very satisfactory.

Mr. J. GREATOREX showed two transparencies on $8\frac{1}{2} \times 6\frac{1}{2}$ plates of his own preparation, which were covered with spots, both opaque and transparent, as well as an unexposed plate from the same emulsion, which was perfectly clean and free from dust. He attributed the spots to the iron matter in the water with which it was washed, as, on making subsequent batches and using only distilled water, the plates developed perfectly clean. He also stated that he had lately tried the hydrokinone developer, as recommended by Captain Abney, and more recently by Mr. E. Howard Farmer; but he could not speak favourably of it, as in every case the result had been stained films, although with the ferrous oxalate developer the transparency was all that could be desired. He could not remove the stain by any method without damage to the picture.

Mr. J. SCHOFIELD exhibited a few capital enlargements on Morgan's argentic-bromide paper, and stated that, as several of the members had expressed a desire to see his method of working, he had come prepared to show them. Presuming the picture to be enlarged is on a plate $4\frac{1}{4} \times 3\frac{1}{4}$, he used the sciopticon; and to prevent the necessity of having to turn down the light whilst the sensitive paper was being put into position, he had made a box which held the lantern, with an opening in the front for the lens and a sleeve hole at the back for regulating the light and arrangements top and bottom for admission of air, but through which no light escapes. The negative having been placed in position and focussed on a sheet of white paper on a drawing-board hung on the wall, the lid of the box was fastened on, and a sheet of ruby glass in front of the box placed before the lens and the paper was then attached to the drawing-board. He (Mr. Schofield) stated that in his experience the results were much finer if the exposure were made on the dry paper rather than when wet, but it was difficult to get the paper flat upon the board by using pins. By cutting a groove down each side of the board, and having a strong wire spring to fall over from the outside, the paper was drawn tight and flat.

The arrangements were very simple and, as evidenced by the work shown by Mr. Schofield, most effective.

The Hon. Secretary read a letter he had received from Mr. W. Harding Warner, asking the opinion of the members "if an *ad libitum* quantity of plates might be fixed in one bath of hyposulphite of soda without a deposit of sulphur upon the films."

The CHAIRMAN and Mr. ATHERTON both stated they used the bath for a great many plates—in fact, until it became exhausted—without detriment to the finished negatives.

Mr. Chadwick then exhibited the "eclipse" light, kindly sent down for exhibition by Mr. McLellan, of Glasgow, and a new camera by Mr. Hare.

A vote of thanks having been passed to those who had contributed to the evening's enjoyment, the meeting was adjourned till April, when Mr. A. Brothers, F.R.A.S., will show how the camera may be used in connection with the microscope.

HALIFAX PHOTOGRAPHIC CLUB.

THE ordinary meeting of this Club was held on Tuesday evening, the 6th instant,—Mr. W. C. Williams, Vice-President, in the chair. The minutes of the previous meeting having been read and confirmed,

The CHAIRMAN exhibited a very beautiful paper print from an enlargement 15×12, from a gelatine transparency $8\frac{1}{2} \times 6\frac{1}{2}$, enlarged with Ross's ordinary symmetrical full-plate lens. The enlargement was very fine and sharp to the edge. He also explained a new idea for a camera-stand which was not quite complete, but will be fully described when finished. It will be of great advantage and convenience to travelling photographers.

Several places of interest were mentioned by members for tours and summer excursions, and the meeting was adjourned.

Correspondence.

BURNISHING AND SOME OF ITS TROUBLES.

To the EDITORS.

GENTLEMEN,—Your correspondent, "Perplexed Jack," in a recent issue of THE BRITISH JOURNAL OF PHOTOGRAPHY, complains of the spotting coming off his prints in burnishing, and as you say many complaints are made I am glad to give this simple remedy.

Prepare the following:—Before retiring to rest put half-a-sheet of glue, broken up, into a saucer of cold water. The glue I used I believe is called "fish glue." It is thin, darkish-coloured, with diamond-shaped string marks on it; but I believe ordinary carpenters' glue will answer just as well. In the morning pour the water off and put the swelled glue into a cup in the oven to melt. When melted add half-an-ounce of methylated spirit and fifty drops of glycerine to half-a-teacupful of the melted glue. The glycerine is to prevent the glue from chipping off the polished surface. When this is cold it is ready for use.

Burnishing prints has introduced two difficulties:—First, if the prints are spotted before burnishing this modern polisher will remove the work, however cleverly done; and, second, it is simply tantalising to try to spot on the highly-glazed and soaped surface. Now for the remedy:—Get your palette and place upon it a little of the cold glue. Take a brush without colour and rub on the glue until you feel the brush has taken up a little of it, and pass it over the spots, not confining your touch strictly to the spot, as, if it go an eighth of an inch round it will not matter, as it dries glossy, although it looks dead when put on. Treat a dozen or two in this way, or all the day's spotting if you like; then spot the prints in the usual way with gum and colour, keeping one brush for the glue and one for the spotting colour.

The two colours I find useful for all kinds of tones are Indian red and lampblack. I also add a few drops of glycerine to the gum I use. It will be found that the prints take the colour just as kindly as in the days when an ordinary rolling-press was considered to give sufficient gloss.

Let me ask spotters to try this upon a large spot, when they will readily notice an end of all burnished print-spotting troubles.—I am yours, &c., ALFRED E. DIGHTON.

58, *Wellington-street, Doncaster, March* 5, 1883.

IODIDE IN GELATINE EMULSION.

To the EDITORS.

GENTLEMEN,—In reply to Mr. G. S. Penny's last letter, allow me to say that the amusing *non sequitur* arises from his own interpretation of the case in point. I should interpret it otherwise.—I am, yours, &c.,

March 12, 1882. W. DE W. ABNEY.

"PLEASED WITH HERSELF."

To the EDITORS.

GENTLEMEN,—When I showed you a copy of this picture it was with a few others I had taken in a bedroom at St. Leonards, and I appear to have left with you the impression that this picture—which you have so well reproduced—was also taken there. Such, however, was not the case. I took it here, and had my daughter for my model.—I am, yours, &c., WILLIAM ADCOCK.

Melton Mowbray, March 10, 1883.

"WANTED: A PRINTING PROCESS."

To the EDITORS.

GENTLEMEN,—An improved printing process is badly wanted, and it seems strange that chemical experts should have wrought such important changes in negative processes, and yet left us as we were twenty years ago as regards permanency and simplicity in printing the final and most important results of all our work.

Suppose we look at the situation from the standpoint of the very large section of the photographic public who are daily working some printing process upon which must depend their living—to whom *time and simplicity of production* mean "hard cash," as well as relief from annoyance and expense; and also from the view of the large class of amateurs who would gladly hail any relief from the present tedium of toning, fixing, and *prolonged washing* of their prints.

Now, what do we want? Certainly the one process which will yield *rapidly* from the negative direct one to a dozen prints with the shortest possible exposure in the printing-frame, and the simplest after-processes of fixing, washing, &c. In looking round the various well-known methods we must first of all discard the beautiful gelatine pictures produced by the Woodburytype, stannotype, colloglyphic, and other similar processes, because they are only available to operators who require a large number of prints of any one subject. The labour and *expense* of producing the *first proofs* put these processes out of the category of the requirements of ordinary professional and amateur workers, and we are obliged to turn to processes where each print is produced direct from the negative. Our old friends, "silver chloride," "carbon tissue," and the newer one, the "platinotype," seem to be the only processes available.

It is only waste of time and space to consider the evanescent qualities of silver prints. Only think of the hundreds of tons of paper pictures produced by this process, and the time, energy, and taste spent upon them, *all to disappear eventually*—probably within the lifetime of the persons who produced them! This is the great fault of silver prints. If we could only establish their absolute permanency it would take something very good indeed to drive them out of favour with the photographic world; but I fear that is hardly to be expected, and if we desire to produce *really permanent* pictures we *ought* to discard it for some other process giving such results.

"Carbon tissue" is good in itself, but it is very uncertain in result of exposure in the printing-frame; it is troublesome in double transfer, and "messy" in working. You cannot judge *by sight* what is the result

exposure before removing the print from the negative; hence many ures and dissatisfaction.

'Platinotype" appears to be the chief hope for the future. It wers our requirements as regards speedy exposure under the nega- e, power to tell in a great measure by actual sight to what extent printing strength has gone, and the processes of development, ing, and washing are as rapid, simple, and certain as one need expect y chemical process to become, or we can reasonably ask for one to be de. Chemists tell us the resulting pictures are absolutely permanent, d, judging by the character of the metallic base, they ought to prove

Here, then, we have mainly what we require. But it is not an mixed satisfaction. Editors and artists write about educating the blic up to the standard of approval of the colour and surface of atinotype pictures as now produced. I do not believe that any nount of argument will convince the general public that they are in y way equal in appearance to good silver prints. It is waste of paper try, and of time to wait, for such a result; and it is better to try to eet with public approval by *alteration of the process, if such be prac- able.*

Personally I admire platinotype pictures exceedingly for certain subcts. They are very artistic in general effect, and, what is of considerle importance in the hands of any person of artistic feeling who can e with judgment the sable pencil and Indian ink upon them to *soften wn* spotty and obtrusive high lights, the power of improving the breadth of effect" in nearly every photograph printed is very great d very pleasant to hold. The tone is so exactly that of Indian ink, d the "matt" surface so good to work upon, that it is almost imssible to detect or to remove the touches. This cannot be said of lver prints on albumenised paper.

But, to my mind, the process has *two main* and *important defects,* d it is in the hope that Mr. H. B. Berkeley, or other promoters of e process, may think it worth while to try to remove these that I enture to trouble you with this letter. First: the cold *greenish-black* nt of the existing "platinotype" is to many persons positively objeconable. If it had the *rich velvety black* of the ink used by printers of chings it would be better as a black tone, but most people object to lack at all as the tint of a photograph; and from my own experience I now many cases where persons of decidedly good artistic taste have aid, after seeing duplicate prints from the same negatives, both ortrait and landscape, in platinotype and silver—"Oh! I much refer the silver pictures!" and there is no other course open except o set aside the platinotype and proceed with the silver, knowing all he while that they will fade away, whilst the others would be ermanent. For some subjects—portraits and groups—the black prints re very nice, but not for landscape. Second: there is a great want of *ichness* and transparency in the *tone* of the *masses of deep shadows* in ll platinotype prints I have seen. Compare duplicate prints from the ame negatives in silver and platinotype, and see how comparatively lat and "mealy" the shadows are in the latter prints. I would like to dopt the process for landscape printing, but this defect deters me and rives me back upon the silver prints.

Now for the remedies, if they can be found. First, as to tone: is t possible to obtain a warmer tone by any alteration in the chemical onditions of preparing, sensitising, or developing the prints? We nust look to the experts in the chemical branch of the science to prouce this, *if it be possible.* If not, we must do with it as it is and ccept the inevitable; but I would suggest that, if it could be altered o as to produce a warm tone like sepia or bistre water-colour drawings, t would be excellent for landscape work, and might prove an alternative hoice for portraiture also. Artist etchers are now largely using the epia tone of ink for printing etchings, and it is a great improvement on he old black tone.

Again: for flatness of surface and want of richness in the shadows, c., it is all very well to argue that the existing tone is very good and rtistic and gives satisfaction to many workers. I do not deny that; I nly say—"Give us an alternative to choose from." No doubt the Platinotype Company are anxious to forward the process in every way. t is their business as a company to sell as much material as they can nd make it a financial success; and if they will only meet the wishes of he public for something still better, in addition to what they now offer, will go a long way in promoting their success.

The process largely resembles in effect the old plain paper silver rinting process, and the want of richness in the shadows is due to the ame cause, namely, that the deposit forming the picture is largely bsorbed by the body of the paper. Would it be possible to prepare a ne-grained paper with a coating of gelatine or Iceland moss of medium ubstance to hold the chemical salts? It would give only a *semi- istrous* surface—not so "matt" as plain paper, and not so bright as lbumen. It would be inert as regards the action on the chemicals, but ould *provide the medium for richness in the shadows* now complained of s wanting. This mechanical effect ought not to be difficult to produce, nd I think, if attained, would make the process very attractive, and night revolutionise the ordinary process of printing amongst photoraphers, professional and amateur. We should have a quick-printing nd easily-worked process, with the certainty of permanency, and the one such as both workers and the public have long been accustomed o.

Will you kindly give your readers an early editorial article on the subject? and if Mr. Berkeley will also give his opinion as to probabilities it will no doubt be acceptable to many a photographer besides,—Yours, &c., LUX.

March 13, 1883.

A QUESTION OF COPYRIGHT.—In the Queen's Bench Division of the High Court of Justice, on Wednesday last, the 14th instant, the case of M'Lachlan *v.* Agnew and Co. and Others came on before Justices Cave and Day, sitting *in banco.* The action was brought by a photographic artist in Manchester against Messrs. Agnew and certain other gentlemen for an alleged breach of copyright. Mr. M'Lachlan many years ago conceived the idea of executing a large picture to comprise portraits of all the members of the Royal Family, to be called *The Royal Family at Windsor.* After having worked at it for some time Mr. M'Lachlan, finding that he had not sufficient capital to complete and publish the work, in 1875 applied to Sir Joseph Heron, one of the defendants, for assistance. At the request of Sir Joseph Heron, Mr. King, the then mayor of Manchester, called a meeting, and as the result these two gentlemen, with twenty-two others, agreed to guarantee £100 apiece to enable the plaintiff to complete the picture and issue copies. Towards the close of 1877, when the picture was nearly completed, it was found that considerably more money than was guaranteed would be required, and accordingly the plaintiff, by way of security, assigned the picture by deed to some of the defendants as trustees for the guarantors, giving them power to exhibit the picture, to publish copies of it, and, after reimbursing the guarantors, to pay the balance to Mr. M'Lachlan. The deed contained no express assignment of the copright, and the plaintiff contended that this deed gave the trustees power to publish, but not produce copies—in other words, that they could only publish copies produced or approved by the plaintiff. Upon the execution of the deed the trustees made arrangements with Messrs. Agnew to publish the picture, and, with the knowledge of the plaintiff, made terms with the Autotype Company to produce copies. When these copies were finished the plaintiff objected that they were not satisfactory, and in consequence a new set were executed by the Autotype Company. These also the plaintiff objected to, and, in fact, alleged that none of the copies produced by the Autotype Company were equal to those produced by himself, and claimed that the trustees had no right to publish any other without his consent. The defendants, the trustees, and Messrs. Agnew continued to produce and sell these copies, notwithstanding the plaintiff's objection. The plaintiff accordingly brought his action for damages and for an injunction. The matter now came before the Court upon an application on appeal from Chambers for an interim injunction until the trial of the action.—Mr. Gore, Mr. Johnston Watson, and Mr. Rosenthal appeared for the plaintiff; Mr. Matthews, Q.C., and Mr. Shiress Will for the defendants.—Mr. Justice Cave, in giving judgment, said that the plaintiff had not made out such an overwhelming probability of success in the action as to entitle him to an injunction at this stage. His Lordship refrained from giving any expression of opinion as to the meaning of the agreement. The decision at Chambers was accordingly upheld, with costs against the plaintiff. Mr. Justice Day concurred.

EXCHANGE COLUMN.

Wanted, an exterior background in exchange for pedestal and other articles.—Address, D. BLAGURE, 73, High-street, Lewes.

Wanted, three-wick lamp for magic lantern, in exchange for two new chromatropes, or offers.—Address, F., 16, Berkley-square, London, W.

Wanted, Ross's quarter-plate portrait lens, in exchange for a sciopticon or magic lantern useful for enlarging purposes.—Address, A. LEE, 4, Cleveland-terrace, Bath.

I will exchange a half-plate bellows camera and lens for a quarter-plate repeating-back bellows camera and lens.—Address, A. HOPKINS, 1, Cotton-buildings, Exeter.

Wanted, Lerebours' whole-plate lens, with front stops, in exchange for a good burnisher. State particulars.—Address, J. M., 2, York-street, Covent-garden, London, W.C.

I will exchange an 18 × 12 rolling-press for Ross's half-plate symmetrical lens or half-plate portable bellows-body camera with dark slides.—Address, G. VART, Bishop Auckland.

I will exchange a capital telescope, thirty inches long, for a whole-plate or 10 × 8 landscape lens, or anything useful in photography.—Address, PHOTOGRAPHER, St. Merryn, Padstow.

I will exchange a pair of microscopic lantern fronts, high and low powers, new and perfect, and a gas bag 36 × 30, for lantern slides.—Address, THOMAS GULLIVER, Brunswick-street, Swansea.

I will exchange a good whole-plate French lens for a studio camera or posing-chair, with two or three backs; must be in good condition.—Address, A. J. BROWN AND SON, Halstead, Essex.

I will exchange an electrical machine, size of cylinder 12 × 10, brass conductor, on mahogany stand, cost £5, for a Solomon's enlarging camera and lantern, or for anything useful in photography.—Address, S. GREEN, 285, Liverpool-road, London.

I will exchange a nearly new 8 × 5 rapid rectilinear and case of stops, by Laverne, for a six-inch portable symmetrical and ten shillings, or offers. Approval.—Address, S. GILBERTHORPE, Spring-bank, Ripon.

I will exchange a gem camera, nine lenses, Victoria camera, four lenses, hot rolling-press, bed 7 × 12, for a studio camera, 10 × 8 symmetrical lens, or accessories.—Address, S. B., 2, West-street, Fleetwood.

I will exchange a quarter-plate camera, tripod, and lens, dark slide, &c., would suit a beginner, for a posing-chair with double backs, or a good background, interior or exterior, with roller. Send photograph.—Address, FRED. RUBBRA, photographer, Stony Stratford, Bucks.

I will exchange Meagher's tourist bellows-body camera, for plates 7½ × 5, swing-back, endless screw motion, single and double dark slide, &c., for either a whole-plate universal camera of any good make, symmetrical lens, or photographic accessories. — Address, CHAFFIN, Sherborne, Dorset.

I will exchange a seashore background, by Reeves and Hoare, two others, seashore and landscape, *carte* cameo press, two and three-quarter diameter and six-inch focus Burr's lens, quite new, and rustic fence, for Cadett's pneumatic shutter or anything useful.—Address, GORDON T. ALLEN, photographer, Ramsgate.

I will exchange twelve dozen *passe-partouts*, 10½ × 8½ outside measure, with half-plate openings, oval, dome, and cushion, eighteen quarter-plate printing-frames, six 5 × 4 ditto, two 10 × 8 ditto, six 12 × 10 ditto, and three stereo. ditto. Wanted anything useful in photography.—Address, W. WALKER, Noel-street North, New Basford, Nottingham.

I will exchange the *Royal Natural History*, by Dr. Andrew Wilson, in six parts, each part cost six shillings, beautifully illustrated and perfectly new, also Carpenter *On the Microscope*, latest edition, first-class order, and part cash, for a Marion's academy camera for plates three and a-quarter inches square. — Address, J. S. MENZIES, Victoria-place, Perth, N.B.

I will exchange a twelve-inch square mahogany camera, draw twenty-four inches, dark slide, all perfect, and camera studio stand, also quarter-plate Lerebours' lens, and Ross's view lens, eighteen inches focus. Wanted, half-plate bellows-body camera, two backs, posing-chair, or furniture for studio, and folding tripod stand.—Address, J. DRIVER, 65, St. Matthew's-street, Ipswich.

What offers in exchange for a capital double-geared rolling press, steel plate 11 × 8¼, folding tripod, six-inch bronze head, 12 × 10 mahogany case water-tight bath, dark tent on three wheels, developing and changing box, tent up to 12 × 10, two pneumatic holders, and a quantity of wet-plate apparatus? Wanted, a portable tourist quarter- or half-plate camera, swing back, with three or more double backs.—Address, J. C., 51, Burgate-street, Canterbury.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

THOMAS EARP and "GREY FOG."—Received. In our next.

LUX.—The Woodburytype or a similar process would, no doubt, give a more pleasing result, but for obvious reasons the one adopted is more suitable to the purpose.

YOUNG FERRO.—1. Filter, render slightly alkaline, and then sun the bath; if after refiltering and acidifying it does not work convert it into chloride.—2. The cuttings are not worth the trouble of saving.

THOMAS.—The cause of the cotton dissolving in the acids is that they have been too weak or the temperature too high. Probably the latter was the reason. In future omit the ounce of water, and we have no doubt you will succeed.

D. STRATHEARN.—1. The best work for you to study is the Autotype *Manual*.—2. *Retouching*, by Burrows and Colton, but the work is now out of print. You might possibly be able to procure a copy second-hand. —3. In the general acceptation of the term, No!

C. B.—Supposing the varnish with which the negative is coated is a spirit varnish, it may be removed by soaking the plate in strong methylated spirit. If you find a difficulty in getting it to dissolve, try the effect of warming the spirit and gently rubbing the surface with a pledget of cotton wool.

F. G. P.—1. The cause of the stains is clearly hypo.; but whether it be from imperfect washing of the prints or is contained in the mounts we are unable to say. The blotting-paper appears to be clean enough.—2. The print is an ordinary silver one. We are unable to inform you who is the publisher.

IODIDE.—The cause of the fogging appears to be light in the dark room during the development or while the paper was being exposed. You must bear in mind, when employing iodised paper in enlarging, that all care as regards light is necessary, as it is in the manipulation of collodion negatives.

ABRAHAM.—All solutions of shellac are turbid when first made—some more so than others. If you allow the solution to stand for a week or two the sediment will subside to the bottom of the bottle, and the clear portion may then be decanted. The subsidence may be much facilitated by keeping the solution in a warm situation.

G. R. CARD.—The brand of gelatine is a matter of taste; a mixture of equal parts of the two you name will answer the purpose admirably. The standard quantity per ounce is twenty grains, but this may be varied according to the "hardness" or otherwise of the sample employed. Ten grains of each of the two kinds mentioned in an ounce of emulsion will give a good consistency.

S. BOWDEN.—The quarter-plate portrait lens, by all means. The portable symmetrical will be quite useless for lantern purposes, whatever distance you may be able to get from the screen; that is, if you wish for good illumination.

S. J. W.—A single lens of twelve inches focus will answer your purpose quite as well—or, indeed, better—as a compound. But if you require it for copying or architectural work then a compound will be necessary; one of ten inches focus will suffice.

W. W. LEWIS.—If you thoroughly clean the plates employed for collodion negatives you may, without fear, use it again for gelatine plates. The best method of cleaning it is to soak the glass in a strong solution of American potash until the films are loosened, then well wash under the tap, and afterwards put them in dilute sulphuric acid for a few hours; again well rinse and dry. Polish as usual.

FORESTER.—1. The object of the alcohol is to keep the pyro. from decomposing when in solution; its addition to the second solution is to render the mixture of the two more easy and rapid.—2. One part of the *eau de javelle* in ten or twelve of water will be a suitable strength. The gentleman you name is, we believe, at present abroad.—3. Both the ALMANACS are out of print.—4. The plate does not require re-fixing.

COLESWEGEN.—The only method of separating the two salts is by their different degrees of solubility, the sulphate being much less soluble than the oxalate. You will not, however, in this manner get a chemically pure oxalate, but by the exercise of a little chemical skill the greater portion of the sulphate may be removed. The galvanic method of removing the iron from the spent developer is interesting, but scarcely so convenient as the potash plan.

J. W. KING.—You will have to make the gelatine sheets for yourself, and then you can have them any thickness you desire. Mr. Woodbury uses Nelson's amber gelatine. By leaving the gelatine in the solution of bichromate of potash long enough it will be sensitised throughout its entire thickness, and not on its surface only, as you surmise. Without knowing more of your method of working, or what you require, we are afraid we cannot render you further assistance.

RECEIVED.—W. Harding Warner; W. T. Wilkinson. Thanks. In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—On Wednesday next, the 21st instant, the subject for discussion will be *On Methods of Filtering Emulsions and Coating Plates.*

THE PHOTOGRAPHIC COPYRIGHT PROTECTION ASSOCIATION.—A meeting of gentlemen interested in the enforcement of the Photographic Copyright Laws was held at the rooms of Messrs. Elliott and Fry, 55, Baker-street, on Wednesday evening last. Members of most of the leading firms who largely issue publication portraits of celebrities were present, and it was decided to associate themselves for the purpose of suppressing piracy of their works.

GOOD FRIDAY.

OWING to our usual day of publication next week falling on Good Friday we shall go to press a day earlier than usual, and publish on THURSDAY next, the 22nd instant. Advertisers and correspondents will please bear this in mind.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician
For two Weeks ending March 14, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M

March	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
1	30·38	NE	48	46	—	50	44	Cloudy.
2	30·63	E	42	39	—	47	38	Overcast.
3	30·69	E	39	37	—	51	32	Hazy.
5	30·62	E	36	35	—	54	30	Foggy.
6	30·21	N	39	37	—	43	32	Cloudy.
7	30·30	N	31	—	—	48	26	Very Cloudy.
8	29·75	N	29	—	—	36	23	Cloudy.
9	30·01	NE	28	—	—	37	22	Cloudy.
10	29 90	NE	27	—	—	39	22	Cloudy.
12	29·80	N	31	33	—	40	25	Overcast.
13	30 03	N	31	—	—	46	26	Overcast.
14	29·75	N	36	35	—	60	28	Overcast.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1194. Vol. XXX.—MARCH 23, 1883.

THE HYPO. FIXING BATH.

ʟ RATHER interesting question to those who employ dry plates ırgely has been revived by Mr. W. Harding Warner, as to whether ; is possible or advisable to employ the same fixing bath of hypo. ıntil it has become discoloured and saturated with salts of silver. ʌ word may here be said with regard to the term "saturated" as hus applied, for it appears to have been assumed by Mr. Warner hat the same bath may be employed for an unlimited number of ılates, or that it will still retain its fixing powers after the hypo. it ontains has dissolved its full quantity of silver bromide. This is so ıbviously an impossibility that we mention it merely to suggest hat Mr. Warner's proposition points clearly to an old and dis-ːoloured bath which is strengthened by the addition of fresh hypo. ɪs it becomes spent. The real question, therefore, is whether the ıse of a *discoloured* bath is permissible.

That such a bath may be—and, as a matter of fact, by a large ıumber of operators is—used daily without any immediate ill effects being apparent in the negative can scarcely be disputed; but the point to be argued is whether negatives so fixed are as permanent and as free from liability to subsequent injury as those fixed in perfectly-fresh hypo. This can only be satisfactorily settled by a careful comparison of the results of both systems—a comparison which, to be of value, should be extended over some time in order to ascertain whether exposure to light or moisture, contact with silvered paper, or the presence of deleterious compounds in the film itself, render the use of the old solution more dangerous than the comparatively fresh. We have ourselves almost invariably made a practice of employing the same fixing solution over and over again, merely strengthening it when its action becomes slow and filtering it when muddy. We are not, therefore, in a position to speak from practical experience of the difference between new and old baths; but we may point out one or two theoretical matters which should be borne in mind.

In the first place, we have to consider the change that occurs in a bath of hyposulphite of soda when employed for the purpose of fixing, or dissolving out the unaltered silver haloids from photographic films. If we take the familiar case of fixing a silver print—in which all chances of outside complications are removed by the copious washing the print undergoes before entering the fixing bath—we have a simple solution of the unaltered chloride of silver by the hypo. This, in the case of a strong fixing bath, results in the formation of a double hyposulphite of soda and silver and chloride of sodium, thus:—

$$\underbrace{Ag\,Cl}_{\text{Chloride of silver.}} + \underbrace{Na_2\,S_2\,O_3}_{\text{Hyposulphite of soda.}} = \underbrace{Na\,Ag\,S_2\,O_3}_{\text{Hyposulphite of soda and silver.}} + \underbrace{Na\,Cl.}_{\text{Chloride of sodium.}}$$

This double salt is the compound which remains in the pores of the paper and gives the intensely-sweet taste to the droppings from partially-washed prints, and which it is so important to thoroughly remove. If a too weak solution of hypo. be employed, however, another double salt is formed, of which the following is the formula—$Na_4\,Ag_2\,(S_2\,O_3)_3$, and which is insoluble. This it is that causes the yellowish mottling which soon makes its appearance upon imperfectly-fixed prints.

It will be seen, therefore, that it is absolutely necessary not only to wash the prints thoroughly after fixing, but also to employ a fixing bath of sufficient strength to form the soluble double salts; otherwise in either case a sulphur compound of silver will be left in the print which, under the action of light, moisture, or deleterious fumes, will be decomposed and deposit its silver in the form of sulphide, causing the unsightly yellowing and fading of the picture which are only too well known.

Such being the action of hyposulphite of soda upon the chloride of silver print it is not by any means difficult to trace an analogy between that and a gelatino-bromide plate, though with the latter we may probably find other causes at work to alter the result. First of all there is the discolouration of the negative fixing bath to be explained, and we may stay to consider to what that is due. It is well known that, though the fixing bath for prints is never employed for that purpose a second time, yet a very large number of prints may be fixed in it without causing discolouration. Again: a solution of hypo. may be saturated with pure silver chloride or bromide with very little change of colour, yet a negative fixing bath becomes discoloured more or less after a very few negatives have been passed through it. This is, in the first instance, due to the imperfect removal of the developing solution from the film. Probably, were the film *perfectly* washed before fixing no such change of colour would ensue; and if such a course were practicable it is possible the bath would remain colourless, or nearly so, for a long time if protected from the atmosphere. By "perfectly washed" we mean thoroughly washed in pure water. The alum bath applied before fixing is undoubtedly a great assistance in removing the discoloured developing solution from the film; but any traces of it allowed to remain, especially if it be acified, would act even more injuriously than the developing solution, by decomposing the hyposulphites in the fixing bath. If free acid be added to a solution of pure hypo., sulphur is precipitated; if the same addition be made to hypo. that has been used for fixing, sulphide of silver is thrown down in greater or less quantity in proportion to the amount of use the bath has seen. Then, again, alum, as we know, decomposes the hyposulphites, producing similar results, so that we can see how the gradual introduction of that substance into a fixing bath charged with silver will cause its discolouration by throwing down the brown sulphide of silver, mixed most probably with free sulphur

What has been said with regard to the discolouration of the bath itself applies equally to discolouration of the film, though as the negative is not subject to repeated doses alternately of alum and hypo. the effect is not so immediately palpable; indeed, a negative unwashed after leaving the hypo. bath may be dipped immediately into alum and acid without showing any appreciable discolouration. But the question narrows itself into this—Is such a course entirely devoid of danger? We are inclined to think that it is not only *not* devoid of danger, but that it is dangerous in the highest degree; for, surely, if the presence of sulphur compounds of silver in a paper print forms a source of fading and change, it is only reasonable to believe the same compounds will be at least equally injurious in a gelatine film. Though the evil may not be at first apparent, let the negative be submitted to other treatment, containing as we will sup-

pose it to do, an inappreciable quantity of the dreaded sulphur compound—be it hyposulphite of silver and soda from imperfect washing, or of sulphide from injudicious use of alum. Let such a negative be intensified, or let it be placed in contact with moist silvered paper, or even let it be stored away: we venture to say that the chances of danger are far greater in the case of a negative fixed in an old bath than where the fresh solution has been used. One other danger in using an old fixing bath lies in the probability of forming the insoluble double salt of the solution if allowed to become too weak.

If a negative be accidentally left for some hours in a new hypo. bath the only result will be a general weakening of the image; but if the bath be old and discoloured the film will be badly stained in addition. We have seen a negative entirely ruined in this manner by a couple of hours' soaking.

To sum up: we hold that though the old bath of hypo. *can* be used, it requires far greater care to be devoted to the treatment of the negative at every stage; and it rests with the operator to decide whether the saving of hypo. is worth the risk he incurs.

EQUALISING THE FOCI OF DISSIMILAR LENSES.

In taking stereoscopic pictures with a bi-lens camera it is imperative that the lenses should be identical in foci, otherwise the pictures when combined in the stereoscope will not appear sharp and crisply defined. This is owing to the image formed by one lens being different in size to that formed by the other. If a first-class optician be dealt with there is no difficulty whatever in obtaining lenses which are accurately paired, whether they be of the single or compound form. It frequently happens, however, with second-rate instruments (particularly those of foreign manufacture) that, although they may be sold as being identical, they are not really so; for, although the foci if measured from the back combinations to the ground glass are the same, still the size of the images yielded by the two may be totally different. It is the equivalent and not the back focus which has to be considered when matching lenses for stereoscopic work.

At the period when the stereoscope was so much in vogue we know it was the custom with some dealers who then supplied photographic apparatus, when a pair of portrait lenses were required for stereoscopic pictures, to take a number of quarter-plate French lenses and focus them one by one on the ground glass of the camera, and when two were obtained which, when racked out to the full extent, gave the image sharp without further adjustment it was considered they had a "pair of lenses." So they had, so far as the back focus was concerned, though there might have been a considerable difference between the equivalents, and, consequently, between the size of the images produced by them. In the case of single lenses of the ordinary landscape form the case is different, as, if the back foci coincide, then the images will be of the same size.

Now, the adjustment of the foci of two dissimilar compound lenses is by no means a difficult undertaking, neither does it require a considerable amount of skill to accomplish, as we shall presently show. Those not conversant with the subject may imagine that to shorten or lengthen the focus (say of a portrait combination) the curves of the lenses themselves must be altered. Such, however, is not the case—that is, when the alteration required is within reasonable limits.

Let us now imagine that we have a couple of lenses of the quarter-plate size, and that we wish to employ them for taking stereoscopic pictures, and also that the images produced by them are dissimilar in size. How are we to proceed? Before answering this query we will digress for a moment in order to explain the principle on which the adjustment depends, so that the subject may be the better understood by those of our readers who may not be conversant with the laws of optics. If we take a couple of plano-convex lenses—say of ten inches focus—the front components of the two portrait lenses in question will answer (such happens to be the exact focus of the fronts of a pair now before us), and mount them with their plane surfaces in contact, we shall have a "combination" the focal length of which is just five inches; that is, the size of the image obtained with it will be equivalent to one given by a single lens of that focus. Now, if instead of mounting the lenses with their surfaces in contact we separate them a certain distance—two or three inches, for instance—we may conveniently do this by placing one in the usual position in the mount and the other in the place of the ordinary back lens, and we shall then find that the image produced by the combination thus arranged is no longer the same size as when the surfaces were in contact, but it is larger. Supposing the lenses to be three inches apart, the image will be equal in size to that yielded by a single lens of six inches focus (nearly). If they be separated six inches the image will then measure the same as that of a single lens of a little over seven inches focus, and so on in proportion to the separation.

From what we have said it will be seen that we have the ready means of altering the focus of any compound lens, of whatever form it may be, simply by lengthening or shortening the tube of the mount so as to bring the components of it nearer together, or placing them farther apart, as the case may be.

With this explanation we will now direct our attention to the two lenses we are desirous of adjusting. These we will assume are similar in construction, and if by chance they are by the same maker it frequently happens that by unscrewing the cells a few times at each end of the mount of the one which gives the smallest image the foci of two may be equalised. In the present instance, however, we shall assume that a greater difference than this is necessary—let us say half-an-inch. How shall we proceed? Shall we shorten the tube of the one this amount, or shall we lengthen that of the other to a similar extent? As the correction of all photographic lenses (as we have many times explained in these columns) is but a series of compromises, therefore, if a lens be corrected so as to give the maximum of advantages when issued by the maker, any alteration that may afterwards be made to it must be one of deterioration; hence it will be advisable to, so to speak, "split the difference"—shortening the tube of one a quarter of an inch and increasing the length of the other to a like extent. The thread into which the lens cells screw are generally cut sufficiently far into the tube to allow an eighth of an inch or more to be removed from either end of it without causing inconvenience in use. The thread on the cells also is generally sufficiently long to permit of their being unscrewed an eighth of an inch, and frequently more, without the risk of their falling out of the tube.

When it is found, upon the images being focussed in the camera, that unscrewing the cells will allow of sufficient adjustment, we shall see at once how much one tube has to be shortened and the other lengthened. If it will not, we proceed as follows:—Leaving the cells of the lens giving the smaller image (which we will call "A") unscrewed as far as possible, we take the other (which we will term "B") and having removed the glasses accurately measure the length of its tube. We now cut an eighth of an inch from the posterior end of it. This is best done in a lathe, if one be at command; if not, a file carefully used will answer the purpose. When this is done the lenses are replaced in the tube, and the images again compared by focussing a distant object of large size on the ground glass. If they now coincide we note how much the length of the tube obtained by the unscrewing of the cells of A exceeds that cut from B; if it be (say) one-eighth of an inch then we must take a little more off B's tube and test again. Each time of testing, the cells of A must be screwed a little nearer home, until we find that the length which has been cut from B is just equal to the lengthening of A. When this is arrived at we must get a piece of tube of this length made to screw into the mount of A, so as to permanently lengthen it. We shall then have two lenses accurately paired, and for practical purposes very little if any, inferior to what they were at first. By removing the piece of lengthening tube from the mount of A, and screwing it into that of B, we can at any time restore both lenses to their original and, presumably, best condition.

By making the adjustment as we have described from one end of the tube only the stops will not, theoretically, be in the correct

position; but, when lenses capable of covering the quarter-plate are employed for the stereoscopic size only, in practice this may be totally disregarded.

VARNISHING GELATINE PLATES.

In the remarks we made last week upon the possibility of any reciprocal action between the varnish and the gelatinous medium of the negative itself, we carefully guarded against any misconception by speaking of "dry" gelatine, as it was our intention to bring another phase of the subject before our readers in the present issue. Experienced photographers know that, although a wet-plate negative changes so much in appearance while drying, it may yet be far from a condition of complete freedom from moisture when presenting the well-known "dry" appearance. Just as the whole point at issue in one of the most famous chemical law-suits of modern times turned upon the difference between "dry arsenic acid and arsenic acid dry," as it was wittingly put by a clever poetiser, so a negative may be dry and yet not dry at the same moment. In the trial we refer to it was, of course, a question of chemically-combined water; but in a film of collodion the point is only the perfection of mechanical dryness.

A wet-plate negative apparently dry on a cold or damp day may possess sufficient moisture to retard the complete soaking of the varnish, and, which is of still more importance, to prevent that complete adhesion necessary to prevent cracking or shelling away in the future. If such be the case in a collodion film, which so readily allows the passage of vapour or liquids through its pores, it can be very easily imagined that a gelatine negative which from first to last is to the old wet-plate worker a complete worry owing to the time required for the various processes it passes through, will often enough be treated as dry when there yet is some considerable amount of water lurking within its substance. A gelatine plate takes so long to develope, fix, wash, and, finally, to dry that it is small wonder if it is often hurried to varnishing before the moisture it contains is entirely driven out.

The consequence of this it is not difficult to foresee. In some cases (the rarest) the negative will run; in others there will be a partial union between varnish and gelatine, which will not permit the former to attain its customary state of hardness and toughness. The remedy against such a condition of things is, of course, to see that the negative is so treated that the presence of moisture may not even be possible. If the plate be well heated after becoming apparently dry for a short time before applying the varnish there will be little fear of evil from such a cause, however long the negative may be kept. A further safeguard, too, will exist by the treatment with alum, which so many negatives are now put through after fixing.

Lest it may be thought that too much stress is being laid upon an apparently unimportant matter, we may, in addition to the fact of instances of this kind having been brought under our own notice, point to a well-known property of alcohol. It is a sufficiently familiar fact that gelatine is soluble in a mixture of alcohol and water of considerable strength, and the greater the heat the greater the amount of gelatine that can be held in solution. An incompletely-dried gelatine film supplies the water, and the varnish, in some conditions, the spirit, the almost necessary result being the solution of the gelatine negative or a part of it when the heat is strong, the plate not quite dry—or "bone dry," as some operators term it, though bones by no means dry naturally—and, above all, when the varnish is weak.

A consideration of these principles has enabled us to diagnose a very singular affection showed in some gelatine negatives of portrait subjects taken a little while ago. These negatives were, when first taken, singularly sharp and clear, and, in fact, generally excellent. The prints taken from them quite belied their first promise, the outlines and the leading markings of the features being peculiarly altered, the dark lines having a kind of light lining to them. "Undue prevalence of moisture" was the first verdict, but we were assured that the negatives were thoroughly dry before the varnish was applied. As this work, however, was usually performed by an assistant, we had to take the statement for what it was worth, as such slight differences in the hygrometrical condition of the film as we have alluded to would not possibly be appreciated by any but a practised and experienced hand. The appearance was only of occasional occurrence, and this rendered it more difficult to detect the cause, but finally we were able to succeed.

We have reminded our readers of the extent to which gelatine is soluble in strong spirit and water, and the case we are describing, when all the circumstances were considered, seemed fairly to resolve itself into an instance of the kind. The mishap was found to be produced only on the occasions when a very thin sample of varnish was being employed, and we have little doubt that the same thing may have happened to many of our readers with the prevalence of similar conditions. Here we have a solution of a resin in spirit of wine (which in all probability contains the fullest allowable proportion of water to start with); the varnish is used many times, but it becomes thick, when, in consequence, the original proportion of water present increases as the spirit evaporates. Upon the addition of an extra proportion of spirit for the purpose of dilution the original amount of water per ounce naturally increases. When, next, this thin varnish is used to varnish a gelatine negative with, the proportion of spirit to water decreases to such an extent that before the liquid has thickened up by evaporation it still remains sufficiently mobile to attack, soften, and partially melt the surface of the gelatine.

We have one or two of the pictures on view at our office in York-street, and shall be happy to show them to any photographer, some of whom may possibly recognise the defect and be glad to learn its cure or prevention—that is, to see that the negatives are perfectly dry; that when diluting the varnish the dilution be not carried to such an extent as to make it too thin; and, finally, that in making varnish, and also, especially, in diluting it, nothing be used but the strongest pure or methylated alcohol procurable.

In another column Mr. C. Beckett Lloyd gives what promises to prove an extremely useful method of filtering gelatine emulsion with rapidity. The principle is not a new one, having been well known to, and used by, chemists for a long time; and it is, as Mr. Lloyd suggests, remarkable that so simple a plan has not been adopted for emulsion purposes before this. We have personally tried the principle in a variety of ways and find it most efficient; and we are confident that it will be adopted very generally amongst those who are in the habit of preparing emulsions. Owing to our going to press this week a day earlier than usual, as we write the meeting of the Photographic Club, at which the filtration of emulsions is to be discussed, is still *in futuro;* but we hope to have the opportunity at that meeting of demonstrating the simplicity and efficiency of Mr. Lloyd's method.

Grave doubts were entertained upon the introduction, some few years ago, of a new class of photographic objectives in which flint glass only was used, that in course of time the action of the atmosphere upon the denser constituents of the combinations would lead to the gradual destruction of the surface. These lenses, however, have now been sufficiently long in use to enable the supposition to be entirely negatived, and some of the most useful lenses to be found consist wholly of flint glass of two degrees of density.

Such, however, has not been the fortune attendant upon other instruments, non-photographic; for the old object-glass of the Paris Observatory—never, by-the-bye, a remarkably good one—which was acquired by Arago a little over thirty years ago, has been so acted upon by humidity as to have been put out of use for some years. A new glass has been made for the instrument, and it is spoken most highly of—so much so that no great impatience is shown to have the larger object-glass of almost double its diameter, now in the course of construction, completed.

The large glass is to be ·74 mètre in diameter, while the one just set in place is ·38; but, whether for eye observation or photographic use, it must be remembered that the larger the diameter of the glass

the greater the difficulties attendant upon its use, while the fewer the occasions upon which the atmospheric conditions are sufficiently favourable to allow of its being used at all.

THE usefulness of photography is at the present time being evidenced in Egypt. In Cairo there are numbers of interesting and beautiful monuments of Arab skill in architecture, but they are fast falling into decay and, in many cases, absolute ruin. To preserve the remnants from further destruction and loss a society has been started, which has lately decided that, as a certain amount of Arab work—notably some beautiful tracery—cannot be preserved, it shall be photographed. For the purpose this is a wise decision, as no work of the hand can approach the camera in minute fidelity of representation without exaggeration on the one hand or the sinking of detail on the other.

WE have lately chronicled the exodus of an astronomical party to the remote Caroline Islands to observe the total solar eclipse, and now we have to announce the recent arrival of the last party who went to photograph and otherwise observe the latest transit of Venus, which now seems an almost ancient phenomenon.

SOME time ago we described M. Janssen's photographic revolver for astronomical photography. It is by no means a mere philosophical toy; and at the present time, according to a note presented to the Paris Academy of Sciences, it is being employed to study movements in the photospheric matter. They are also working at photographic photometry, on the principle that the intensities of two light sources are in the inverse ratio of the time they take for the same photographic work (*e.g.*, producing the same tint on two quite similar plates).

M. CHARDONNET, as we have described, has been making some researches on the effect of the ultra-violet rays upon the eye. He asks what becomes of them, and what form is taken by their energy when absorbed. He considers the transformation of energy fatigues the eye, and that in the long spectrum of the electric arc there are so many of these rays that the light is necessarily fatiguing, while with an incandescence light, with its short range, all labour of absorbing useless rays is saved, and the eye, in consequence, is less fatigued. M. Mascart demurs to this view, and thinks the conclusions too absolute. He showed some years ago that the ordinary sight perceives the whole ultra-violet solar spectrum as far as lavender grey, and some eyes see even farther.

AT the March meeting of the Royal Astronomical Society photography played a very important part. Dr. Gould gave an account of his work at Cordova, and showed photographs he had taken. He considered that he had, with the aid of Mr. Thompson's advice, who had to be invalided home, been successful in photographing stars down to the tenth and a-half or twelfth magnitude. Mr. Cummin showed a photograph he had taken of the great nebula in Orion, the appearance of which in many parts gave rise to an interesting and animated discussion, the majority of those taking part in which inclining to the belief that the photograph represented certain unknown dark objects in space.

AN interesting paper on gas-burners was presented to the Gas Committee of the Leeds Town Council some little time ago, and gave information which would be useful to those who wish to make special application of gas illumination in photography. Among the interesting data we note that the argand—almost always looked upon as the *beau ideal* of a gas-burner—is only efficient when the gas pressure is exactly apportioned to its structure. Thus, with the gas pressure too great, it gives more smoke than any other burner, and when too low there is less light-value from the gas than from any other form. Perhaps the item of most use to the photographer will be found in the following paragraph:—"When a very steady, uniform, localised light is desired, and a burner not very sensitive to the effects of dust, the fishtail may be employed; but it gives less light for the gas consumed than the other burners, especially with the smaller sizes."

A USEFUL EMULSION FILTER.

I SEE by a paragraph in the last issue of the Journal that the subject of filtering gelatine emulsion is to be discussed at this week's meeting of the Photographic Club. As I am unable to be present at that meeting I propose to describe in your columns a very simple and convenient method I have employed with success, and trust it may prove as useful to others as I have found it myself.

The filtration of viscid colloid substances—such as gelatine, albumen, and collodion—has always proved a more or less difficult matter to photographers, and many different forms of apparatus have been devised for the purpose of expediting the otherwise tardy operation. These have consisted chiefly of various arrangements by means of which the viscous solution has been forced through the filter under pressure, by pumping air into a closed chamber containing the substance to be filtered. The opposite plan of receiving the filtrate into an exhausted chamber, though scientifically the better method, has not received much attention, owing to the greater difficulty of attaining the required conditions by mechanical means. The plan I am about to describe is, however, based upon the exhaust principle, and requires no mechanical arrangements whatever, nor, indeed, any apparatus that is not to be found in any dry-plate worker's laboratory.

It consists, briefly, of a system of filtration under pressure which is well known to chemists, and which it is rather remarkable that none of our emulsion workers have hitherto thought of utilising. The pressure—or, rather, the "exhaust"—is obtained by means of condensed steam, and in its simplest form the apparatus and general arrangements are as follow:—

Procure a glass boiling flask of suitable capacity, an india-rubber cork to fit, and a glass funnel; this is all the apparatus needful. Pierce the india-rubber cork and slip it on to the neck of the funnel, making the joint as tight as possible. If the funnel be reserved for this special purpose it may be cemented to the cork by means of india-rubber dissolved in benzole. The cork may be pierced by means of an ordinary cork-borer if the latter be kept wet while boring. These arrangements having been made the apparatus is ready for use.

To filter (say) ten ounces of emulsion I use a flask of about twenty ounces' capacity; a larger one is all the better, but a smaller one is of little use. Into the neck of the funnel I push a plug of moistened cotton wool (previously cleaned by washing in weak alkali and afterwards in water) or, better, a piece of sponge. Everything being ready for filtration I introduce into the flask a small quantity—say one drachm—of distilled water, and by means of a spirit lamp or Bunsen burner raise this to boiling point, keeping it there for a minute or two so as to fill the flask with steam. The india-rubber cork carrying the funnel is then quickly and securely inserted into the flask, and the emulsion poured into the funnel.

As the flask cools the steam is condensed, creating a vacuum in the flask, to supply which the emulsion passes through the filter rapidly and steadily. If all the joints are perfectly tight the filtration will continue for a very long time after the flask and its contents have become cold; but, as it is almost impossible to ensure the cork fitting perfectly air-tight, there is, of course, a certain loss by leakage. Otherwise a ten-ounce flask should, when employed in this manner, draw through *nearly* ten ounces of emulsion, as the relative volumes of steam and water at ordinary pressure are as 216 : 1. Practically I find that with a twenty-ounce flask fitted as I have described, and allowing for all loss of power by leakage, I can draw through about twelve ounces of water. In the case of emulsion the result would no doubt be less, as, owing to the greater length of time occupied in the filtration of the more viscid liquid there would be a greater loss of power by leakage. I find, however, that under these circumstances a twenty-ounce flask suffices for ten ounces of emulsion.

This is, as I have said, the simplest form in which the principle can be utilised. There is practically no limit to the variations that may be introduced in order to adapt the plan to any special requirements, whether large or small. Should the introduction into the emulsion of the small quantity of water used to generate the steam be considered undesirable, it may be obviated by using a separate flask as the generator, and connecting that by means of a bent tube and extra cork with the bottle into which the emulsion is to be filtered, always, however, bearing in mind that each joint introduces fresh risk of loss by leakage

C. BECKETT LLOYD.

NOTES ON EMULSION MADE BY PRECIPITATION AND OTHERWISE.

Colour of Emulsion by Transmitted Light.—I mentioned in my last communication that I considered the colour of an emulsion to be the best guide for the length of time which we should boil; and this brings up the question as to the efficiency or otherwise of the colour test as a criterion of sensitiveness. That the colour of an emulsion can alone at no time be taken to prove sensitiveness I am convinced; but, on the other hand, it would appear that using an ordinary formula, and particularly with the boiling process, the advent of the blue modification of the bromide indicates that a certain sensitiveness has arrived.

Moreover, I at present incline to believe that without the presence of the blue or grey bromide there can be no great sensitiveness. It is quite possible, however, that a plate may be sensitive whilst the film appears to be rather red than blue; but it must be remembered that this does not show that a great proportion of the bromide is not of the blue form. A small quantity of red bromide added to a considerable quantity of blue will give the whole a reddish tinge; but, of course, the blue bromide will still be present.

To give an example: an emulsion is made with a large excess of bromide. It is boiled till the blue stage is quite reached. The bulk of the gelatine is added and a portion is washed. The resulting plates show a certain sensitiveness. To the remainder of the emulsion (unwashed) there is added almost enough silver nitrate to convert the large excess of bromide. The result is the formation of a certain quantity of red bromide, and the general appearance of the plates will be reddish by transmitted light. They will, however, be just about as sensitive as the first-made plates, which appeared quite blue. In the case of the latter plates it would probably be said that we had a film red by transmitted light and yet very sensitive. This is, however, not a truly correct statement, because the portion of bromide which constituted the redness is, in all probability, almost inert. It is really the blue bromide which is sensitive.

It is quite probable that many methods of mixing or emulsifying may give a film constituted as the last-mentioned is without our intending or desiring it, and that it is from this fact that we have the difference of opinion as to whether or not sensitiveness may be had in the case of a bromide red by transmitted light. Probably, in all cases where we imagine we have such, the truth is that the sensitiveness lies entirely in the blue bromide which is present. I have myself, using the boiling process, got plates of very considerable sensitiveness which were reddish by transmitted light without taking any particular steps to bring this about.

That in every emulsion made by boiling there is a certain proportion of bromide in all the different colours which bromide can assume is proved by the appearance of a long-boiled emulsion during precipitation. If we boil an emulsion for (say) three or four hours, and then allow such time to elapse as will cause the greater portion of the bromide to subside, we will find that the small quantity still suspended in the supernatant fluid shows the whole range of colour from blue-grey at the bottom to orange or ruby in the upper portion. The same holds good even after being digested with ammonia; but in this case the red colour is less decided.

From this we may take it that every emulsion contains a certain proportion of bromide of each of the various possible colours, and may assume that various methods of mixing, modifications of boiling, &c., may give different proportions of the different colours, and that from these variations of proportions result the slight differences noticeable in the colours of finished emulsion.

Washing of Precipitated Bromide.—I have to thank Mr. Archer Clarke for his suggestion to add *hot* water to the silver bromide for the second washing in the precipitation process. It certainly causes the settlement to take place somewhat more quickly. The water may even be boiling.

Precipitation Process on a Commercial Scale.—I cannot agree with Mr. Clarke in seeing any difficulty in working the precipitation process on a commercial scale. At the very outside this amounts to the keeping of the emulsion necessary for one week's work in stock at a time. This will amount, in the case of work on a very large scale, to (say) forty or fifty gallons. The space taken for such is by no means great; in fact, I cannot conceive a dry-plate manufactory large enough for carrying on work on such a scale—or, in fact, on any scale—where storage room could not be got for the emulsion necessary for a week's coating. What about the plates which must accumulate during the winter months when manufacturers usually attempt to lay by a reserve for summer, when the demand is brisker than in winter, whilst the facilities for preparation are less? Certainly these must require many times as much storage room as would the emulsion for one week's use. Further: I know that it is a common practice for a manufacturer to make—by any of the ordinary methods—the emulsion required for the week, and all on one day. Of course this involves the necessity of having room to store the week's supply.

I cannot see the reason for Mr. Clarke's limitation of the quantity of emulsion mixed at one time to one gallon. I know of cases where thirty gallons are mixed at a time, and I certainly incline to think that a better result arises from mixing a large than from mixing a small quantity.

Deposit Formed During Boiling.—This point, which Mr. Clarke has mentioned, I consider one of great importance. He considers that with the precipitation method it is unavoidable that this deposit should be mixed with the gelatine to form the finished emulsion, but such is by no means the case. After boiling, the emulsion may be poured into a second vessel, in which to stand till precipitation takes place. By this means not only may the granular deposit which adheres to the boiling vessel be discarded, but also any proportion of the coarser bromide, which is more than useless in the finished emulsion, may also be discarded. Thus the emulsion may be stirred up immediately that boiling is complete, and then may be allowed to stand in the boiling vessel for (say) thirty minutes, when it can be poured into the precipitating vessel. During that thirty minutes a certain quantity of the coarser bromide will have settled, and it will be found a positive advantage to get rid of this along with the crust which deposited during boiling.

A Possible Cause of Failure with the Precipitation Method.—A friend mentioned to me recently an experience which may form the key to failure in the attempt to work any precipitation process. He had prepared an emulsion according to the formula given by me at a meeting of the Photographic Society of Great Britain. He set this aside to precipitate, but after several days came to the conclusion that the process had failed, and that no precipitation had taken place. He carried the vessel into the light, when he was surprised to find that he had been mistaken. The bromide had gone down, but the slightly milky appearance which the supernatant fluid *always* retains had deceived him into the impression that precipitation had not taken place. It is, in fact, most difficult to tell in the dark room whether it has or not. In my own practice, as I never have any doubts on the subject, I pour the supernatant fluid off after the appointed time, without taking steps to ascertain whether the bromide is settled or not. The best way to proceed, if there be doubt, is to pour the supernatant fluid into any glass vessel, allowing it to trickle down the edge. We may then easily see whether it come off fairly transparent or not. If the time of precipitation have been too short there will be a *sudden* change from a transparent to an opaque stream.

W. K. Burton.

CARBON TRANSPARENCIES FOR THE LANTERN.

The first essential in a successful lantern transparency is a suitable negative, and photographers about to adopt this, the best of all processes for the purpose, must begin at the beginning and produce their negative first of all.

For silver printing and, in fact, for any class of prints to be viewed by reflected light, it is necessary that the negative be sufficiently dense to allow the darker parts of the print to gain a certain depth before the lights are printed through, in order to give vigour and brilliancy. For a lantern transparency, however, the darker parts do not require such a body of colour, but only so much as to still allow the light to give the detail existing in the shadows as in the lights. This being so, in taking negatives for lantern transparencies care must be taken not to have them too dense, but only so much so as to give proper gradations between high lights and deep shadows; at the same time they must be fully exposed and not flat.

What a field of delight the production of negatives for this purpose offers, and with what little exertion it can be done! A quarter-plate pocket camera and two single landscape lenses (one of long focus and one short), half-a-dozen double backs, and a light alpenstock stand, are all that will be required in the way of apparatus. Use the best plates you are acquainted with, and develope them with the sulpho-pyrogallol developer.

The negatives being taken, the next step is to prepare them for printing. This is effected by pasting on the reverse side of the negative a square mask, with an opening a little larger than the finished slide is intended to be, which forms the safe-edge so essential in carbon printing, and especially so when the carbon print has to be developed upon glass.

The best carbon tissue in the market for this purpose is the Autotype Company's "portrait brown," No. 113, which can be had in half-bands ready sensitised; and, as it will keep good for a month if kept in an air-tight tin case, it is strongly recommended that it should be so procured, as then not only is the operation of sensitising avoided but also that of drying, to which operation considerably more than half the failures that are met with in carbon printing are traceable.

To those photographers, however, who prefer to sensitise their own tissue, the following method will be found the best of any the writer has as yet tried:—Cut the tissue in rolls of about four feet long and seven inches wide. Make a solution of bichromate of potash one and a-half ounce, water forty ounces, and liquor ammonia half-a-drachm; filter carefully, and pour into a deep dish about eight inches long and as narrow as possible (say a small brown pie dish). Now immerse one of the rolls of tissue, and unroll it the reverse way, keeping it under the solution as much as possible; when re-rolled take hold of the end and lift it slowly out of the solution and hang it over a line or a rod (face outwards) to dry. Tissue so sensitised will dry in half the time, keep longer, and be more manageable than if sensitised by soaking the usual time. Where it is possible to get the use of a kitchen *not* lit by gas, tissue so sensitised will dry in four or five hours.

The next operation is the exposure under the negative, which must be timed by means of the actinometer. For the class of negative recommended two tints will be found ample. The exposure being effected the carbon prints are developed upon good glass previously polished, and coated with gelatine a-quarter of an ounce, bichromate of potash thirty grains, water ten ounces. This is applied warm (after carefully filtering), and when the plate is dry it is exposed to day or sun light for a few hours so as to render the coating of gelatine quite insoluble. Upon this substratum the exposed carbon print is squeegeed down, and subsequently developed in hot water.

Carbon transparencies so made will be entirely dependent for their quality or suitability for the lantern upon the character of the negative as to density or thinness (not flatness). If the negative be dense so will the carbon transparency, and *vice versâ*; but it will soon be apparent to the operator which is the best class of negative after making a few transparencies from negatives of different grades of density and projecting the same upon the screen.

W. T. Wilkinson.

PHOTOLITHOGRAPHY.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

The subject under consideration could be made to embrace a very wide field, for it would be quite legitimate under the head of "Photolithography" to glance at the various photo-mechanical printing processes owing their origin to the action of light on bichromate of potassium used in conjunction with gelatine, albumen, and such organic matters. It is now between forty and fifty years since Mungo Ponton discovered the properties of these substances, which more immediately concern photographers. It is not by any means, then, a novel subject, but is, indeed, one of the processes springing from the cradle of photography; and it has grown and spread its branches to such an extent that there is scarcely an art but has felt in some degree the benefit of its touch.

Photography, so far from being an unwelcome intruder and usurper among her sister arts, has been really an ally to them—has created work and suggested new departures, to the mutual advantage of all. It is not any part of this paper, though, to consider these various applications. The weekly and monthly publications lying on our library tables give some idea of the extent to which engravers and draughtsmen are generally aided, either in a primary or secondary form, by photography; in fact, it is well seen that the camera and the press go hand in hand.

Photolithography in its simplest form deals only with line work—black and white—but no half-tone whatever. It professes to produce the same results in line from a lithographic stone or zinc plate by the aid of photography as are produced by the lithographic draughtsman. Of course crayon work and tinting is another matter, with which we have at present nothing to do. The demonstration tonight is simply concerning line work, and for that purpose the original from which the photograph is taken must be of line work; and here comes the first matter for consideration. In the general routine of a draughtsman's work there are really very few subjects which can be handed over to the photolithographer; in fact, the run of commercial drawings are not adaptable, and the trained lithographic artist with his pen and brush commands the work. In these days of pictorial effect draughtsmen rush to washes of colours to represent the various materials of the design—stone, metal, wood, trees, grass, water, clouds, and suchlike. These washes are fatal to the reproduction of the drawing in *facsimile* by photography. Nothing but well-defined lines and dots should be the original, as the colours completely obliterate the underlying lines and are reproduced as great smears. The lithographic artist working by hand has here the advantage, as he can alter these at will by lines and dots, as instance the grain of the wood, the waving lines of water, the flourishes of trees, and heaps of dots of sand. So, unless the original drawing be made with the intent of photolithographing it, there is great chance of its being unsuitable. It should also be very firm, clear, open, and correct in every detail. There are some admirable examples in a well-known journal—the *Builder*—which are evidently done from pen-and-ink drawings, made specially. There is not a simpler process than the reproduction of a suitable subject, and not a more troublesome and aggravating one than the attempt at an unsuitable one.

The second matter is making the negative, and in this too much care cannot be exercised. Speaking to a body of photographers, I need do no more than allude to the necessity for securing sparkling definition to the very edge of the negative. A rectilinear lens or one of like character should be used, and of sufficient length of focus to more than cover with equal brilliancy of illumination the size of plate required, and, of course, stopping down to get sharpness.

In reducing a large plan to (say) fifteen or twenty inches a great length of focus is required, and it is always well to bear in mind, if we have not a stock to select from, that by removing one of the lenses of a rectilinear or other combination lens from its tube and use the single lens we have practically another instrument of double the focus, which if used fairly within its covering power, will do admirably for straight-line work.

In enlarging it is, of course, the other way about—a short-focus lens is more to the purpose. The camera and subject should be perfectly parallel and centre to centre; the least deviation will affect the straightness of the lines. I believe the wet process is very much in favour for the production of the negative. It is easy and certain to obtain any amount of density with wet, and that is, perhaps, the chief consideration, the lines being required so clear—just bare glass—and the other part so perfectly opaque. Some of the negatives on the table are by the wet process. The only remarks that need be made are that the collodion was ordinary and rather old. If the exposure be too long the lines are spoiled through want of brightness, and if too short the lines will certainly be clear enough; but the grain of the paper original will be obtrusive and difficult to intensify. If a little gelatine be introduced to an ordinary slow iron developer there will be a great gain in clearness and density. A good plan is to have a stock-bottle of—

Gelatine	60 grains.
Water	6 ounces.

When soft add two ounces of glacial acetic acid. This keeps indefinitely, and for use add to the developer instead of the usual quantity of acetic acid. Intensify with a few drops of the silver solution and the developer mentioned, and before fixing thoroughly bleach by immersion in a solution of bichloride of mercury. Fix in hypo., re-immerse till again bleached in mercury, and blacken with solution of ammonia. Between each operation there must be copious washings. This is all, no doubt, familiar to you; but I merely speak of it because the negatives were so intensified.

Perhaps the most popular intensifier is Dr. Eder's lead process; any amount of opacity appears to be obtained with it. This and many others will be found detailed in Major Waterhouse's recent articles on *Photolithography*.

In using gelatine plates it is preferable to have the slower quality, and in developing with ferrous oxalate to use the bromide freely to obtain clear lines, prolonging the development to gain more density. After fixing the mercury intensifier may be used, or other favourite methods. Occasionally from indifferent originals there are parts which may refuse to be coaxed up to right density, and, where, maybe, the main portion consisting of fine work would be endangered by further forcing. In such cases a little after retouching with Indian ink will work wonders.

The next operation is preparing the transfer paper. In this there is great latitude, both in the materials and the manipulation. The object is to obtain a print which is to retain the greasy lithographic ink upon the lines and subject matter only, similar to an ordinary lithographic transfer. Paper coated with a mixture of gelatine and bichromate of potash is the readiest method. When dry, light renders this insoluble and non-absorbent of water, and the parts affected thus by light retain the greasy ink applied, while the unaltered parts are washed away in warm water. There are so many different modifications of the process that I had some difficulty in deciding upon one. The mode chosen is after the New Zealand manner of obtaining a tacky surface, which makes the after operation of transferring to the stone so very easy and certain, and also does away with hot water in the development:—Three ounces of gelatine are covered with water and allowed to soak, and about twenty grains of chrome alum dissolved in water are added. When heated and made up to thirty-five or forty ounces it is ready for coating. It must be kept warm by the dish being laid in another one containing hot water, or any other convenient method. All air-bells must be removed, and the paper is floated or drawn over the solution very carefully. It is then hung up to dry, and afterwards recoated in the same manner. When dried it will keep all

it in stock. When required to sensitise it is floated on a saturated ıtion of bichromate of potash for a minute or so until it is limp. ıs then allowed to dry in the dark or yellow non-actinic light. There some pieces of bank-post paper on the table prepared in this way. e time of exposure in the printing-frame varies, of course, with the gative; all the lines must be lightly visible. The paper is exceed- ıly sensitive, and must not be examined except in a non-actinic ht.

We now come to the inking, and here I would have liked to have ed the highly-commended velvet roller method, but have not had the portunity nor the roller. To those interested they cannot do better an refer to Mr Pritchard's *Studios in Europe*, which gives a good scription. The prints here were inked at the lithographic press. A ɔne is rolled up with transfer ink, the print placed face downwards, d pulled through. A thin coating is best, and it ought to be done by skilled lithographer.

To develope, the print is placed in cold water, face up, and allowed remain awhile till the unaltered bichromate is soaked out; it is then aced in clean water, and rubbed lightly with a soft sponge free from it. The ink will thus be washed away from the parts unaffected by ght, and will remain firm on the lines, &c. The white portion ill, owing to the chrome alum before alluded to, have a coating gelatine left, which, although insoluble, will absorb water and low of the transfer adhering to the stone when under going the nal operation, which is performed by a lithographer, and in a anner similar to that by which he is accustomed to ink ordinary ansfers.

Perhaps a little further reference to the chrome alum may not be miss, as by its means the gelatine, as you see, still remains in the ansfer and favours the "grip," which is so important in transferring ɔ the stone. There is a transfer here that does not possess this uality, and it is very liable to be damaged through slipping, &c., 'hile pulling through the press. It was prepared without the chrome lum, and the gelatine is all consequently washed away. There are, of ourse, other methods for obtaining the tackiness, but the one selected 'orks all right.

THOMAS M. LAWS.

ON THINGS IN GENERAL.

I WAS glad to see by a paragraph in last week's issue that the Copyright Association has not collapsed. So many hints have been heard of it that had begun to fear its early promise had not fructified. No one can eny that some association or other of the kind is needed, though it is easonable to believe that the largest gainers by publication should be he largest—that is, in a pecuniary sense—supporters of the new society. Whose side, I wonder, would the Association take in the amusing Rowley-Tebbs controversy that for some time has been carried on in the *Athenæum?* The whole affair seems to me to lie in a nutshell, so far as copyright is concerned. The present owner of the picture is, I believe, a lawyer. Is it likely he would appeal to public sentiment, and to the good feeling of a gentleman who had expended money in producing the photograph, that the sale of the photograph might be stopped? Not one word has been said as to any assignment of copyright by the artist, and it would really seem as though Mr. Virtue Tebbs imagined that the purchaser of a picture obtained its copyright also, which is simply absurd. So far as the evidence goes at present copyright does not even exist in the picture, and sale would be legal of any copies of it, if such could be made.

There is a great deal of the transit and eclipse expeditionary work going on just now, and the heroes who are carrying it on are gaining favour and renown for their skill and devotion to science; but *is* "the game worth the candle?" The Russians said they would not join the Venus Transit Observation Association on account of the cost being unwarranted, as better results could be obtained at less expense. Dr. Ball says their little bill came to twenty thousand pounds, and minimises the effect by saying that, looking upon it as a surveying expedition, it cost only one shilling for every 250 miles. That is all very well for a special pleader; but we must remember that other surveys have before been made which have been worse than useless, whose cost would total up to a considerably greater extent. Further: in a surveying expedition one expects a little more given than the distance of two points, even if a considerable number of triangles are made to obtain the result.

There is a vast deal of interesting and suggestive matter in the paper on *Commercial Photography in America,* read before the Edinburgh Photographic Society by Mr. Suverkrop. The Americans, having more appreciation than the British of the commercial value of modern innovations, have made a wholesale use of the application of photographic processes to business purposes, far exceeding anything done in this country, and we may well take a lesson from them. Unfortunately the furtherance of such ends lies less with photographers than publishers, so that, no matter how useful a newly-invented process may really be, it is likely to come to little unless some specially-enterprising man cares to work it up. And, still unfortunately, the records of invention in this country show that inventors rarely reap the reward of their skill and perserverance. I advise all my readers who have not already done so to carefully read Mr. Suverkrop's paper. Incidentally, in the discussion that followed upon it, Mr. Norman Macbeth spoke of the vast superiority of American engravers over English. Now, the Americans have introduced some remarkable novelties of style, but anunmixed meed of praise cannot be accorded to them. Mr. Macbeth does not do his countrymen justice in his sweeping remark.

Another aspect of photography and commerce as affecting the professional photographer himself was presented by Mr. Geddes, in his paper communicated to the Dundee Photographic Society. He gave some particularly-useful advice as to the conduct of the business portion of a photographer's work. His remarks upon tact, upon the treatment of his sitters (children and adults), upon the gentlemanly conduct of the employer in his own studio, and upon the class of work sent out, cannot be too strongly praised. With one remark I rather disagree. No one more than myself would estimate the value of good work; but when he says—"The more successful the photographer becomes as a worker the more successful will be his trade commercially." A photographer must do good work to get on, but he must also possess business tact and, it must be added, business knowledge, or he has little chance of succeeding; the experience of any photographer with his eyes open will demonstrate that. How many men of first-class technical ability are there not who, from one cause or another, have utterly failed to make their mark or even to pay their way, all through want of a little business training—the one thing, as a rule, that a young photographer does not learn or get taught?

FREE LANCE.

NOTES FROM THE NORTH.

THE interesting—or what ought to be *the* interesting—event of the year to such of our northern photographers, both professional and amateur, as cannot take an occasional trip to London, viz., the opening of the Royal Scottish Academy's Exhibition, took place on Saturday, the 17th ult. The exhibition as a whole is considerably above the average of recent years, and will be found more than usually valuable to photographers as an educational institution, in consequence of the very decided coming to the front of those artists who delight in finding their favourite motives in combinations of landscape and figure painting.

I have on various occasions directed attention to the temptation to abuse the new power given by the use of rapid gelatine plates by the introduction of figures where they are not needed, or the placing of them in objectionable positions in cases where, if properly introduced, they would have added much to the charm of the picture; and, although aware that in this Journal and elsewhere very complete instructions have been given, and very simple laws have been laid down, with a view to obviate such malpractice, I have no hesitation in saying that a few hours' careful study of some of the pictures on the walls of the present exhibition will be of more real advantage to the inquiring photographer than many months of such reading.

Photography now plays an important part in book illustration, and many books are published which might more properly be called collections of photographs, with descriptive letterpress. One of the most extensive and elegant in the latter class that has come under my notice has recently been published by Mr. William Paterson, of Edinburgh, under the title of *The Castles and Mansions of the Three Lothians,* in the form of two handsomely-bound imperial quarto volumes, containing one hundred and three photographs, each about $7\frac{1}{2} \times 5$. The negatives have been taken by Mr. John Annan, whose long experience in that department of photography has enabled him to combine in a satisfactory way pictorial effect and structural peculiarity. The printing, which is in carbon — the colour selected being intended to imitate old sepia drawings—has been entrusted to Messrs. Annan, of Glasgow, and they have done the work admirably. The historical and descriptive accounts have been carefully and capitally drawn up by Mr. John Small, Librarian to the Edinburgh University, and have in most cases been revised by the owners of the mansions.

Altogether, the book, although necessarily an expensive one, will form an enviable addition to the libraries of those who can afford such luxuries; and photographers who live in this part of the country, or who may intend visiting it, might do worse than procure a copy of the prospectus, which contains a list of the castles and mansions illustrated, and will give material aid in the decision as to "where to go with the camera."

JOHN NICOL, Ph.D.

A TOUR IN ITALY WITH THE CAMERA.

No. III.

THE next day I roamed about Venice in search of the picturesque, which is by no means difficult to find, the only difficulty being selection. Venice is a city which has seen her best days. The days when her fleets commanded the seas and commerce brought her immense wealth are gone; yet in art she still reigns supreme. Art is everywhere. She owes her existence and her very foundations to art triumphing over natural obstacles. Her temple of St. Marco is a gem of art, which has risen with her greatness and is growing old, and still more beautiful with her

decline. Venice is ever the dream of the poet, the artist, and, I might say, the art-loving photographer.

In Venice Tasso's echoes are no more,
And silent rows the songless gondolier;
Her palaces are crumbling to the shore,
And music meets not always now the ear:
Those days are gone—but Beauty still is here.
States fall, arts fade—but Nature doth not die;
Nor yet forget how Venice once was dear,
The pleasant place of all festivity,
The revel of the earth, thê masque of Italy!

At first I was in pretty much the position of a certain abused quadruped standing between trusses of hay and clover. When all was so beautiful choice became very difficult. However, the Piazza of St. Marco and its neighbourhood soon possessed an irresistible attraction. This site is certainly unique in the whole of Europe, and ever possesses an interest for the tourist and art-lover. The Piazza is the busy centre of Venice—the place "where merchants most do congregate." It is bounded on all four sides—on either right and left—by handsome buildings, the lower parts of which consist of arcades, where wares peculiar to Venice are shown in the most enticing manner. This square with its colonnades forms one of the chief attractions of the visitor, who rarely leaves the city without making purchases of the exquisite glass work and artistic jewellery for which Venice is so famous.

On the east of the Piazza stands that far-famed eastern fabric which is one of the wonders of Italy. San Marco was first built in the ninth, but burnt in the tenth century. Parts of the tenth and eleventh centuries saw it rebuilding. The structure is of brick adorned with the richest-coloured marbles. The architecture is Byzantine. The church is crowned with shining cupolas, which ever glitter in the brilliant Italian sunshine. It is not the size of the building which impresses the mind, but the exquisite perfection apparent in each and every part. It is not its brilliancy but its harmony which everywhere reigns supreme. All its beauties are blended in one exquisite whole, in which nothing stands out gaudily, excepting, alas! where the hand of the renovator is doing its best to mar that sublime harmony. Two interesting views, both easily obtainable, can be secured. First, the *façade* from the Piazza—the most frequently met with; and the other, a side view from the balconies of the Doge's Palace.

On the south-east of the Piazza is the Piazetta, where, against the bright blue sea, stand two red granite columns—the one surmounted by St. Theodore, the patron saint of Venice before St. Mark supplanted him, standing on his crocodile; and the other by the famous Winged Lion of St. Mark. The photographer with an artistic eye will not find much difficulty in his search for pretty views about here. This is the rendezvous of picturesque sailors and gondoliers, whose gondolas and barcas lie moored to the shore close by. Groups of Greek seamen, with their huge scarlet caps, and sunburnt sailors from the shores of Morocco, with their even more quaint head-gear, afford plenty of attraction to the photographer for instantaneous work.

From the shore close by I obtained, amongst many others, the picture which illustrates this number of the Journal. The view is taken at the mouth of the Grand Canal. Opposite is St. Georgio Maggiore and the military barracks. In the foreground is one of the many gondolas, or, more properly speaking, "barcas," which are ever flitting to and fro. There is a difference between the gondola and the barca. The former is usually covered with a low black canopy or "felze," and is painted black in conformity with a sumptuary law passed in the fifteenth century. It measures about thirty feet long by four feet broad, tapering to a point both at prow and stern. The barca is a modern boat somewhat large and open at the side, and provided with a light awning to screen the passengers from the glare of the sun. The iron prow, called the "ferro," is partly intended to counterbalance the weight of the gondolier and partly as a gauge of the height of the bridges which cannot be passed under unless the ferro (the highest part) clears them. The picture is, of course, taken instantaneously, in the sixth part of a second or less.

In the Piazza, and near the Cathedral of St. Marco, is the ponderous Campanile—a rectangular brick structure over 300 feet in height, the ascent of which is easily made by a series of inclined planes winding round inside the tower. The view from the top is very fine. Below can be seen the city with all her islands, domes, beautiful spires and pretty minarets, surrounded by shallow lagunes. In the distance, on the one hand is the mainland backed by the snowy Alps, and on the other the Adriatic stretches away as far as the eye can reach.

With reference to the Campanile: I once heard of an American who had just arrived in Venice, and who wanted to "do" the city as quickly as possible. Guides were soon on the spot. In response to the query, "How long will it take to see all over Venice?" each stated what time it would occupy. Yet one capped the rest by saying he would show the stranger all over Venice in an hour. "I guess you're my man," exclaimed the Yankee, and forthwith off they started. Needless to say to the Campanile they bent their steps, and from its summit all the chief attractions of the beautiful city could be seen, or at anyrate imagined. The finest view from the Campanile is at sunset. Then everything is a-glow. The whole of Venice with her shipping, her gilded cupolas, St. Marco with its glittering domes, the Doge's Palace and snowy statues with the far-distant Alps are bathed in golden sunlight. To get a view of the Campanile with the cathedral from the Piazza below is somewhat troublesome, on account of the great height of the former. Another and pleasant feature of this part of Venice is the tame pigeons. They are fortunate birds, a legacy having been left for the purpose of feeding them. They are so tame that many times they have literally covered me whilst feeding them. Close at hand is a shop where packets of maize are sold for that purpose. A very interesting picture can be obtained by taking an instantaneous group of fair ladies—Americans I found rarely minded—feeding the birds. Although I tried many times I did not succeed as well as I should have wished, though I "caught" several birds with wings extended in the air pretty sharply. The general effect of my picture was usually marred either by too much movement or under-exposure—rather common defects, I am afraid. A good light and a rapid exposure (about one-fiftieth part of a second) I found necessary for a satisfactory result.

J. J. Acworth, F.I.C., F.C.S.

NOTES ON PHOTOGRAPHY.

Lecture XVI.—Silver Printing.—Continued.

The ordinary paper of commerce is not found to be suitable for silver printing, and paper specially prepared is therefore always employed. There are two principal brands in general use—Rives paper, so called from the place of its manufacture in France, and Saxe paper, from Saxony.

Salting.—This is the first operation in preparing the paper for printing.

For Albumenised Paper.*

Ammonium chloride	100 to 200 grains.
Alcohol	½ ounce.
Water	4½ ounces.
Albumen	15 ounces.

The albumen is obtained from fresh eggs (each egg gives about an ounce), added to the materials, and the whole *thoroughly* beaten up with a

* *Instruction in Photography.*

ndle of quills; it is then allowed to stand for a time, and filtered rough a piece of sponge placed in the neck of a funnel. The paper is ated on this solution for about one and a-half minute, avoiding dirt d bubbles, and hung up with American clips to dry, the temperature t being lower than 80° Fahr. When dry it is rolled and put away t until it is required for sensitising. For doubly-albumenised paper is first floated on a plain solution of albumen, the albumen congulated heat, and the paper then salted on the albumenised side.

For Plain Paper.*

Ammonium chloride	100 to 200 grains.
Gelatine	10 ,,
Water	10 ounces.

he solution is filtered as before, the paper floated for about three inutes, and hung up to dry.

Sensitising.—This is usually done the day before the paper is required r printing.

* Silver nitrate (recrystallised)	30 to 60 grains.
Distilled water	1 ounce.

pinch of carbonate of soda should be added to ensure the solution eing neutral. The salted paper is floated on this from three minutes hot to five minutes in cold weather, and hung up to dry. It is hung p so that one corner is lowest, and on this is placed a small piece of ibulous paper (it adheres) to absorb the drainings. When dry, but before curls up, it is placed in clean blotting-paper between boards for se.

When a few sheets have been sensitised the bath will become reduced a strength, and must either be titrated (estimated) and made up to roper strength, or it can be poured back into the bottle and made up o its original bulk with double-strength solution. Each sheet takes bout half-an-ounce of solution. After being used some time the sen- itising bath becomes discoloured. To remove this it is shaken up with little kaolin and filtered, or exposed to the sun in a neutral condition. For hard negatives a weak salting and sensitising bath is used, and printed in the sun. For weak negatives a strong salting and sensitising bath is used, and printed in the shade.

Ready-Sensitised Paper.—The sensitised paper can be preserved longer by keeping it under pressure between blotting-paper which has been oaked in a solution of carbonate of soda and dried, or it can be floated n citric acid at the back and dried.

Toning.*

(1)	Gold chloride	2 grains.
	Chloride of lime	2 ,,
	Chalk (precipitated)	1 teaspoonful.
	Water	16 ounces.
(2)	Sodium acetate	30 grains.
	Gold chloride	1 grain.
	Water	10 ounces.
(3)	Borax	100 grains.
	Water	10 ounces.
	Gold chloride	1 grain.
	Water	10 ounces.

No. 1 is kept a day or two or prepared with hot water. The paper should have a little free silver nitrate left on it. No. 2 is kept a day or two, and the whole of the silver nitrate should be washed out of the paper before toning. No. 3. is specially recommended for use with ready-sensitised papers. The solution should be mixed in equal quantities when required. The whole of the silver nitrate should be removed from the paper, and a little soda carbonate added to the wash water to destroy any acidity before toning.

The temperature of the toning bath should never be below 60° Fahr. The prints should be printed and toned a little deeper than they are intended to remain. If the toning bath refuse to act it may be due to the gold being exhausted, some hypo. having got into it, or acid in the paper. A red tone in the print shows insufficient and a blue tone overtoning. The prints should be moved about while toning.

Fixing.

Hypo.	4 ounces.
Water	1 pint.
Ammonia, ·880	1 drachm.

After toning the prints are rinsed and placed in the fixing bath from twelve to twenty minutes.

Washing should take place in running water for several hours, or each time the water is changed the prints should be drained and blotted. The method of fixing should be tested by the iodide of starch reaction already described.

E. H. Farmer.

* *Instruction in Photography.*

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

ABRIDGEMENT OF BRITISH PATENTS.

No. 2790.—"Improvements in Albums for Holding Photographs and such-like Articles." Communicated from Abroad, by A. Aron, of Rue Turenne, Paris.—*Dated June* 14, 1882.

The object of this invention is to construct albums for holding photographs and suchlike articles, so that the said articles may be readily placed within or withdrawn from the album without risk of tearing or crushing that portion of the leaf wherein the slot or aperture is cut for the passage of the photograph, or suchlike article, into or from the album. For this purpose and according to our arrangement, each leaf of the album is composed of two portions, namely, a fixed portion or leaf proper, and a removable portion or slide, this latter portion being adapted to be slidden into the fixed portion either from the top or from the bottom edge or from the lateral edge of the leaf, and to be readily withdrawn therefrom as required. This removable or sliding portion carries the photographs or the like which are inserted therein through slits or openings in the lateral edges of such portion, and this portion is also provided with apertures or openings for the exhibition of the photographs or like articles, the said apertures or openings corresponding with those in the fixed portion or leaf proper when the sliding portion is in place. In another arrangement or modification the portion carrying the photographs or the like is a fixture, and the outer leaf is adapted to be slidden over this fixed portion and to form a sheath or envelope therefor.

No. 3013.—"An Improved Process of Fixing Photographic Pictures or Representations upon Earthenware, Porcelain, Glass Ware, and the like." Communicated to him from Abroad, by J. Irland, of Paris, Merchant, left by H. H. Lake, at the Office of the Commissioners of Patents. —*Dated June* 26, 1882.

It has heretofore been proposed to produce upon earthenware, Chinaware, porcelain, glassware, and the like photographic pictures or representations. For this purpose the carbon process of photography have specially been employed. It has not, however, been heretofore practicable to render such pictures or representations unchangeable or permanent. They disappear when washed or subjected to friction. The object of this invention is to provide a process of fixing which prevents such change or alteration of the photographic pictures or representations. In carrying the said invention into practice in the ordinary manner to the earthenware, porcelain, Chinaware, opal glass, glassware, plate, or other glass or the like, the photographic pictures or representations in carbon by the ordinary well-known means by employing paper prepared with coloured carbon—that is to say, after having obtained from the negative an impression upon this paper apply it in the dark to the earthenware, &c., which has been previously gelatinised in a cold bath of two or three degrees. The paper, having had the impression produced on it, and been applied to the glass or other surface, is developed in the dark by treating it with hot water, which dissolves the parts not affected by the actinic action of the light, and the parts whereon the impression is produced remain adherent to the glass, &c., &c. The representations applied may be drawings, images, portraits, landscapes, letters, scenery, figures, &c. The photographic image in carbon is enclosed in a thin coating of sensitised gelatine by washing with water or by friction. This gelatine may be dissolved or detached. Fix it by a kind of enamelling by operating in the following manner; that is to say, spread with a brush a layer of boiled oil or oil, varnish, or alcohol, with or without the addition of a small quantity of spirits of turpentine; carry to an oven or kiln the objects thus decorated and varnished. The heat spreads and renders regular the coating of varnish, obliterates all traces of the strokes of the brush, and hardens the varnish, which then forms a resisting glaze which protects the photographic image in carbon. The pieces taken from the oven or furnace are treated with pumice by the ordinary means. The photographs thus obtained are absolutely transparent and very clear. Prior to the application of the varnish for fixing the subject or picture upon the glass, &c., &c., the photographs may be coloured in order to give to the subject a natural colour.

No. 3035.—"Improvements in Photographic Cameras." G. Hare, of Calthorpe-street, Gray's Inn-road.—*Dated June* 27, 1882.

The invention relates to improvements in photographic cameras, and has for its object the production of a lighter, simpler, and more compact portable camera than those heretofore in use. For this purpose, form the body of the camera of a black frame connected by a bellows body to the front of the camera; to the lower and front side of the back frame is hinged the base-board, which is so angled at its rear edge as to enable the sensitive plate to be fixed either at a right angle or at an angle more or less than a right angle thereto, and fix the base-board and the back frame at the required angle to each other on one side by means of a link pivoted at one end to the baseboard, and provided at the other end with a pinching screw running in a slot in the back of the frame, a notch being formed in one side of each slot to indicate when the parts are right angles to each other. The other side is held by means of a bracket hinged to the back frame, and extending forward nearly to the front of the base-board, when it is held by a pinching screw carried by the base-board acting upon a plate fixed by the bracket. The front of the camera is provided on its bottom edge at each side thereof with a pinching guide plate working in a groove in the base-board, and this groove and the pinching guide plate are partially covered at one side by a plate or runner fixed to a slide working in the base-board, such plate serving as a guide or runner for the front to run upon and clamp the pinching guide. Plates are capable of being tightened or loosened by means of a thumb nut acting upon a screw connected to each of such pinching guide plates. That side of the back frame which carries the bracket is made broader than the other parts of such frame in order to bring the bracket outside of the base-board when the latter is turned up against the back frame, thus enabling the bracket in combination with a hook or catch on the base-board to be used as a means for holding the camera in its collapsed position. The slide carrying the front of the camera is moved to and fro, as desired, by racks and pinions as usual, and the camera can be supported in use either on the base-board or on the bracket side thereof, nuts being fixed on such parts for the purpose. In some cases I dispense with the bracket and employ a pivoted link and pinching screw at each side of the back frame, which latter I make of similar shape on both sides thereof. None of the parts are required to be removed, either for adjusting for use or for packing up the camera.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 24	North Staffordshire	Wedgwood Institute, Burslem.
,, 28	Bristol	Studio, Portland-st., Kingsdown.
,, 29	London and Provincial	Mason's Hall, Basinghall-street.
,, 29	Liverpool Amateur	Free Library, William Brown-st.
,, 29	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 15th instant, the chair was occupied by Mr. J. J. Briginshaw.

Mr. W. Cobb showed some negatives taken upon plates the emulsion for which had been prepared with a solution of metagelatine prepared by Mr. W. Ackland, after the method described many years since by Mr. M. Carey Lea. The gelatine for the preparation of the emulsion had been boiled with potash until it was converted into metagelatine; when cold the solution was neutralised with acid, and the salts were then dialysed out. He (Mr. Cobb) had taken some of this solution and added ammonia to it, and then used it as a basis for emulsifying in by the method described by Mr. A. L. Henderson. He had also made some emulsion with Mr. Henderson's own solution, and plates from both batches had been given to Mr. A. Cowan to expose and develope. The results were laid before the meeting, and appeared to be so similar that it was difficult to distinguish them.

Mr. A. Cowan remarked that he had also made some emulsion with metagelatine of Mr. Ackland's preparation, but had employed the boiling plan. He found that he got a very brilliant plate of average speed, and was surprised to find how well such a thin solution held the bromide of silver in suspension.

Mr. A. J. Brown said it was remarkable that nothing but gelatine or its derivatives appeared to have this power of holding bromide of silver in a fine state. With albumen or sugar substituted for gelatine the bromide was coarse, and with gum somewhat so.

Mr. W. E. Debenham remarked that whatever leucine might have been formed in Mr. Ackland's solution would have been removed with the salts by dialysis before using it to make the emulsion.

Mr. A. L. Henderson said that, if coarse bromide meant rapidity, it should suffice to dilute the colloid solution to get rapidity at once instead of waiting for it. He also stated that if a rapid emulsion were used unfiltered, and also after filtering through muslin, wash-leather, and fine white leather, it would be found to lose in rapidity according to the closeness of the filter itself. This was not because any of the coarse bromide had been kept back on the filter, but that it had been broken up and made fine, and therefore slower. He further stated that if a solution of gelatine (say) of twenty-five grains to the ounce were boiled until it just refused to set on cooling, the addition of a small quantity of fresh gelatine would cause it to set; but if the boiling had been continued much longer the same quantity of fresh gelatine would not restore its setting powers, but much more would be required. Hard gelatine would not give nearly such quick plates as soft.

Mr Cobb and Mr. Debenham had made their quickest plates with hard gelatine.

Mr. Brown showed two portable lamps for changing plates. One was simply a tall cone of cherry fabric placed over a night light; the other wae a folding prism of cardboard with a window of cherry fabric at the bottom and a piece of card laid on the top, which was sufficiently high to prevent danger of ignition, and spaces were left top and bottom for entry and exit of air. He also showed a sample of the fabric, which had been distributed gratuitously, and a sheet which he had purchased from the manufacturers. The latter was of somewhat less ruby colour than the sample, and had, moreover, numerous interstices through which white light would pass—a defect from which the original sample was free.

Mr. Cowan exhibited a series of transparencies printed by development upon gelatino-chloride plates. He did not find that with any one developer he could obtain variety of tone by altering the exposure and the time of development merely. He could not with the ferrous citro-oxalate obtain any but black tones, whilst with the acid citrate he secured warm colour by increasing the amount of chloride of sodium used as a restrainer.

Mr. Brown, Mr. Debenham, and Mr. A. Haddon had found that, as stated by Dr. Eder, the colour of the image was changed, without altering the developer itself, merely by lengthening the exposure and shortening the time of development, this treatment giving a brown, whilst the opposite gave a black, colour.

In order that negatives and transparencies under discussion might be examined by all the members simultaneously it was decided to have a lantern, which might be used at any of the meetings; and the offers of Messrs. Cutchey and Henderson to lend their lanterns for the present were accepted with thanks.

It was announced that on the 29th instant chloride emulsion would form a special subject of discussion, and Mr. Cowan and other gentlemen promised to experiment in that direction in the meantime and report to the Association.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of the above Association was held in the College of Physical Science, on Tuesday evening, the 13th instant,—Colonel Sheppee, the President, in the chair. Previous to the commencement of the business,

The Chairman made a few remarks, in the course of which he thanked the members for his election.

The minutes of the last ordinary meeting having been read and confirmed Mr. Gibson was nominated for membership. Messrs. J. Garland, E. Schumann, and R. Snowdon were duly admitted members of the Association.

Mr. Thomas M. Laws then read a paper on *Photolithography* [see page 162], and gave a demonstration. Mr. Laws' remarks and operations were followed with much interest, and at their conclusion a hearty vote of thanks was accorded to him.

The meeting then became of a conversational character, and several questions were discussed.

Some excellent photographs were shown by Mr. Galloway, and others were presented to the Association by Mr. Robinson and Mr. Auty. Mr. Gould exhibited a very fine stereoscope, with rackwork for focussing. Mr. Auty showed and described a Shew's instantaneous shutter, and one by Messrs. Harvey, Reynolds, and Co. attracted considerable attention.

Votes of thanks to the donors of photographs, exhibitors of apparatus, &c., and to the Chairman, concluded the meeting.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The fourth annual lantern meeting of this Society was held on Thursday, the 15th instant, in the Royal College of Science, Stephen's Green East, Dublin. A large collection of views—all taken from negatives the work of members of the Society—was exhibited to an audience of about four hundred and fifty visitors invited for the occasion. Messrs. Bewley and Watson had charge of the lantern, and the description of each picture was given by Mr. John L. Robinson.

The collection exhibited was generally considered to have been by far the best shown by the Society.

The next meeting is intended to be held on Friday, the 13th April.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Association met on the 5th January, for the first meeting of the year. The chair was taken by Professor Vogel, who inaugurated the proceedings by good wishes for the prosperity of the Society usual at this season.

Two new shutters—one by Herr Th. Hase and another by Herr G. Braun—were shown. The latter has a pneumatic action, and is placed inside the camera, where a sort of blind closes the back of the lens. It was considered very suitable for landscapes in which a shorter exposure for the sky than for the foreground was necessary, or for portraits in which it was desired to give the head a shorter exposure than the rest of the figure; but not so well suited for instantaneous pictures, as it hardly seemed to act with sufficient rapidity.

Herr Martini related his experience with Obernetter's emulsion, the formula of which he had bought in order to be able to prepare plates for the market. As yet he had given the formula only two trials. The first time he had followed the formula exactly, and the second time he had made some slight alterations in it. The first batch turned out clean and clear, but not sensitive enough for portraits. He had not yet tried the second batch. He found the process somewhat expensive, requiring a proportionately large quantity of silver, and, on account of the prolonged washing, a great deal of water. The washing lasted eighteen hours, while with his own emulsion it only lasted half-an-hour.

The Chairman remarked that the long washing was not such a drawback for the preparation of small quantities (such as a photographer would make for his own use) as it appeared to be in the wholesale preparation. To the former, indeed, the loss of time occupied by washing was less observable, as he would be doing other work in the interval, and Obernetter's process would, perhaps, for that very reason, be more convenient, as it did not demand continued attention during the whole process of emulsionising, washing, &c.

Herr O. Lindner made his maiden attempt at emulsionising by Herr Obernetter's formula, and, though the resulting plates were not everything that could be wished, they quite came up to his highest hopes.

The Chairman showed several portraits taken by Herr Kurtz, by electric light, which were as soft as if taken by daylight; indeed, had it not been mentioned, he would have supposed them to have been taken by daylight. He further showed a drawing of Herr Kurtz's electric light studio, which differs from the European studios. It has five electric lamps with matt globes. Herr Kurtz was of opinion that the matt globes absorbed about sixty per cent. of the light.

Herr Lindner then introduced the subject of the lighting of sitters. He thought that, as the photographic portraitist confessedly accepted the lighting of the best portrait painters as his model, his end (namely, artistic lighting) would be most easily attained by having a glass-house like a painter's studio.

Herr Quidde agreed that portraits painted by the best masters might be regarded as models of lighting for the photographer, but doubted whether a painter's studio would make a suitable photographic one. His experience in taking marble and plaster busts was that he had to choose a lighting which appeared to the eye flat and monotonous, otherwise he got hard pictures. He thought the photographic plate was more sensitive to the contrasts of light and shade than the eye.

Herr Reichard quite agreed with the previous speaker. Very celebrated portrait painters had expressed their astonishment at the lighting adopted in his studio, because it seemed in their eyes flat and wanting in contrast. He had consequently gone to the studio of one of these painters and taken a portrait there, the lighting of which was arranged by the painter, but the result was not successful. Even with a very long exposure the shadow side was not thoroughly worked up.

The Chairman reminded the disputants that the relations between brightness and darkness were quite different to the eye and to the photographic plate, and that in order to have pictures which would look right one must give what appears to the painter's eye a "false" lighting.

Herr HABERLAND complained that plates intensified with Edwards's tensifier became yellow in time. The formula directs that the plates ould not be washed when taken out of the fixing bath; but he had intenied some after, as well as others without, washing them, and the result as the same in both cases—the plates became yellow.

Herr ALB. SCHWARTZ had had the same experience; but with the ordinary ercuric intensifier (laying in of chloride mercury and then coating with nmonia) this fault never occurred.

Herr WIGHT advised washing the plates well, treating them with a twor-cent. solution of muriatic acid, and then washing them well again before tensifying them.

Herr MEYER had remarked that plates developed with pyrogallic acid had greater tendency to become yellow than those developed with iron.

Herr REICHARD laid special stress upon the plates being freed before itensification from *all* adherent chemicals—not merely soda, but also the eveloper, which was difficult of removal, should be thoroughly washed way.

Herr BRAUN remarked that plates were very apt to become yellow when itensified if they have been previously examined by daylight.

The meeting was shortly afterwards adjourned.

Correspondence.

THE HYPO. FIXING BATH.

To the EDITORS.

GENTLEMEN,—Mr. Chas. J. Hall, in your last issue, complains that I 'seem to think" that the proposition contained in Mr. W. Harding Warner's letter [page 125 *ante*] is "utterly absurd." If I had desired to lemonstrate the amount of error contained in the statements of Mr. Warner's anonymous authorities it would have sufficed to point out that a very moderate knowledge, either of chemistry or of the English anguage, is sufficient to show that the assertion that a solution already "saturated with bromide of silver" can be used to fix "any number of negatives"—that is, to dissolve more bromide of silver indefinitely—is contrary to possibility, or, to use Mr. Hall's own language, "utterly absurd."

I did not, however, think it worth while to remark upon such an obvious impossibility, but wrote with reference to the use of a hypo. bath approaching the condition specified, yet still so far from having reached it as to be capable, with a lengthened immersion, of dissolving the bromide of silver, and fixing more or less perfectly the plate; and this question the authorities quoted, the arguments used, and the practice and advice of our best workers are united to settle in favour of a fresh rather than an old fixing solution.

Mr. Hall asserts that my "illustration of allowing a negative to stand in an old fixing bath for a night is a far-fetched one, and not to the point." Such an assertion is very easy to make—much easier than to find argument to support. I will show, however, that my reasoning is strictly to the point. Let a negative be left all night in a fresh hypo. bath and the shadows will remain clear. Let one be left for a similar time in a bath such as photographers generally consider has been worked sufficiently, and the plate will be hopelessly stained. Let a third be left for a much shorter time in a bath approaching only the conditions of saturation with bromide and sulphide of silver assumed by Mr Warner's authorities, and the same result is obtained. Mr. Hall gives confirmation of this statement by his admission that "there is sometimes a little more discolouration than usual." I would rather be without any discolouration as the "usual" thing.

I do not assume that most of your readers would have a bath in use until it had reached this condition, and, therefore, suggested that the longer time should be given with the bath which they would probably possess. When the bath nearly approaches the saturated state premised, a plate containing iodide and richly coated will not be fixed before the staining has commenced. That negatives stained in this manner should print with rather more intensity than those which have been simply fixed is not to be wondered at, especially as the silver image has at the same time been subjected to a species of sulphur toning; but the uncertainty as to the permanency of this last-mentioned change—the slower printing of the stained plate, and the possibility of a little undissolved silver being left in the film to become gradually darker with time—far outweigh the slight advantage of obtaining a little extra intensity, which may, after all, be excessive.

Perfect fixation is so important that it can scarcely be too strongly insisted upon. It must be remembered that, as has been repeatedly pointed out, there is commonly, if not always, a silver compound present which requires longer immersion in the hypo. than is sufficient to dissolve the visible bromide. In two instances I have been consulted by photographers who had been troubled with a crowd of red-brown spots that came over the negative gradually during the printing. Believing the spots to arise from gradual darkening of this silver compound in places where the grains of bromide were the last to be dissolved, I advised the habit of leaving the plates in the hypo. twice as long as was necessary to fix out the visible bromide, and in both cases I have been informed that since this treatment was adopted there has been no recurrence of the evil. Since perfect fixation is so desirable it is eminently undesirable to use a solution—such as one already nearly saturated with silver—that will fix very slowly. If even only one negative be in question, it is desirable to get it thoroughly fixed and out of the bath before the staining action commences—difficult with some plates and impossible with others with a bath near saturation; but when many negatives have to be dealt with, how many dishes and what watching would be required! In my own practice I have regularly kept two hypo. baths in the dark room, both filled with fresh solution. I have latterly added a third, and am about to set up a fourth.

Mr. Hall's argument—that because you would not expect to get good results from developing a picture for a night, therefore you should not consider it an indication of imperfection in a fixing bath that it will spoil a plate left in it for the same time—is, like all arguments by analogy, inconclusive by itself.

If there were a developer A, which would develope in a shorter time than another developer B, and yet would allow a plate to be left in for several times as long as was necessary to produce its effect without stain or injury, whilst B, in the same time, stained the plate destructively, would any one hesitate to say that A was the better developer of the two?

The advantage of the non-actinic colour of the old hypo. bath is so trifling as not to be worth much consideration. When Mr. Hall, however, described it as of "ruby" colour, one wonders whence the rubies come with which he compares it.

Mr. Hall takes up the cause of Mr. Warner's unnamed authorities as warmly as if he were himself the "distinguished amateur" referred to, and felt bound to defend the assertion that he had made. Whether this be the case or not I have no means of judging, further than the improbability of finding each additional person defending such curious views as those set out in Mr. Warner's letter.—I am, yours, &c.,

London, March 30, 1883. W. E. DEBENHAM.

SPOTTING AND BURNISHING.

To the EDITORS.

GENTLEMEN,—The difficulties of "Perplexed Jack," and all his brethren in affliction who have, from time to time, wailed forth their complaints and sought your advice what to do to prevent the spotting being rubbed off by the burnisher, have recalled to my mind the time when I also was afflicted with the same annoyance; and, in the hope of its being of some use to those correspondents, I now give you my method of overcoming the difficulty. Mr. Dighton has sent his method, and, if you care to publish mine also, your correspondents will have two solutions of the difficulty to choose between.

You have frequently advised the use of albumen, but have not said how to use it. I take—

The white of one egg,
Water .... 1 ounce,
Ammonia .... 1 drachm,

and use this mixture to moisten the colour with while spotting. The alcoholic solution of soap, which is afterwards used for lubricating, coagulates the albumen, and, however thickly laid on, the colour will not be rubbed off by the burnisher. Indeed, after burnishing it cannot be removed at all except by scraping.

The colour should previously be rubbed up on the palette with water only, and allowed to dry. Gum must not be used on any account; and, instead of moistening the brush in the mouth, dip it into the albumen solution, which should be kept in a wide-mouthed bottle.

I enclose as a sample a *carte* which I have spotted and "decorated" in this manner. When burnishing it the screw was purposely made much tighter than usual for vignettes, so that the test was rather severe.—I am, yours, &c., JOHN McLAREN.

Larbert, March 17, 1883.

AN APPEAL FROM CALIFORNIA.

To the EDITORS.

GENTLEMEN.—Can you in any way put me into communication with some of the English amateur photographic societies? I represent twenty-five amateurs, and we are very anxious to correspond and exchange prints with some of the European societies.

Any assistance that you can give us in this direction will certainly be appreciated.—I am, yours, &c., W. B. TYLER.

318, *Pine-street, San Francisco, California,*
February 28, 1883.

LANTERN TRANSPARENCIES.

To the EDITORS.

GENTLEMEN,—I read with much interest Mr. Stewart's experiences with the direct printing of transparencies on a citro chloride gelatine film, especially as I myself have been working at the same process and trying to make it a success. Comparing it with gelatino-chloride and gelatino bromide when developed either by ferrous oxalate, ferrous-citro-oxalate, or pyro., I find it has the advantage over these in the great clearness in the shadows which it certainly gives.

I coated a batch with Mr. B. J. Edwards's gelatino-chloride formula, as given in this year's ALMANAC, and succeeded in getting excellent results with ferrous oxalate (six of oxalate to one of iron, well restrained with bromide), and the best ones were those which had a short exposure and a prolonged development (twenty minutes to half-an-hour); but they would not compare, as far as clearness in the shadows went, with those by Capt. Abney's citro-chloride formula, which, I think, for simplicity, vigour, and clear shadows leaves nothing to be desired. My trouble was the toning before fixing. I got very little result with the borax bath, but succeeded better with the lime, though on account of its great reducing action it necessitates longer and deeper printing. The idea of redevelopment in ferrous oxalate after fixing never occurred to me; but as Mr. Stewart seems to have had such success with this plan I mean to try it.

Those who want a really simple and excellent process would do well to try Captain Abney's formula (page 221 of the ALMANAC for 1883), and they will find it to give brilliant transparencies, reminding one of those done by the wet process, and very different from the weak and foggy-looking productions one is in the habit of getting from a gelatino-chloride or gelatino-bromide emulsion when developed. Another great advantage is the variety and superior warmth of tone one can obtain by this excellent process. Will some of the amateur brotherhood try it and report progress?—I am, yours, &c., L. MACDONA.

Cheadle, Cheshire, March 20, 1883.

EXCHANGE COLUMN.

Wanted, a 10 × 8 camera and slides, also a gem and Victoria apparatus, in exchange for oil sketches, 12 × 7, land and seascapes.—Address, J. MALINS, Crosswood, Aberystwith, South Wales.

I will exchange a first-class air-gun, shaped butt, rifle and shot barrels, pump, mould, punch and key, complete, for a Ross's rapid symmetrical, 8 × 5, or a whole-plate lens.—Address, W. K. A., 33, Gordon-street, Glasgow.

I will exchange backgrounds and accessories for others of equal value and importance or for a whole-plate portable folding landscape camera, lenses, and changing-box by first-class makers. — Address, VINCENT HATCH, Huddersfield.

☞ We are compelled to leave over several Exchanges till our next issue.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Thomas Mills, 53, Garth-road, Bangor.—*Two Photographs of Mr. J. H. Alexander (Cymro Du).*

John Smith Pollitt, Barlow's-court, Market-street, Manchester.—*Photograph of the Hon. Algernon Egerton, M.P.*

Albert George Petherick, 12, Alfred-street, Taunton.—*Two Photographs of the Floods in West Somerset, Showing Submersion of Part of the Great Western Railway and Breakage of the Baltmoor Wall, Lyng.*

J. B. J.—Madder brown and Indian ink will answer extremely well. If the tones be very cold add a little indigo.

A. Z.—Sometimes a little hydrochloric acid will remove the stains. If not, try the effect of gently rubbing the glass with putty powder moistened with water.

GEO. PRITCHARD.—The only means by which you can obtain the image smaller, as the dimension of the studio will not permit of your retiring further from the sitter, is to employ a lens of shorter focus.

S. RICHARDSON.—So far as we can judge, the only fault is that the print is very much over-toned. Instead of employing the toning bath warm you would get on much better by using it cold—say at a temperature of 60° or thereabouts.

XENOPHON.—In all probability the proportion of pyro. is too great for the particular kind of plate you are using. Try a one-grain solution in place of the three-grain, and if the image be still too black and white you must increase your exposure.

DESPAIR.—The reason you have spoilt your negatives in attempting to transfer the films is that the coating of india-rubber you applied to protect the film, when the second was poured on, was too thin. Use a thicker solution next time.

G. F. TURNER.—So far as we are aware there is no one in England at the present time who produces the description of photographs to which you refer. They are produced in Paris, we believe. Inquire of Messrs. Marion and Co., Soho-square.

DEVELOPER.—We have frequently explained why the binoxalate of potash is not used. It is far less soluble than the neutral oxalate, and contains besides a very large excess of acid. It may be employed if it is first neutralised by means of carbonate of potash.

J. E. WILSON.—The use of an alum bath after fixing paper prints has been recommended, and many printers employ it, claiming, by its use, to secure greater permanence. When it is used we should not advise the ordinary amount of washing to be curtailed to any great extent.

D. W. T.—You will experience no difficulty in obtaining the French gramme weights from any of the dealers in chemical apparatus. Try Becker and Co., Maiden-lane, Covent-garden. The same remark applies to glassware graduated in cubic centimetres; indeed, the latter is rather more easily obtained than that graduated in grains.

LUX.—1. The "ruby fabric" and paper you name are quite safe if used double—that is, as safe as any coloured medium that can be found.—2. *Papier Joseph*, or fine tissue paper, or even Swedish filtering-paper, may be used for packing between the faces of the plates, and will be much safer than ordinary blotting-paper, either white or pink.

S. W.—The "fading" appears to be due to a change in the colour of the paper itself, and not to a fading of the pigments. Many papers, particularly those made of wood fibre, are very prone to change with exposure to light. Very few samples of paper, indeed, will bear a prolonged exposure to strong light without undergoing some change in tint.

WESTMORLAND.—Evidently the paper you are trying to use is not one specially made for photographic purposes, otherwise it would not turn a "dark brown" immediately after it comes into contact with the silver bath. Discard the sample and get some Whatman's fine drawing-paper, which will possibly answer your requirements better than anything else you can obtain. It is not very expensive.

CARBON PRINTER.—Chromotypes, mounted with the full gloss, should be spotted with oil colour while they are on the glass and before the transfer paper is applied. Take the ordinary oil colour, sold in tubes, and thin it with rectified spirit of turpentine, match the colour of the picture and apply neatly with a sable pencil. The colour thus thinned will dry very quickly. If the spotting be carefully done it will be impossible to detect it when the prints are transferred.

A. J. GRIFFITHS.—We certainly think that, as a specific charge is made for engraving the plates from which the mounts were printed, it is your property, unless there were any agreement to the contrary. If you give an order for address cards, a certain charge is made for the engraving and printing so many cards, and the custom is to deliver up the plate as well as the cards. Why should it be different in the case of mounts? If no separate charge be made for the engraving then you can have no claim to the plate.

G. F. GRAMMER.—Your better plan will be to use a separate solution of sulphite of soda and citric acid, rather than attempt to mix them with the glycerine developer. You must bear in mind that every grain of citric acid added to the sulphite *beyond neutrality* displaces its equivalent of sulphurous acid, most of which escapes, leaving citrate of soda in solution. A saturated solution of sulphite of soda, rendered neutral or slightly acid with citric acid, might be used in such proportions as practice shows to be suitable. If you want the special action of the citric acid in addition to the sulphite, the acid may be dissolved in the pyro.-glycerine solution of Edwards's formula; but you will have to find by experiment what proportion best suits your requirements. The sulphite will be used separately.

GREY FOG.—Having carefully considered your seven questions we think we shall satisfy you best by a general answer. The fog is apparently due to too rapid mixing *at the high temperature*. The same mode of mixing at a lower temperature would probably give a clean emulsion, though, the remaining conditions being the same, not so rapid. The colour of the emulsion is not an infallible test of rapidity; but, other things being equal, a blue or violet colour by transmitted light indicates a higher degree of sensitiveness than a red or orange colour. With careful mixing (so as to produce a red emulsion) at a high temperature a more rapid emulsion will be produced with a given time of boiling than when a lower degree of heat is observed. The acidity of the bromide would tend to clearness rather than to fog. Finally, we may repeat that the fog appears to have arisen from want of sufficient care in mixing the emulsion at the high temperature.

RECEIVED.—W. H. Harrison; George Smith; W. Harding Warner. Thanks. In our next.

WHAT IS PHOTO-FILIGRANE?—"Bravo, Brown! benedictions on Barnes! and a beamish blessing on Bell! for 'photo-filigrane' visiting cards," murmured Henrietta de Bastren, as she gazed with a strange emotion in the monstrous egotism of her passion at Bluchington Montgrove's amber moustache and nose. Bluchington had a pure and innocent mind; but a grave suspicion of distrust flitted over his somewhat austere and ecclesiastical face, as he replied, "Are you a walking advertisement for photo-filigrane?" "No! on the contrary, I'm a 'standing,' though not a standing-still one," returned Henrietta, as with inexpressible grandeur she struck her lover to the earth. Bluchington and Henrietta have not met since this slightly-unpleasant episode, but the mishap does not in any way alter the fact that Mr. Walter Woodbury's invention, "photo-filigrane," is a firm notion. Any readers sceptical on this point had better apply to Messrs. Brown, Barnes, and Bell, who hold the patent for the said invention, and are therefore better able to explain its technicalities than we can.—*Fun.*

LONDON GAZETTE, *Tuesday, March* 20, 1883.

PARTNERSHIP DISSOLVED.

JOHN LORIMER M'LANACHAN AND ROBERT MARGERISON HOBSON, trading as M'Lanachan and Co., Douglas, Isle of Man, photographic artists.

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THE BRITISH
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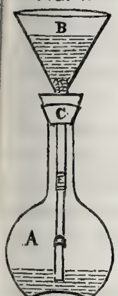
FILTERING GELATINE EMULSION.

Since the description appeared in our last issue of Mr. C. Beckett Lloyd's method of filtering gelatine emulsion and other viscid solutions which require the application of a certain amount of force to make them pass through the filtering medium, we have received several requests for a more detailed description of the apparatus and for diagrams illustrating its mode of action. Though the arrangement is so simple as to scarcely require any further explanation, we think it may probably assist some of our readers if we accede to the request and give diagrams of one or two applications of the steam exhaust principle of filtration.

The diagram (*fig.* 1) represents the simplest form of the arrangement as described last week, and which we subsequently had the pleasure of exhibiting at the weekly meeting of the Photographic Club. It consists simply of a glass boiling flask, A, of any suitable capacity—say capable of holding twice the quantity of emulsion usually filtered at once. A glass funnel, B, is passed through a tightly-fitting cork, C, the joints being made as secure as possible, and the apparatus is ready for work. In the original description, as well as in the filter we exhibited at the Club, an india-rubber cork is used, but subsequent trial leads us to believe that an ordinary cork of good quality rendered thoroughly air-tight by boiling in melted paraffine answers better. The cork should be first attached to a piece of lead sufficiently heavy to sink it below the surface of the paraffine, and heat is then applied until air-bubbles cease to rise from the cork. The superfluous paraffine is removed from its surfaces, and when quite cold it is pierced by means of an ordinary cork borer, the cut surfaces being far smoother than when an unwashed cork is bored.

FIG. 1.



In order to make a perfect joint with the funnel, the neck of the latter is cautiously heated by means of a spirit lamp or otherwise until it is hot enough to melt solid paraffine. It is then passed through the hole in the cork, which will thus be, as it were, cemented to it by means of the paraffine it has absorbed, and a little of the latter may be melted on to the extremities of the cork where the funnel enters and emerges. If this be done at a sufficiently high temperature, when cold the cork as well as the joint will be perfectly air-tight.

Some doubts have been expressed with regard to the safety of the operation of heating the flask with so small a quantity of water as one drachm; but with ordinary intelligence and care there is not the slightest danger. If the flame of a spirit lamp or "Bunsen" be applied to the *bottom* of the flask a fracture is nearly certain to occur, as the quantity of water mentioned is insufficient to cover the internal curve. If, however, the flask be held in a horizontal position and the heat applied to the *side*—where the water then gravitates—the operation is of the safest. But it is not necessary to use a spirit lamp at all, as the flask may be immersed in the ordinary emulsion boiler until filled with steam. If the small quantity of water inserted in the flask be objectionable as an addition to the emulsion, it may be ejected by reversing the flask immediately before inserting the cork.

As regards the filtering medium, there is choice of a variety of materials. Filtering paper is not to be recommended, as, in addition to other objections, air is drawn between the filter and the funnel, and a great portion of the power that should be exercised on the surface of the emulsion in the funnel is wasted. For the same reason chamois leather and similar materials should be avoided, nothing answering so well as a plug of some fibrous material pressed tightly into the neck of the funnel, through which nothing but the emulsion can then pass. Cotton-wool, sponge, tow, or glass-wool are all useful, the two last being, perhaps, the best. Let a good-sized "plug" be used, as if it be too small it will probably be sucked through into the flask, so great is the force created.

In order to avoid, as far as possible, the formation of air-bubbles, it is as well to attach to the end of the funnel, by means of an inch of india-rubber tubing, a piece of glass tube sufficiently long to reach within a-quarter of an inch of the bottom of the flask.

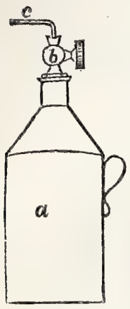
Little more can be said with regard to the use of this apparatus than was described last week. The flask is filled with steam, the cork inserted as promptly as possible, and the emulsion poured into the funnel, also with as little delay as conveniently may be. The rapid insertion of the cork is needful, as, naturally, the steam commences to condense immediately the heat is removed from the flask, and so long as the latter remains open air has free access and so the vacuum is spoilt. It is also advisable to pour in the emulsion quickly, otherwise the comparatively free passage of air through the filtering medium has a like effect. An additional refinement, which would materially increase the convenience of using the apparatus without adding very greatly to the cost, would be a funnel fitted with a glass tap, by which the communication between the interior of the flask and the funnel could be entirely shut off at will. This would permit of a more leisurely mode of working, and also enable the filtration to be stopped at any desired moment. Such funnels may be obtained at from two shillings each.

We may add that one or two suggestions have been made with regard to the substitution of alcohol, ether, and other more easily-volatile liquids for water in order to facilitate the filling of the receptacle with condensable vapour. We have no hesitation in saying that such a course is the reverse of desirable, since nothing like so good a vacuum would be obtained by any other liquid. No known liquid expands in the process of vaporisation to anything like the extent that water does, a single minim being sufficient to fill with steam a flask of the capacity of three and a-half ounces. Besides, water is the cheapest liquid and is obtainable everywhere, and the time occupied in raising one drachm to boiling point need not exceed at the outside one minute.

We will conclude by giving a diagram and brief description of another application of the principle, and one which will be found extremely useful for many purposes where a portable aspirator is required. The diagram refers to an arrangement we have roughly

constructed for our own use. *a* (*fig.* 2) is an ordinary paraffine oil tin, the neck of which is closed by soldering. *b* is a common gas-cock, also soldered into the neck of the tin, and with a piece of bent brass tube, *c*, screwed and soldered into the opposite end. If the tin itself be a good one and the soldered joints be all right, it is clear that we can preserve a vacuum in this arrangement for practically any length of time until it may be required, and that it may be carried about from place to place.

FIG. 2.



To use it: hold the tin for a few seconds over a Bunsen burner, and the cock being open quickly dip the tube *c* into water, a quantity of which will be drawn in. Again hold it over the "Bunsen" until steam issues violently from *c*, when close the tap, remove the heat, and the apparatus is ready for use immediately, or its force will keep. It is only necessary to connect *c* by suitable means to any vessel to be exhausted, turn the tap, and the vacuum commences to work at once.

EQUALISING THE RAPIDITY OF TWIN LENSES.

Last week we described how two lenses of dissimilar foci could be adjusted with the greatest accuracy, so as to be employed as "twin lenses" for the production of stereoscopic pictures. We now recur to the subject for the purpose of directing attention to another point, which has to be considered in connection with pairing lenses for binocular purposes beyond that of equalising the foci of the two instruments, namely, that they must both possess the same degree of angular aperture, otherwise they will not work with the same speed.

It is seldom that any two lenses by different makers will be furnished with stops of exactly the same size, therefore, after the foci have been successfully adjusted, it is necessary to turn attention to the sizes of the apertures. Supposing we have a couple of lenses whose equivalent foci we have rendered identical, and the diaphragms of each are dissimilar in size, we take the largest stop of one lens and out of a piece of cardboard make another with exactly the same size of aperture to fit the slot of the other lens. This stop is then carefully blackened so as to avoid reflections from its surface. When this is done, the two lenses with the diaphgrams are screwed on to the camera and tested by exposing a plate, purposely giving a considerably shorter exposure than is known to be necessary if we wished to secure a good negative, so that any inequality may the more readily be detected.

If on development the two halves prove equal in exposure, well and good; we have now only to make the apertures of the stops of both lenses equal in size. This is easily accomplished by enlarging those of the smaller set with a half-round file, using those of the other set one by one as patterns. At the same time care must be taken that the edges of the openings are bevelled off at the same angle, and also that they are perfectly blackened, so as to prevent reflections both from the edges of the openings and the flat surface of the metal. When blackening the modified set it will be advisable to treat the other set in the same way, so as to secure uniformity in the two sets, for the reason we shall presently explain.

A case may arise of two lenses not working with equal rapidity though the sizes of the diaphragms may be the same, which is not improbable when the lenses are by different makers; and, even if they are by the same maker, if they were made at different times the glasses of one may be less perfectly polished than the other, or the glass itself or the balsam with which the front combinations is cemented may be yellower in tint in one case than in the other. In the event of this arising, the only plan is to adjust the stops by direct experiment. This is best done by taking the largest stop of that lens which is the slowest and making the opening slightly larger than the corresponding aperture in the other, then exposing another trial plate as before, and making a further enlargement if it be found necessary. When once the largest stops are adjusted, so that the exposure is equalised, all the others can then be altered. If this be done in the same ratio as the first one no further test plates will be necessary.

It sometimes happens that lenses which are issued by the maker as being accurately paired do not work with the same degree of rapidity, although the equivalent foci may be identical and each set of diaphragms have exactly the same size of aperture, while possibly, the lenses were made at the same time and, presumably from the same pot of glass. Now, so far as stereoscopic pictures are concerned, a slight inequality in the exposure of the two halves of the negative is not really of very serious importance, as the pictures when combined in the stereoscope will not show the difference although it is always very desirable to have the pictures exactly alike. But, in employing twin lenses for other purposes—such as taking two or more *cartes de visite* on the same plate—the case is totally different; for, unless the lenses are equal in rapidity, one half will be better exposed than the other, and consequently there will be a difference in the density of the two negatives, so that one will print in less time than the other. This will entail considerable inconvenience in the printing, particularly when a large number of duplicates are required.

Several instances of this discrepancy have at different times been brought under our notice, even with lenses by our best opticians, and the cause, in some instances, we have found to arise from very trivial circumstances. In one case, a pair of *carte-de-visite* lenses of some eight inches equivalent focus were placed in our hands, together with some negatives taken with them. There was a palpable difference between the two halves of the negatives, yet the instruments themselves were by a first-class optician, and were supplied as being accurately paired. Upon careful examination we found the equivalent foci were identical, and that the size of the apertures in the two sets of diaphragms coincided exactly. The glasses were then removed from the mounts and placed upon white paper; but no difference whatever in tint could be detected, either in the single ones or in the cemented compounds. For some time we were puzzled to account for the difference, until we noticed that the blackening on the inside of the tubes was different in character. In one instrument it was a very intense dead black, while in the other—the quicker of the two—although it was very black it had more of a grey tone, and, moreover, the coating had less of a matt surface.

At our suggestion the interiors of both tubes were recoated with a dead black varnish. This had the desired effect, as, upon trial, the lenses were now found to work identically in every respect. The slight reflection from the sides of the tube of the lens which had proved the quicker had acted the part of a secondary exposure on the plate.

In another instance a pair of *carte-de-visite* lenses of smaller size than the above were shown us, in which we detected the cause of the difference in rapidity at once. We found that the slot for the diaphragms in one tube was much wider than in the other, while the diaphragms themselves were of the same thickness; hence a slight amount of diffused light found its way through the opening, and acted upon the plate in the same manner as just described. This was rendered conclusive by the following experiment:—When the lens tubes were covered up with the focussing-cloth while a negative was being taken no inequality could be detected between the two halves; but when the cloth was removed, and another plate exposed, there was at once a palpable difference.

Whenever two lenses which have been supplied as a pair are found to work unequally, the tubes should be at once carefully examined for defects such as we have just alluded to, and particularly it should be seen that the sliding tube fits accurately into the rigid one, so that no light gains access between the two. The camera, also, should be critically examined to see that no light is admitted round the flange of the lenses, and that the interior of it has no reflecting surfaces, bearing in mind that the faintest gleam of diffused light acting on one half of the plate will give it the appearance of having received a fuller exposure than the other.

Although we have at various times easily detected the reason that "paired" lenses work unequally, we have not always been successful in doing so. We have in our mind just now a pair of stereoscopic compounds, by a leading optician, which we have most

itically examined in every way, but have failed to account for the anifest difference there is in rapidity between the two instruents.

A ONE-LENS OUTFIT.

'UR readers will scarcely imagine us desirous of endeavouring to iow the inutility of setting out to photograph with a number of enses rather than with a single instrument; yet there is so much to be iid in favour of working with one lens that it may be thought worth 'hile to devote a little attention to the consideration of the matter. Ve do not desire to look at it so much from the standpoint of the iere tyro—the beginner in the art—as from that of an exerienced and skilled hand. The ranks of photography have lately ieen swelled to so great an extent—and will, we believe, coninue to be so to a still increased extent in the immediate future—hat it is well to make this remark, as, from what appears to be iassing before us, the "output" of cameras and lenses on a cheap cale during the last year must have been enormous, and utterly inprecedented even in the old days of the stereoscopic fever.

Taking, then, an experienced photographer as our exemplar, it is in undoubted fact that many such set out upon a photographic tour without thought of a second lens. They have their camera with its lides, their one lens, their tripod, and they want no addition to the weight of what is already a heavy encumbrance when a walk of ten r twenty miles lies before them. When they are amateurs they iave not, as a rule, set out to take one particular view; they hotograph for their own pleasure, and it is hard if in a day's walk hey do not secure a few negatives of high calibre and fit for exhibiion. "What," they would say, "could be wanted more?"

With a professional photographer the case stands upon an entirely lifferent footing. He sets out to take certain views or buildings, ind for his pocket and reputation's sake he cannot afford either to lose the opportunity of obtaining a negative of every subject required, or to take a picture from an unsuitable standpoint or at an unsuitable distance, on account of optical requirements governed by the use of only one lens. Hence a professional photographer has to ensure the securing of the largest number of negatives well taken, while an amateur simply takes such views as appeal to his fancy and are adapted to the restricted scope of his instrument. He loses many opportunities of obtaining beautiful views and effects, but he saves his purse and his muscles, and is responsible to no one for failure or inability to secure certain subjects.

By working with one lens only many incidental advantages arise. A considerable amount of haziness exists in the minds of many photographers, professional and amateur, as to the lenses to choose, and, simple in the extreme as the question is, we know from what has come under our own observation that the principle upon which a series of lenses should be chosen to be of the greatest use is often little understood. We are aware of instances of a photographer possessed of three lenses—a wide angle, a narrow angle, and a medium angle—the true functions of which he must have been quite ignorant of, as the focus of each happened to be almost alike; yet he had a system of his own for selecting the one to use for a certain class of work, though we have a shrewd suspicion that there was one favourite lens which did the bulk of the work. To such a one the use of a one-lens outfit would be a positive advantage, as, granting that all which gave straight lines were equal in quality, if the one with the widest aperture were selected it would, by the use of diaphragms, be capable of doing all that the other could do.

In all instances when, through lack of teaching or want of time to master little technicalities, ignorance of the kind we describe is likely to exist, it is perfectly obvious that the use of one lens must be far more likely to lead to the production of a distinctly better average of work, the possessor not being harrassed with conditions of whose true bearing he is ignorant. Particularly may this be said in view of difficulties with diaphragms; for, although so much has been written on the relative rapidity of diaphragms and the simplicity to which a description of the proportions they bear to one another has been reduced, there yet remains a want of knowledge on the matter which is extremely surprising. On this account alone we cannot avoid thinking that to a beginner, or one who can devote little time to the study of the subject, a one-lens outfit is a decided advantage, and will be till he has mastered his work and learned thoroughly the little that is needed to acquaint himself with the powers and capabilities of other lenses he may employ.

There is a gain, too, in discarding all but one lens that should not be lost sight of. When a camera is needed for use with not more than one lens there is less occasion for that variety of accommodation in the camera which has been brought to such perfection in the more recent instruments, and, in consequence, lightness (the one important point to the tourist) can be consulted in the highest degree, and economy can be practised without loss of efficiency.

The old Kinnear camera will be familiar to many of our readers. A most useful instrument it has been; but in its earlier form it was not adapted to the employment of lenses of widely different foci. When the shorter-focus lenses were introduced it was found that the camera would not close sufficiently to allow the lens to focus. This could be obviated by boring fresh holes for the screws that secured the back; but the side swing which the first form so ingeniously provided for was put out of court, and there were difficulties with the bellows cutting off portions of the field of view. The endeavour to meet these difficulties led to the introduction of improved cameras, till at the present time we possess apparatus in this country which we suppose is unequalled the world through, but in many cases at a cost of increased weight and extra expense.

Finally: we would say that for the beginner the use of a one-lens kit will enable him to master the art with greater facility, and for the tourist it renders possible a decided diminution in the weight of his apparatus; but when the utmost variety in the way of securing views and buildings is requisite to be mastered, if the photographer only posses a one-lens kit it will necessitate many possibilities being discarded.

FROM an announcement in another column it will be seen that photography is to be represented at the forthcoming International Exhibition to be opened at Calcutta in December next. Major Waterhouse, who is a member of the Executive Committee, has kindly offered his assistance to any intending English exhibitors, and the agent in England is Mr. W. P. Dilworth, 4, Westminster-chambers, London, S.W.

OUR readers have been kept *au courant* with the progress of astronomical photography and of its employment in the various transit of Venus expeditions; and we may here note as worthy of record a protest from Trinity College, Hartford, Conn., U.S.A., by Professor Hart, who states that the report in a contemporary that a photographic process was employed by the German Imperial Commissioners in their observations in the college grounds is not correct. He writes that "besides contact observations they restricted themselves to the use of the heliometer."

IN the almost inaccessible observatory on Ben Nevis, where the indefatigable Mr. Wragge has established so many meteorological instruments, one which he considers as amongst the most important is the instrument for measuring actinism designed by Dr. Angus Smith, who, further, lent the one he himself used. It is employed at Ben Nevis to measure the actinism both of the sun and of daylight; and, to use Mr. Wragge's own words, is "an immense acquisition to a meteorological observatory."

IF there be one mode of treating spirit (to obtain it of greater strength) that has been brought before the notice of photographers more than another it is that of placing it, whether methylated or plain, in a bladder, and allowing it to remain in a warm place for some time. It has been stated that when taken out the specific gravity will be found much reduced in consequence of the preferential evaporation of the water. This pretty idea—fathered upon Sœmmering, and generally taught—is stated by M. H. Gal to be completely false. So far from the alcohol becoming stronger it becomes, he states, weaker when in contact with a membrane. And

the long-existing error cannot be explained on the supposition that where the folds of the bladder were not reached by the liquid the aqueous vapour might escape before the alcoholic; for his memoir states that the vapour of the liquid also becomes weaker in alcohol under such conditions. This he explains very simply, by pointing out that in air alcohol encounters a space containing not a trace of its own vapour, whilst water finds an atmosphere already more or less saturated.

A VERY important paper on the decolorising of shellac has been published in an Austrian periodical. We cannot do more now than briefly refer to it; but we trust to make the experiments suggested, when, if they prove successful, we will bring them before our readers. It is known that the ordinary mode of bleaching shellac consists in dissolving in alkali and precipitating by chlorine—a process, however, which deprives the resin of some of its most valuable properties. Herr Andes dissolves the shellac in solution of carbonate of soda by adding it gradually to the latter at boiling temperature, and then, after a few minutes' ebullition, firmly luting the lid of the boiling vessel and allowing the whole to cool. A cake of fat forms on the top. This is to be removed, the liquid strained, and the dissolved matter in the clear solution precipitated by the addition of sulphuric acid, drop by drop. The precipitate is to be well washed, to free it from acid, and treated in the old style—pulled out while soft, wrung, and twisted. It is said that all the good qualities of the lac are preserved, and that it makes an excellent light-coloured varnish.

IN certain circles it has become rather the fashion to speak in terms of depreciation of electric lighting, its prospects, and the cost of its production; yet a careful observer cannot fail to be struck with the continually-increasing area over which it is becoming utilised. Night is now turned into day in a double sense in many large manufactories by means of the electric light, and to many printing offices it has become a necessity. Quite recently the *Daily Telegraph* offices—where one form of lamp is in nightly use in the printing and folding rooms—were visited by an official deputation from Leeds, who were much impressed with the value of the light. We learn that part of the Reform Club is to be experimentally lighted, and from every quarter news of such trials arrive. To the photographer who desires to utilise electricity in his studio these facts are of great interest, and aid him to believe that the time may not be far distant when the cost of employing it will not be prohibitive.

MEANWHILE he must do the best he can—where his business will not afford the cost of electric lighting plant—with the means already at his command. Unfortunately gas, as an artificial illuminant, seems to have too many difficulties in the way of its employment to permit of its common use; but Professor Tyndall has published the result of some experiments which go to show that there are far more possibilities in gas than have been in the slightest degree approached at present. Stating that the amount of light given off by a gas burner is governed by the temperature of the flame, he shows that a very minute part of the energy produced by the consumption of gas assumes the form of light. Only one-twenty-fifth of the radiant energy is luminous, and, as the hot products carry off at least four times as much energy as is radiated at all, it follows that not more than the one-hundredth of the heat evolved in combustion is converted into light. What possibilities are not here shadowed forth!

WHEN gas is used in the work room, as is now so frequently the case, the fumes evolved are both disagreeable and noxious unless they be carried away by some kind of flue. How frequently (or infrequently) this is done our readers best know. We lately called attention to a method of depriving the fumes of their noxious character by suspending a sheet of perforated zinc some distance above the burning gas. Dr. Joule, however, has recently brought before the Manchester Literary and Philosophical Society a means of bringing about the required end in a still more efficient manner. He places slaked lime in a vessel the bottom of which (about a fo in diameter) is slightly domed and perforated with fine holes. T vessel is suspended about six inches over the flame. It is found th a stratum of lime about four or five inches deep suffices to remo the acid vapours to such an extent that the residual fumes will n redden litmus paper.

SOME REMARKS UPON THE IMPROVEMENT OF CAMERAS.

FOUR or five years ago I asked the attention of photographers to a improved camera designed principally for studio work, in whic repeated adjustment or focussing could be made without having t close the shutter or disturb the dark slide after it had once bee placed in position. The period being prior to the general introduc tion of gelatino-bromide into photographic establishments, sufficien care was not taken to provide for the non-admission of light to th sensitive surface when the internal screen or mirror of the camer was moved from its angular position to a horizontal one, or the reverse; therefore the instrument did not, perhaps, receive the attention it deserved. This defect, together with the probability that the greatly-exalted sensitiveness of the new process would tend to remove the necessity for any such contrivance, put the idea aside, till it has again appeared that some arrangement of the kind for the purpose in question is quite as desirable as in the old wet-plate days.

To those who do not recollect the camera, as exhibited and described at the annual meeting of the Photographic Society of Great Britain in the early part of 1878, I may say that it consisted in the addition to an ordinary camera of a silver on glass plane mirror in the interior of the instrument, having a specially-devised movement from a position at an angle of 45° to a horizontal one, and a focussing screen inserted in the top, over which was erected another similar but fixed mirror, also at an angle of 45°, to view the image when reflected on the ground glass by the lower one. In practice the slide, with its prepared plate, could be placed in the camera, and the shutter drawn ready for exposure before any adjustments of the figure or the operation of focussing had been proceeded with, because the necessity for making use of the ordinary screen at the back, as usual, is abolished. The mirror of the interior at this time being in its oblique position protects the plate, and diverts the image to the upper ground glass, where all the preliminaries are effected. The lens may then be covered and the mirror raised by means of a small lever at the side of the camera to a horizontal position, in which it closes the aperture above and leaves the instrument clear of obstruction for the light admitted by the lens to act upon the plate. The operation of focussing may be repeated as often as necessary by the simple act of lowering the mirror and raising it again out of the way.

It will thus be seen that this mirror in reality confers on the lens the quality of being its own finder, with the advantage that the image as focussed and as received upon the sensitive plate is from one and the same point of view instead of from two different ones, as when a couple of the same focal length are employed. This may not be of much importance in landscape, but is very important in portraiture, where an alteration of six or eight inches in the point of sight would just miss the mark. It is scarcely necessary to give instances where the preliminaries to taking a portrait must be repeated, because a week in any portraitist's experience will provide sufficient to illustrate, especially if his "sitters" include children and animals; so here this part of the subject may be left.

The camera I constructed was intended, as I have stated, for wet-plate photography; therefore no great care was taken to prevent the admission of very weak diffused light. With the advent of gelatine, however, this lack of complete exclusion constituted a serious objection. Much of the failure in this respect arose from defective workmanship, the model being a home-made affair; the remainder proceeded from no provision having been made to prevent the entrance of light when the mirror was passing from one of its positions to the other. In a well-lighted studio, with the camera fully exposed, the danger from this cause would not be slight, but fatal to the idea unless some means were adopted to remove the evil. The remedy I have to suggest is to glaze the upper screen with a piece of ground yellow glass, which is observed on the upper mirror of the supplementary camera through an eyepiece, or a couple, as space will permit. The coloured glass would not be detrimental to the operation of focussing by lowering the illumination, nor would the eyepieces, either open or fitted with magnifiers, affect it—the latter being a positive advantage if made to fit the brows, as in the better kinds of stereoscopes. Open ones would, perhaps,

preferable, lest a magnifier should at any time project an image ı very bright object in front of it upon the camera screen behind The probability of that occurring would be slight, because it is ite the usual plan to keep the apparatus covered with a cloth— ficient in itself, if *always* used, to dispense with any extra pre-ıtions in the use of coloured glass.

[n fitting cameras with this system of mirrors it is compulsory to ›vide for the focussing of the image to be effected by moving › front of the camera, so that the original adjustment of equal tance intervening between the lens and sensitive surface or linary focussing-screen and that of the lens to the upper one by lection may remain undisturbed; to prevent the passage of light ınd the edges of the mirror by a fitting of wood-work; and, ıo, when lenses of short focus are employed, to arrange the mirror move as much as possible in a line with its position of rest, before takes the turn upwards, for its lower edge to clear the lens.

Instead of setting the mirrors in the manner as above indicated, small one or a right-angled prism may be made to answer if ounted together with a ground glass and eyepiece, at their proper stances, in a square tube made to slide before an opening of suitable ze in a partition placed between the lens and plate-carrier, to shield e film from light when the mirror is slid into position to divert e rays either upwards or to the side as may best suit the con-ɔnience of the operator.

In respect of this mirror arrangement: I should be very glad to e something of the kind introduced. Therefore, if anyone interested esire more details than he can find in this or my former paper on ıe subject, published in the early part of 1878, the endeavour to ford them will give me much pleasure.

A very desirable and useful improvement in field cameras consists ı having a means of raising or lowering and securing the rising ont in position without the necessity of having to leave the back f the camera to do this at the front. No better mechanical con-rivance than a milled-headed screw of suitable length, whose hreads number three or four to the inch and working in a nut, eed be desired. The screw in its collar should be fixed to the top f the camera, and the nut to the inside of the front. Such an rrangement is much superior to a rack-and-pinion movement, ›ecause the pitch of the screw will, while ensuring a quick motion, ıfford ample support for the front and lens without using a binding crew. This appliance will necessitate the elastic partition for tereoscopic photography to be hooked into eyes on the inside of the amera, instead of fitting into cut-away openings, as at present, to ›bviate the need for removing the front whenever it is to be used.

JOHN HARMER.

LANTERNS AND SLIDES.

No. VI.

WE have next to consider the light which it is best to employ. There can be no doubt that the nearer it is to a point the more perfect will be the results. The nearest approach to a point is the electric arc light, which is likely to be out of ordinary reach for many a year to come yet. The next best and, therefore, the most practical is the oxyhydrogen or lime light, of which there are several forms. The most perfect is that in which pure oxygen and hydrogen are mixed together in the proportion of two volumes of hydrogen to one of oxygen, the point of flame produced by their burning at a small jet being directed upon a pencil of lime or similar non-combustible material. The mixture of these gases is, however, so dangerous that, although it is just possible for the jet to be made safe, the risk of explosion is so tremendous that the use of mixed gases in this form is now definitely abandoned, although it used to be a lecture experiment.

In what is now known as the mixed gas burner the gases are kept under pressure in separate bags, and only mix inside the jet just before they are to issue from it. As, however, there is supposed to be an element of danger about this form, it is very generally superseded by the blow-through jet, in which a jet of oxygen is made to pass through a hydrogen flame already burning. Any flame which will burn in common air gives greater heat if fed with oxygen instead; but none has hitherto been available in which the heat produced is comparable to that of hydrogen, which is, therefore, still used where a maximum of light is required. It is, however, a troublesome gas to make on the moderately-large scale required for lantern work, though easily enough prepared on a small scale for experimental work, or on a very large scale, if it were so wanted. The most convenient and most generally-accessible substitute for it is common coal gas, and a less effective though still efficient substance is alcohol. The vapours of benzole and ether have also been employed, but are not yet widely known or used. The most commonly-employed method is to take the supply of coal gas from the house service and convey it to the jet in the lantern, where a supply of oxygen from a bag or other reservoir is made to blow through it on to the lime.

A story was told me the other day of a *soirée* given at one of the large manufacturing centres, when the chairman, in opening the proceedings, announced that unfortunately some part of the proposed entertainments would have to be abandoned in consequence of illness of the performers, but that at anyrate they had Mr. ——'s dissolving views, which could not fail. The moment came—sooner of course than was originally intended for the room to be darkened by turning down the gas at the main, which was the only place, when, lo! the light in the lantern was turned out also, and then too late it was found that there were no appliances within reach for bringing a supply of gas to the lantern. The dissolving views, therefore, did fail, and the entertainment came to an end; indeed it did not begin. The moral, of course, is to see that there is a supply of gas independent of the main.

Even at the best it is far from convenient to have a long tube dangling from a gasalier or trailing along the ground. This difficulty can be got over, and the apparatus compactly fenced in away from the inquisitiveness of meddlesome spectators, by having the hydrogen or coal gas in its own bag, even though it is intended to use the blow-through form of jet, on account of its safety. But is there any danger in using the two gases in separate bags under pressure, and allowing them to mix in the jet before burning? Scores of persons will be ready with a positive answer, "Yes!" and quote instances where explosions have taken place. Too true—many of them even fatal. But, the cause? Back pressure—that is, unequal pressure on the two bags—the one gas being forced back into the other bag until the mixture reached an explosive state, when undoubtedly the sudden relaxing of the pressure would and did let the flame rush back into the bag, with terrible consequences. To meet this difficulty back-pressure valves—ingenious arrangements—have been devised; but are perfectly inefficient one and all to prevent the explosion if the cause, mixed gas, be in the bag. But it will be said these back-pressure valves prevent the possibility of the gases becoming mixed in the bag. To this I reply they do nothing of the kind, for it is almost impossible to produce back pressure at all. The explosions have happened of course and very frequently; but it has been ascribed to back pressure in order to conceal or explain away culpable folly and negligence.

If an operator have not intelligence enough to understand the manipulation of oxyhydrogen he had better keep to sperm oil, for a two-wick paraffine lamp would be dangerous in his hands, while the humouring which a four-wick, or even a three-wick, lamp requires would be far beyond his reach. The truth is that oxyhydrogen is very simple to manage, and even the mixed gases (in separate bags) perfectly safe with ordinary care if once the principles are understood.

Let us consider a moment what takes place. First, the hydrogen (or coal gas) is turned on and lit, and then turned down a little; for if the full current of hydrogen were on there would not be room enough for the oxygen to pass. The oxygen is then turned on till the best light is obtained, and then checked. If too much be supplied the light goes out. It is quite clear, therefore, that the oxygen cannot pass back into the hydrogen bag without first putting out the light. The operator would naturally, without any teaching, turn off his oxygen, because he would not care to waste it. All danger of back pressure would then be at an end. On the other hand, if the hydrogen were passing in such excess as to drive back the oxygen only hydrogen would be burning at the jet, and, therefore, as there would be no light his attention would be instantly called to it, and no back pressure would take place.

What really happens is this:—In theatres and such places where the lime light is much used the practical working is left to uneducated persons, and it is with them principally that these accidents happen. The hydrogen burns much faster than the oxygen, and when the one bag is empty the other is still partly full. In refilling, the *wrong bag* sometimes gets filled, and then the light will not go right. The operator gets "fiddling" with the weights on the pressure-boards, and "up goes the donkey!" I am quite satisfied that, long before back pressure could occur to an extent which would render the bulk of gas in the bags dangerous, explosion would be determined either inside the jet or in the tube, where it would be innocuous, but that even this is impossible with moderate attention. One precaution, too seldom taken, is absolutely essential. The oxygen bag should be marked with an immense "O" and the hydrogen bag with an equally large "H." Another:—If there be

any suspicion that the bags leak, under no circumstances test either with a light.

The oxygen must be passed through a washing-bottle before going into the bag, and the water should contain a little caustic soda to neutralise the chlorine which always passes over with it. The washing-bottle should be large, and, if possible, contain ice, so that the oxygen, being cooled, may contain no more watery vapour than it will hold without depositing it inside the bag, where, of course, it would tend to rapidly destroy the fabric.

For limes none are better than the "Excelsior," which, besides being of excellent quality, are most perfectly packed. The lid of the case fits into a groove filled with sealing-wax, which has to be heated in order to open the box. On closing it the wax is again heated, and the case thus hermetically fastened. For ordinary home or school work, the lime light is hardly needed; though it is really very little trouble, and the light vastly superior to that given by any oil lantern.

Of the oil lanterns it will be supposed that I naturally prefer the sciopticon. I do, and for these reasons:—It will burn steadily for four hours without the slightest attention. The light is ample with properly-transparent slides—such as our own or albumen or carbon—to illuminate an eight- or even a ten-feet disc, while the heat which it evolves with only two wicks is quite sufficient to warm a moderate-sized room in winter without the aid of a fire. Three wicks we abandoned years ago as difficult to manage, and, therefore, inefficient. The light power, although a great advance on the old form of oil lantern, being moderate, every attention has been paid to economising it as much as possible by the adjustment of foci of condensers and front lenses, and by the focussing arrangement I have described; consequently if, instead of the oil lamp, a lime jet be substituted, it is far more powerful than the ordinary lime light lantern.

There is another point on which the expensive lanterns of the biunial and triple types are unscientifically constructed. I have shown that the best results are to be attained by definite positions of light, condenser, and front lens. When, therefore, the lanterns have to be tilted so that the discs may coincide on the screen, all three should work together, instead of which the condenser and front lens only move together, while the light has to be readjusted by two separate movements. All this inconvenience and a good deal of the uselessly-expensive brasswork of the fronts might be obviated (as has been done by Mr. W. J. Chadwick) by making the lanterns separate and hinged together at the front, with the further advantage of being able to use one separately for other purposes—such, for instance, as enlarging. But the dealers find their profit in the glittering milled-heads, which serve no earthly purpose except to extract a higher price than would be necessary for a more scientific and more useful instrument, and the public blindly buy, fully convinced that the higher the price the better the article.

George Smith.

TRANSATLANTIC JOTTINGS.

The editor of the *Photographic Times* (New York) has some good hints on producing portrait negatives with pictorial backgrounds. The method would be very useful in some cases, though perhaps not for regular studio work. Our readers will recognise it as a modification of a process which caused a great amount of discussion in our pages a number of years since. It consists in interposing a transparency between the lens and exposed plate immediately after exposure, the sitter retaining his position unmoved the whole of the time. The exposure with the sitter is made with a drab background, while for the second exposure it is replaced by a white one. It is obvious that some special contrivance will be needed to bring the transparency in front of the negative without loss of time. A light hinged frame lying at the bottom of the camera is suggested. A little ingenuity will be required to carry this idea out, but it is capable of many useful and pretty variations.

It does not need any argument to show how disappointing at times is the effect of a landscape in the finished negative compared with the appearance it presents to the eye, the charm of varied colour in the view so often misleading the judgment and causing any but the most experienced hand to form a false estimate of its photographic capabilities. It is recommended to reduce the picture to a study in monochrome by simply viewing it through a piece of violet glass, which will then practically bring the lights and shades to such relative depths as will fairly represent their photographic value.

Mr. E. L. Wilson, in touching upon his experiences of foreign photographing, gives some amusing bits of experience. He thinks that, though it is far easier to take instantaneous views of places with wide-angle lenses, yet he recommends—and carried out in his own practice his recommendation—the photographer to take picturesque "bits" and studies, when full details could be given, in preference taking his risk of extra trouble being involved. He writes:—"I should prefer to secure some bold, well-lighted selected 'bit' which would display the chief characteristics of the architectural and general appearance, than I would go to a distance and get the whole of the building in my picture—to have *my foreground disgraced* by a lot of moving people or dilapidated buildings, or policemen standing near to!"

In writing on *Common Lenses in Photographic Use* we must expect an editor of an American journal to dilate on things American; hence, although it is well known that a large number of English instruments are used across the Atlantic, we find no notice of any of them, though instruments of native manufacture are well to the fore. We find no fault with this, and the more so that important improvements in photographic optics were originated in the United States. The Morrison lens is an old friend, though the Waterbury is less familiar, perhaps, on account of its being a landscape lens of the old type, which, though for a time grown out of date, are now much more in favour than they have been for years.

There is little doubt that stereoscopic work will in the now immensely-increased number of amateurs find more favour than it has done. It is singular that such wonderfully beautiful effects as the sterescope produces should have gone so entirely out of favour, yet such is the case, though the signs here and there that occasionally meet our view lead us to the supposition above expressed. In *Unfrequented Paths in Stereoscopic Photography*, the editor of the *Times* introduced us to a useful effect which an exaggeration of the stereoscopic principle allows us to produce. It was desirable to take a view to show the indentation of the coast line of a certain lake frontage, so as to show it in high relief in the stereoscope. An ordinary view gave a mere flat outline, but by taking the two views a considerable distance apart the utmost relief required was obtained. In the case in point this had to be done by rowing the boat to the first desirable point as shown on the ground glass and then uncapping the *right* lens of the binocular camera, and after rowing some fifteen or twenty strokes to the *right* again focussing the view and uncapping the *left* lens. The view so taken was quite sharp, thanks to gelatine plates and a drop shutter, and the effect stereoscopic in the highest degree. We may note that to produce relief from distant objects it is always necessary to take the two pictures from standpoints wide apart, the only objection being that the effect suggests a small *model* rather than nature itself.

GETTING READY.

"Getting ready!" There is a pleasant ring in the words, coupled, as they are, with enjoyable outings, blue skies, and balmy breezes. The very wet and gloom of town in winter becomes more bearable as we anticipate the rambles through shady lanes and by rock and waterfall we hope shortly to enjoy. The contrast between the soot-begrimed twigs of a London garden in February and the rustling, leafy glades sprinkled with sunshine of a few months hence in the country, makes one all impatient to be up and doing, gathering some of the beauties that will surround us to add to our store of pleasant recollections, for such our photographs are. As we look them over, incidents otherwise forgotten are vividly brought to mind, though years may have passed. Perhaps the actors—even the places themselves—are changed beyond recognition or may be entirely passed away, or at least so altered from what they once were as to be past remembrance, and our pictures the only links that connect us with pleasant memories of the past. To be a good photographer one's heart must be in the work, whether for business or pleasure it must be more or less of a hobby; and in making preparations for it, so that he can pursue it with a maximum of pleasure and a minimum of disappointment, "getting ready" is a very important prelude. Provision has to be made for numerous contingencies by methodical and careful preparations that are calculated to save a world of trouble when at a distance from head-quarters. Scores of both amateur and professional photographers are waking up from their winter's rest to debate the kind and dimensions of the work they intend to do on their approaching summer campaign.

Since the use of gelatine dry plates has become so general, a marvellous increase has taken place in the army of photographers. Hundreds of amateur recruits are yearly added that, had our old and well-tried friend wet collodion remained in the ascendant, would still have continued in blissful ignorance of instantaneous shutters and alkaline development.

Now, however, *nous avons changé tout cela*, and camera-makers and dry-plate manufacturers find their hands full of work, making, altering, and improving to meet the requirements of their numerous *cliéntèle.* The fact of so many taking up photography as an amusement has induced me to write on a subject which has already been so much better written upon by others—I was about to say exhausted and worn threadbare; and, instead of telling the same old tale, I was at first inclined to give the subject a wide berth. I must endeavour, however, metaphorically to run off the metals and plough up the ground between the lines, as our new methods of working have in a measure afforded the opportunity.

To begin with: what does a new desciple of this alluring pastime expect to do? To make himself famous as a portraitist? To eclipse Rembrandt in effects of light and shade? To put Canaletto to the blush with architectural and sunny pictures? Or only to bring home with him reminiscences of his trips? Whatever and whichever exists his mind should be made up before he starts. So much good work can now be done with lenses which in the old wet-plate days were for certain classes of subject entirely out of court that, provided he get good lenses of the rectilinear type, protraiture and instantaneous views can be managed without large apertures, and straight lines secured in architectural subjects with the same instruments.

The size of the pictures to be rendered is a primary consideration, bearing in mind every inch extra in size causes more than a corresponding increase in the weight and bulk, especially noticeable if the apparatus be carried by one's self. Therefore weight and bulk are two very important considerations, and in a great measure to determine the size of the plates to be worked. The beginner generally "hankers" after large pictures, and if he start with a small plate—say quarter size—he is not long before he gets discontented and "goes in" for something more important. But if pleasure is to be combined with work, there must be some limit to size unless he be one of the favoured few who rest all the weight-carrying responsibility on other shoulders. For my own part, I think whole-plate ($8\frac{1}{2} \times 6\frac{1}{2}$) size is quite as large as may be conveniently and pleasurably dealt with, for pleasure goes in inverse ratio to size when one has to carry his own apparatus, and I am no advocate for making a toil of a pleasure. With half-a-dozen double dark slides, and an arrangement in the camera for cabinet pictures or quarter size, the photographer is provided with quite sufficient for a hard day's work; in fact, more than sufficient if his subjects are as carefully selected as they ought to be. There is no greater mistake made than exposing on every pretty subject that attracts at first, as more often than not on better acquaintance much of the beauty vanishes. The rule should be to as thoroughly learn your subject as time will permit, for it is only by continual and long practice that the photographic value of a view can be accurately judged.

Since the optical lantern has come so much to the front negatives on quarter-size plates can be taken expressly for it. In selecting views for this purpose a slight difference in principle must be adopted to that for ordinary work. It is a well-known fact that the size of a picture has considerable influence in determining its artistic value; so in composing a view for this purpose (the lantern), more stress must be laid upon the necessity of seeing the picture as you wish it than in trusting to arrangement upon the focussing-screen, which in this case is a secondary matter. A mass of light that in a small picture would look in proper proportion to the rest of the subject would, probably, when enlarged in the lantern, be exceedingly objectionable, and present a wide, bald space which, although not altogether untrue to nature, would be very inartistic. The least appearance of emptiness in small pictures intended for enlargement is a fatal objection if a pleasing and well-composed study be desired.

Absolute sharpness and definition must be carefully obtained by the aid of a magnifier; much more care in this respect is necessary than for views that are to be printed only the size of the original negative. Nothing is more disappointing than an out-of-focus picture on the screen.

I find I am getting to work in the field rather than making preparations for a start; so to return to the beginning:—Having decided upon the size of the plates, the camera and stand must be selected. If they have to be purchased they should possess the three qualities of lightness, rigidity, and few loose pieces; the rest depends on the taste of the user. If the camera is already in hand, and has been used for wet plates, it must undergo a most careful scrutiny to ascertain that no light gets to the plate except through the lens; a minute hole of no consequence in working collodion may be sufficient to spoil a day's work. It is always advisable to wrap up the camera in a focussing-cloth when at work. A large opaque focussing-cloth is therefore desirable; it is very little extra trouble to do this, and it is a great protection in case of having overlooked some tiny hole in the bellows or flange—the most likely place for faults of this description.

Each dark slide should be enclosed in a seperate bag as a protection against light and dust. Captain Abney recommends such bags should be made of india-rubber. I use black twill, but have no doubt india-rubber would be a more efficient protection; in any case too great care cannot be exercised in this particular.

Now, as to the plates to be used: as far as my experience goes plates of a moderate degree of rapidity are preferable to those excessively so. So much has been written *anent* the preparation of gelatino-bromide plates that numbers of amateurs make their own with facility and success. The simple operations involved are easily mastered, and the principal difficulty lies in drying the plates after coating. If a dark, well-ventilated room be available, and under the entire control of the plate-maker, there need be little difficulty in successfully accomplishing the manufacture. The precipitation method of Mr. W. H. Burton doing away with the necessity of washing the emulsion, the whole process may be conducted in such a room with very little mess and a tolerable certainty of success; and there is certainly more real pleasure and credit in having prepared all that is required for an outing than having been dependent for a great part on other people. Moreover, by making plates at home and testing their quality, information is acquired of much use in the final development. I would, therefore, advise those who can to be their own plate manufacturers.

I would also suggest that in packing the plates they should be done up in smaller parcels than usual, and containing different quantities—say a dozen, divided into three parcels of two, four, and six. This division will save unfastening, when, perhaps, only one or two double dark slides have to be filled; and the less the plates are exposed to the air and chance of light so much the better for the plates.

The historical bit of string, knife, and half-crown should always be part of a photographer's kit. The twine will often be found useful; the knife ditto, especially if it be provided with gimlet and screw-driver; and as to the half-crown, in small divisions, it is marvellous what an astonishing effect it has, for it will provide willing models, it will stop the traffic in a country road, provide pictures, give subjects for views requiring them, and often save the tired photographer considerable unwonted exercise. By no means omit the half-crown.

To conclude: always start on a trip provided with every necessary, never trusting to the chance of obtaining a requisite at the journey's end.

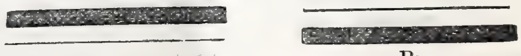
EDWARD DUNMORE.

IODIDE OF SILVER IN THE EMULSION.*

HERR SCHUMANN is (says the *Wochenblatt*) again extremely busy with the large Steinheil spectrograph, which has just reached him, checking the results of his smaller instrument. As was to be expected, with this new apparatus, the prisms of which, three in number, are made of flint glass, the maxima lie more towards the refrangible side of the spectrum which extends far into the ultra-violet. Of course this circumstance can exercise no influence upon the fact that iodo-bromide of silver plates are much more sensitive to the less refrangible rays than pure bromide of silver plates, since that result, obtained with the same apparatus and under equal conditions, is thoroughly indisputable. Herr Schumann writes to us:—

"My last plates of December, 1881, I have latterly tested spectroscopically with Steinheil's large spectrograph. The plates belong to two parallel series, which contain respectively bromide and iodo-bromide of silver. The emulsions were boiled 15, 30, and 45 minutes, and after boiling 45 minutes were treated for 30, 60, and 90 minutes with NH_3. I have cut one part of the plates into strips, and exposed these strips in sets of four. I have also used bromide and iodo-bromide plates lying upon one another for taking a group of plants, and for the spectrum light. It was constantly shown, as I had previously found, that the preparation containing iodine is considerably more sensitive to the less refrangible rays than pure gelatino-bromide of silver is; and, secondly, that it absorbs many more rays than the latter. In the stereoscopic camera I took two photographs, in one of which the bromide plate lay uppermost, and in the other the iodo-bromide plate.

Br Br I



Br I Br

Simultaneously I exposed in another camera a further pair of plates. For the former the lens was an aplanatic, and for the latter a portrait lens, both by Liesegang. While all three absorption plates developed an image already partly over-exposed, there was scarcely a trace of an image to be seen upon the bromide plates, which were undermost. It was quite otherwise with the iodo-bromide. The bromide plate laid above it had allowed quite a considerable quantity of light to pass through it—a quantity which sufficed for the development of a pretty distinct image. These plates have given me great pleasure. Though the iodo-bromide plate—which contains about one-fourteenth Ag I—has absorbed nearly all the light, yet it is extremely pale. The want of intensity is so pronounced that at first I thought the bromide plate must have lain above it; but on exact examination one finds that the bromide plate is at least not more sensitive than the iodide plate. The slight intensity of this iodine preparation, and also of those which were treated with ammonia, is quite surprising, and I might almost assume that it is a consequence of the plates having been kept ten months. The bromide plates behave the reverse way; they are dense and have a hard action, particularly in the high lights. To this presumed change I shall next direct my attention.

"The spectral views, taken with Steinheil's perfect apparatus, offer, when compared with my small spectrographs, a whole series of important points, new to me. I shall not mention them, because in the above-mentioned cases I only tested old plates, and their behaviour is different from that of fresh preparations, to which I shall for the present limit my inves-

* Continued from page 123.

tigations. All that I shall say is:—1. That these bromide plates are *somewhat* more sensitive to the ultra-violet rays than the iodo-bromide plates. 2. That the maximum sensitiveness, especially of gelatino-bromide, appears to lie nearer the violet than is the case with my small spectrographs. 3. That the maximum action of the rays of the magnesium light is perceptible in the ultra-violet; and it almost seems to me that the gelatino-bromide is the more sensitive here. Iodo-bromide, indeed, as formerly, shows a maximum between E F, yet it by no means reaches the height of the ultra-violet maxima. Though there are certain points respecting Steinheil's apparatus which I cannot yet intelligibly explain, yet there are two which I must confess:—1. The spectrograph is very transmittent for the more refrangible rays, and particularly for the ultra-violet. 2. It works very rapidly and gives a sharp picture of the lines. Besides that, I cannot yet judge of the productions of this spectrograph, because I have only used it for photographing with for a short time.

"In order not to offer up an extensive series of plates—the preparation of which has taken weeks—as a sacrifice to my uncertainty in spectrographing, at the end of next week I shall test a series of *mixed* gelatino-bromide and iodide, which will not take long to prepare. I shall simply prepare two emulsions—one with Ag Br and the other with Ag I. After being washed, these will be mixed and then immediately poured upon plates. Nine preparations will be made, containing respectively 0, 1, 2, 3, 4, 5, 6, 8, and 10 per cent. K I to 100 K Br. I choose finer gradations on account of the previous results. These plates will then be spectroscopically examined:—1. By sunlight, or, failing that, by the light of the clouded sky. 2. By magnesium light. 3. By petroleum light. 4. By the light of the electric spark, if I meanwhile obtain the altered spark apparatus. Further: in order to ascertain the absorption I shall make exposures in the stereoscopic camera according to the following scheme:—

Br I 1 2 3 4 5 6 8 10%

Br

1. Exposure. 2. Exposure.

Br

Br I 1 2 3 4 5 6 8 10%

3. Exposure. 4. Exposure.

All the spectra will be taken upon bromide and iodo-bromide plates, placed alongside of each other, each 12 c.m. long and 5 c.m. wide. Perhaps I shall also place together plates made of strips which shall contain all the preparations. Such strips can be cut very cleanly and rapidly, in the dark, from poured plates by my new cutting apparatus.

1	2	3	4	5	6	8	10

In a few nights—say, by the end of this month—I hope to be able to place the results before you."

The foregoing, says Dr. Stolze, is very interesting in more than one respect. Amongst other things it raises anew the question of the keeping qualities of emulsion plates, and, combined with Herr Schumann's former spectral views, upon older plates, which lie before us, it offers quite peculiar vouchers for it. Herr Schumann had already alluded to the very slight intensity of these pictures on old iodo-bromide plates; now, however, this behaviour appears still more distinctly, while the bromide plates behave in exactly the opposite way. Here, a region for research, which has latterly been several times disturbed, lies before us in a new form:—What, so runs the question, are the changes which in course of time take place in pure bromide of silver films and in iodo-bromide of silver films? Do they consist only of the direct action of air, moisture, or harmful gases upon the silver salts, or is the change introduced indirectly by a decomposition of the gelatine? In the course of time does some of the iodide of silver form a double compound with the bromide of silver? or should, under certain circumstances, addition of the iodide of silver, perhaps, bear the blame of the now-frequent decomposition of gelatine plates, which commences at the edges?

All these questions are raised here and await an answer. Time will be required to find one; but it will be found, and we may hope that Herr Schumann, with his untiring zeal, will not be the smallest contributor to this work. May he succeed in solving this riddle also, and so bring his great experiment to the most admirable conclusion!

(To be continued.)

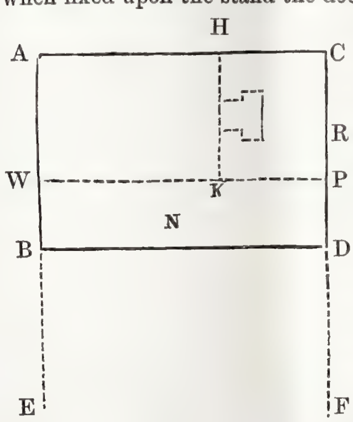
THE WANTS OF PHOTOGRAPHIC TOURISTS.

When recently making a selection of photographic apparatus to take with me during a trip to Switzerland, the discovery was soon made that there is room for considerable improvement on the part of manufacturers in the construction of photographic appliances really useful to the tourist, who wishes not to take an unnecessary weight of baggage.

Mr. W. England and Captain Abney have pointed out that the best thing in which to carry glass and bottles of chemicals is a basket. The sides act as springs when thrown about by railway porters, and if the bottles inside are carefully packed in paper this mode of carrying them is the safest of all. Yet I could find no photographic dealer who had baskets suited for the purpose, and after some trouble discovered a place in Covent Garden, where one was obtained adapted to the purpose. If photographic dealers supplied neat square baskets, into which one or two zinc washing baths are fitted, in which, again, the tourist could pack the camera and the rest of his photographic necessaries, the boon would be great; for it should be borne in mind that in travelling on photographic aims intent, little things make all the difference between comfort and discomfort. The French and the Swiss are remarkably clever at making elegant basket portmanteaus; in fact, the best on sale in England are imported from France, and, like the patterns on clothing fabrics, bear the marks of the refined taste of that country.

Then, again, in travelling it is well to use as few flat developing and washing dishes as possible. The liquids are liable to splash over the table, and, if dishes about the house be used for washing, only one or two negatives can be placed in each dish at a time, and the space occupied, the amount of splashing, and the quantity of water required are great. All this is a nuisance in the bedroom of an hotel, and dipping baths, each holding one plate, so that the plates can succeed each other in rotation in alum solution, washing waters, and so on, would be useful. But numbers of ebonite dipping baths are both expensive and liable to warp in the heat of southern climates, earthenware and glass are too heavy and liable to break, and there is no reason why tin dipping baths for water and those liquids which will not attack them, should not be in the market for the benefit of the photographic tourist. There is also room for improvement in tourists' cameras, and in these days of a return to the dry plates and to the lenses of old, made available once more by the rapidity of gelatine plates, I should like to see a return to the box cameras of past times, with improvements. Most tourists' cameras are made on the assumption that he has unlimited time at his disposal for screwing, unscrewing, and working over those parts of the apparatus which display the ingenuity of the maker. In the days of the old box cameras I tried to abolish this waste of time in my own case; and the ideal which makers should strive to reach is that the operator shall have but one screw to fix, namely, that attaching the camera to the top of the stand, when all shall be ready for work, lenses and everything being in position.

A camera which would meet some of these requirements is represented in the accompanying diagram, in which A B C D is the box, and when fixed upon the stand the doors at the end of the box, with hinges at B and D, are opened outwards and allowed to fall to B E and D F, when all is ready for use. The focussing-screen is at A W, and the front of the camera, H K, carrying the lens, can be moved by screw backwards and forwards in the box, and be made to project outside it at R when required. The box must not be so long from A to C that when using any ordinary lens the sides of the box at C P shall cut off any of the view. The dark slides and other things go in the space N, and when the view is taken the lens and front are screwed back to the focussing screen A W, leaving a large space for the insertion of a leather receptacle, containing spare lenses, focussing-cloth, and other necessaries.



In this camera there is great rigidity, and the additional weight to the operator is not so very great, since the sides of the box to so large an extent form also the sides of the camera. The rigidity might be increased by making the two doors at the ends of the camera without hinges and to pull out altogether, so that they could be laid on the ground while the view is being taken, and not flap about attached to the camera when there is wind.

Rigidity should never be sacrificed to light weight. There is nothing more annoying than gimcrack apparatus, however well made, which trembles in the passing breeze and sails over the precipice when borne by a moderate gust. The legs of tourists' cameras are usually too long; there is small necessity for the ordinary length, and by making them shorter they need not be constructed to fold. I cannot see the advantage of folding legs, for they are less easy to grasp with the hand and to carry than the unfolded ones, which are also useful to "poke about" with in hedges, streams, and mountain snows. Short, sturdy legs, which do not fold, help to give great rigidity.

Then the screw which fixes the camera to the stand should have a hole in the head of it, to run a string through, with a bag at the end, in which stones can be put when the wind is high. Years ago, during two or three weeks' photographing of sea views at St. Bride's Bay, on the romantic coast of western Wales, I used several of the appliances herein described, and the wind was never any bar to photographic operations; the sturdy little camera would work steadily in a gale, and it was so constructed as to waste little of my time in fitting it up for each view.

How many manufacturers of photographic apparatus have the forethought even to bore a hole through the nut of the camera screw of the tourist's camera? Does one exist who does so? In speaking to a dealer in things photographic about these matters, and grumbling somewhat that not much apparatus seemed to be made by those who had practically felt and understood the wants of photographic tourists, the dealer said, in effect, that many of the things on sale were not made by practical photographers, but by men who had been told once how to make an article by some photographer, and worked away all their lives blindly making the same old thing, like a horse in a mill. Is there no dealer who will make it a special branch of his business, by attention to little things, to save time, trouble, and weight of baggage to tourists?

There is no tourists' camera in the market that I know of fitted with a falling front, yet such are necessities in the Alps when taking views, the major part of which is sometimes below the level of the horizon. Falling fronts are useful when photographing certain engineering works, such as dock gates, when the water is low and the camera is on a level with the upper part of the gates. Mr. Donkin, if my memory is not at fault, once published how he was put to some trouble in making a falling front to his camera, which he used at such high altitudes that he cut the top off the Matterhorn and some other noted mountains to make level space on which to plant his camera legs.

W. H. Harrison.

A TOUR IN ITALY WITH THE CAMERA.
No. IV.

Leaving the Piazzetta, by turning to the left towards the Riva degli Schiavoni we come to the "Ponte," which spans the canal leading to the gloomy "Bridge of Sighs." What memories of the past does that bridge awaken as it rises up before one! How many a tale of woe has been consummated in that elegant structure! The "Pozzi," or half-ruined dungeons, by the side of the narrow and dark canal, with the place where criminals were executed, dark and gloomy enough even now to make the timid shudder, may be inspected:—

"I stood in Venice, on the Bridge of Sighs;
  A palace and a prison on each hand:
I saw from out the wave her structures rise
  As from the stroke of the enchanter's wand.
A thousand years their cloudy wings expand
  Around me, and a dying glory smiles
O'er the far times, when many a subject land
  Looked to the winged lion's marble piles,
Where Venice sate in state, throned on her hundred isles."

Bearing in mind its sombre past I waited for a day when nature seemed in harmony with the surrounding scene. I found that on a dull, cloudy day, with the smallest stop, a couple of seconds or even less was an ample exposure to get an excellent picture.

With regard to the weather I was really very unfortunate. Other times when I have visited Venice I have looked in vain for the cool shade of clouds or a soothing shower; but then I always went in June or July, after ten months of English winter. This time, as it was the end of September, it was but natural to expect a little gloom and wet, more especially as the whole of Europe was being denuded by floods.

One bright, sunny afternoon, after a dull morning, I set out desirous of getting a few instantaneous views of moving gondolas. Through the courtesy of some Italian officials I was allowed a place for my camera-stand on the Piazzetta landing-stage of the "penny" steamboats which ply to and from the railway station. By-the-way, these steam launches do not seem to harmonise with the surrounding order of things. In consequence of their rapidity they are the terror of every gondolier; moreover, they are his competitors, for they will do the same trip for a penny, whereas he would require more than ten times that amount. Besides, they are altogether inartistic, being perfectly trim and matter-of-fact little boats, and by no means in keeping with the art city. Having posed my camera I had first of all to explain to a number of officials present the wonders of my apparatus. Its "finder" and "Chadwick," which I was using, seemed more especially to interest them. This ordeal over, I sat down and waited for "shots" at passing boats. The difficulty here is getting them to come "within range." Usually they would either be too far distant or else too near, However, I succeeded in varying intervals in getting "shots" good, bad, or indifferent. The same evening during development I learnt that one-quarter of a second (the exposure I gave) was too long compatible with sharp definition for close objects; also that it was possible, even when the light was not at its best, to expose one-tenth of a second or even less and yet get satisfactory results.

Next day, being fairly fine, I again set out with the same object in view. This time I met with a *contretemps* of an unfortunate nature. I had fixed my Chadwick shutter very carelessly on the lens. Several pictures were satisfactorily taken with it, and I was following another in the finder when off tumbled my "Chadwick," and in one bound was in the sea. My excitement so much upset me that it very nearly caused myself and camera to take a "header" into the water after the lost shutter. However, I thought better of it, and decided upon offering a reward of five francs for its recovery. This very soon had its effect, for first one boy and then another divested himself of all unnecessary clothing and was soon fumbling at the bottom, which, fortunately, was not deep, as it was close to the shore. At first I was afraid they would be unsuccessful, but not for long; for one boy, more fortunate than his fellows, came to the surface in high glee, and in another instant he landed with the shutter, not much the worse for its salt-water dip, when an exchange much to our mutual satisfaction took place.

After remaining in my hotel for a few days I found, if I wished to get most of the important views of Venice, I should have to stay a considerable time unless I could take advantage of favourable weather in getting more views by changing my plates. With this idea I consulted my "*Padrone*" on the subject, suggesting that he should find me a *camera obscura* where I could carry out the necessary operation. He was obliging, and various cupboards more or less large, were shown me. However, the chief feature about these *cameras* was not the *obscura*. At length I selected the best, and by a judicious application of matting it was rendered tolerably light proof. At first I used to change plates in the dark, but afterwards found it more convenient to rig up my ruby lantern.

Laden with my apparatus—which in Venice I usually carried "rigged up"—I went direct to the Piazzetta, the rendezvous of the gondoliers. This time I had decided to take a picture of one of these interesting boats in semi-repose. After selecting one to my mind I called for the attendant gondolier. He soon came, and answered as usual my question "parlez vous Français?" in the affirmative. These fellows are, however, "old birds," and not unfrequently their whole vocabulary of the French language is summed up in "Oui, monsieur," in answer to this question. The one I had selected was a species of this genus, for I soon found out that if I wished to communicate I had better trust to the small amount of Tuscan I possessed. By dint of some exertion I led him to understand that his gondola was a great point of attraction with me; in other words, that I wished to photograph it. Unfortunately there was a fair tide on, which made matters difficult; but, what was worse, my gondolier had no idea of "artistic merit." He was evidently fresh this bright morning, for he could not keep steady an instant, but was ever on the move on his own account. Sometimes, when I wished him to be near that I might focus, he would row away a hundred yards or more; then he would rush down with the flowing stream; then again he would row as hard as possible inshore up to me. He was doubtless trying to do his best; but when I caught him tying his boat to a man-of-war lying some distance off, and afterwards to the buoy at the head of the vessel, I was fairly annoyed. He wished to oblige. Might he just go and borrow an anchor; then he could "fix" his boat just where *signore* wished. After half-an-hour or more spent in the attempt this last suggestion was too much, more especially as a crowd around me had attained unpleasant proportions. I therefore called my gondolier and made a hasty embarkation. I next made his boat grace one of those "canal scenes" which in Venice are so varied, so picturesque, and so admired.

One of the best-known views of Venice is that one looking up the Grand Canal from the Piazzetta, or thereabouts. On the left is the fine Church of Santa Maria della Salute, which was built as a votive offering by the Venetians after terribly suffering from the plague, from which some 40,000 persons perished. With its magnificent cupola and dazzling white marble columns glittering in the morning sunshine it is one of the chief landmarks of the city. A very interesting trip may be made and many well-known views obtained, more or less artistic, but all interesting, by engaging the services of one of those bronzed gondoliers and his boat for a trip up the Canal Grande, which is nearly two miles in length by thirty to sixty yards in width. This is the great water highway of Venice, and occupies a very similar position to our Regent-street or Strand, or the Parisian boulevards. Everywhere there is busy life. Gondolas and other craft are flitting in all directions. There is very little mercantile traffic except in barges, for the water is too shallow for vessels of greater draught.

Starting from the Piazzetta and leaving the Salute on our left we glide onwards past large hotels, once palaces of rich Venetian patricians; then, passing under the iron bridge, our gondolier will not forget to pause to point out Palazzo Contarini. It is, with its white marble balconies and columns most delicately wrought, one of the finest *façades* in Venice. Passing on we come to Pal. Foscari, a handsome structure in the pointed style of the fifteenth century. Then on the same side Pal. Balbi and Pisani attract our attention, whilst on our right hand the gondolier will indicate Pal. Mocenigo, once occupied by Lord Byron; then we pass successively Pal. Corner, Grimani, and Loredan, each of which was once the dwelling-place of princes. Before each palace door are marble steps leading down to the water's edge. They were once trodden by men who in their time guided the destinies of nations; now "they are crumbling to the shore." Those great wooden posts in front are painted with the colours of the family, and are used as moorings for their gondolas. This is especially a favourite neighbourhood for artists, and consequently for photographers who make art their study.

Pursuing our voyage a little farther we suddenly find a splendid marble arch, forming a single span across the Canal Grande. This is the Ponte di Rialto, or Rialto Bridge, the most interesting of all bridges of Venice. and for many years the only bridge across the canal. Its width is some 150 feet, over thirty feet in height, and rests on some 12,000 piles.

Similarly, all the houses and palaces of Venice have arisen, as it were, out of the sea. The whole city is a colossal edifice on piles, and, in order to support the enormous weight put upon them, only the finest and hardest trunks were employed, selected from foreign lands and brought to Venice by her vast mercantile fleets. The neighbourhood of the Rialto is a busy quarter, for close by are the markets for fish, fruit, and vegetables. The best view of the bridge is obtained from the right-hand side previous to passing beneath it.

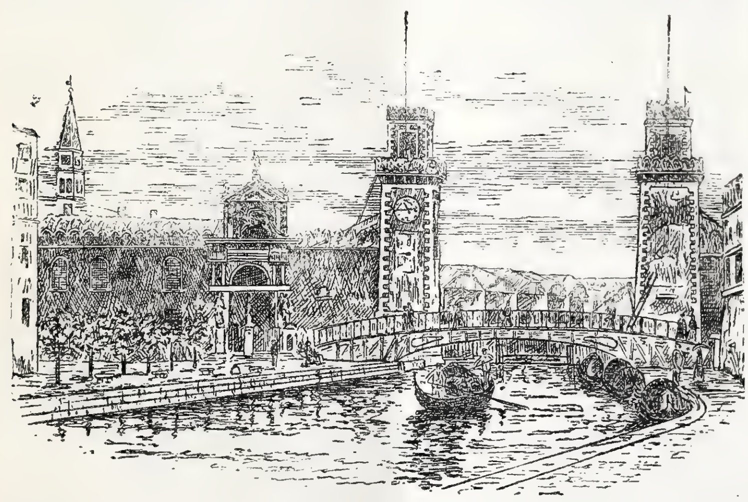
Leaving the Rialto we pass, close to the bridge, the Fondaco de' Tedeschi, which used to be the chief meeting-place of German merchants, besides serving as a deposit for their wares from the thirteenth century upwards, but is now utilised by the Government. Further on the same side is the Ca d'Oro with its wonderfully-sculptured façade; then the Pal. Vendramin-Calergi—a very fine renaissance edifice erected over 400 years ago; but, as with most of these palaces, time has done its worst. Both in the interior and exterior the impression of decay is forcibly conveyed to the mind—a glorious past blended with a squalid present. On the other side our attention is chiefly attracted by the Fondaco de' Turchi, built in the Romanesque style of the sixteenth century. This handsome edifice formerly belonged to the republic, but was given up for the use of Mahomedan merchants. Here the Koran used to be read and the blessing of Allah invoked, and here congregated all the oriental life of Venice. This beautiful building has been carefully restored and has quite a recently-built appearance. And so we hasten on towards the lagune between a few more minor palaces which merely serve to show how greatly Venice has fallen from her high place among the nations. Yet again those lines recur :—

"Those days are gone, but beauty still is here."

And to the art-seeking photographer Venice is—

"Still dearer in her day of woe
Than when she was a boast, a marvel, and a show."

The view illustrating this number is that of the Arsenal. The decay of Venice is here especially apparent. In the palmy days of the



republic this establishment employed some 16,000 workmen, but now only some 2,000. At the entrance stand four antique lions from Greece, one of which is said to have stood on the battle-field of Marathon. The interior is well worth a visit, and contains a fine collection of arms and relics of ancient Venice. J. J. Acworth, F.I.C., F.C.S.

FOREIGN NOTES AND NEWS.

Retouching Regarded as a Fine Art.—Electric Illumination of the Dark Room with Red Light.

Whether photography be an art or not has been a matter of dispute for some years; but an ingenious Italian has, according to the *Archiv*, obtained the recognition of retouching as a fine art, and his story shows the shifts photographers are driven to for their own protection in countries where there is no copyright act. In 1867 the photographer, Signor Carlo Naya, began to publish an extensive series of reproductions of works of art in the palace of the Doge and in the Venetian churches. He sent the negatives of these reproductions to an artist named Marcovich to be retouched, and paid him for his work in the course of a year the sum of 45,000 lire (about £2,000)! A number of these photographs were copied by a firm called Sargenti, and thrown into the market. Signor Naya's first complaint about the piracy was rejected by the law court before which it came, because Italian law affords no protection against imitation to purely chemical-mechanical productions, such as photographs. Signor Naya, therefore, laid his negatives before Signor Fabris, the conservator of the Doge's palace, and received from him a judgment to the effect that they had been retouched by the hand of an artist; that heads—and whole figures, indeed—had been drawn in by hand, these heads and figures not having come out in the negatives on account of the unfavourable colour of the originals, and that this supplementary work should be regarded as specially artistic work. Signor Naya further brought undeniable evidence that Sargenti's pictures were not original photographs, but copies of his. The negative retoucher had placed a sign agreed upon on every negative. He had removed a leaf on the point of a twig, or a small ball at the summit of an obelisk. Each of these distinctive marks could be seen on examining the original negatives, but they were absent both in the prints and in the copies. A small pamphlet on the above case of piracy has been published by a Venetian advocate, Lepoldo Bizio.

In the *Correspondenz* Dr. Th. Stein writes as follows :—

"In order to light the dark room quickly and conveniently with a red light by which to work with gelatine plates I employ two methods—one with the aid of a small incandescent lamp, and the other with the addition of a red illuminating Geissler's tube. Both methods are easily established and may be mounted at comparatively little cost. The mode of using them requires but little explanation. I use for the first mode of lighting two small Grove zinc and platinum elements, the current from which passes through a small incandescent lamp blown of red glass. The current from a pair of such elements is extremely constant, and is sufficient to maintain a thin, spiral platinum wire enclosed by the red glass during four or five hours at an equally clear glow, the illuminating effect of which, as transmitted through the lamp glass, is sufficient for photographic operations. The small battery remains constant for even a longer time if, whenever one leaves the dark room, the current be cut off from the lamp by means of an interrupter. This "break" consists of a simple knob inserted in a small board, which one has only to press in order to prevent the current from reaching the lamp. The second arrangement consists of three parts—a single exchanging element filled with solution of chromic acid, a Ruhmkorff inductor, and a Giessler tube, from which red light streams out as soon as an electric induction current passes through it, and which serves as a lamp for photographic purposes. When one enters the dark room with the plate to be developed, it is only necessary to press down the zinc of the exchanging element in order to set up an induction current, which, in its turn, sets the Giessler tube going. The latter arrangement, on account of its comparatively weak light, is only suitable for working with small plates or for amateurs, while the arrangement first described lights a dark room quite sufficiently by the aid of the small glass lamp. Small incandescent lamps in combination with exchanging elements were recommended for lighting dark rooms with some time ago, yet the method in question could not be used for a long time continuously, because the exchanging elements develope no constant and sufficiently-intense electric current. I obtained the apparatus described from Herr W. C. F. Müller, of Hamburg, manufacturer of electric glass wares; but they can, no doubt, be easily procured from any shop where apparatus for use in experiments in the different branches of natural philosophy are sold."

THE SPECTRAL BEHAVIOUR OF MIXED GELATINO-IODO-BROMIDE.

For my previous experiments with gelatino iodo-bromide of silver I had always dissolved both haloid salts, together with the gelatine, in water, and then added the nitrate solution. The influence of silver iodide so precipitated upon the sensitiveness of the gelatino-bromide of silver is sufficiently well known from what I have published in this journal and in the *Archiv;* but not so the spectral behaviour of iodo-bromide emulsion, which is obtained by mixing ready-prepared gelatino-bromide of silver with gelatino-iodide of silver. Neither Dr. Székely nor Professor Eder, who after the former first examined the behaviour of mixed gelatino-iodo-bromide of silver, gives us an explanation of its sensitiveness to colour. This is so much the more regrettable because quite lately we have learnt to value highly the advantages of spectroscopic experiments in determining the sensitiveness of photographic plates, and have derived therefrom important advantages, both in theory and practice.

My predilection for examining gelatino-iodo-bromide induced me within the last few days to prepare an emulsion according to Dr. Székely's directions, and to compare it, on the one hand, with analogously-prepared pure gelatino-bromide of silver, and, on the other hand, with an unmixed gelatino-iodo-bromide of silver. In the following I show, along with the final result, the way in which the plates were prepared; yet not as if I intended to offer anything new in these latter details, but only to allow others to have a perfectly-clear conception of the experiment.

When I completed the emulsification with silver oxide and ammonia it was principally in order to be able to compare it with other rapidly and analogously-prepared gelatine emulsion. Whether emulsion boiled, digested, or treated with ammonia, &c., and mixed, behaved like that prepared by me with ammoniacal silver oxide I must for the present leave undecided. What I maintain in the following lines, on the basis of my present experiments, relates, therefore, only to mixed emulsions prepared with ammoniacal silver oxide.

Homogeneous gelatine for the preparations Nos. 122—132a.
18·0 grammes Simeon's hard gelatine.
180·0 c. c. of distilled water.
Soak for six hours.

Pour out—

Melt for $1\frac{1}{4}$ hour in a water-bath of from 8—60° C.

16·5 grammes for No. 131 }
16·5 ,, ,, ,, 132a } Allow to set.
Remainder ,, ,, 132 }

No. 131. *Gelatino-iodo-bromide of silver, unmixed* (prepared with ammonia silver oxide).

a { 16·5 grammes Simeon's hard homogeneous gelatine
1·2 ,, K Br (according to Eder) from Theodor Schuchardt, Görlitz
0·06 of a gramme K I, from Ed Liesegang, Düsseldorf } Melted, temperature at the commencement of the mixing $38\frac{1}{4}$° C.

b { 1·5 gramme $Ag\,N\,O_3$ }
0·06 ,, ,, } 1·56 $Ag\,N\,O_3$ from Th. Schuchardt
15·0 c. c. of distilled water
$N\,H_3$ added until the precipitate is dissolved } Cold $15\frac{1}{2}$°C.

c 2·5 c. c. cold of distilled water for rinsing after the ammoniacal silver oxide.

No. 132a. *Pure gelatino-iodide of silver*, prepared with ammonia silver oxide.

a { 16·5 grammes Simeon's hard homogeneous gelatine
1·4 ,, K I, from Liesegang, of Düsseldorf } Melted, temperature at the commencement of the mixing $38\frac{1}{4}$° C.

b { 1·2 gr. $Ag\,N\,O_3$, from Th. Schuchardt
15·0 c. c. of distilled water
$N\,H_3$ added until the precipitate is dissolved } Cold, $13\frac{1}{2}$° C.

c 2·5 c.c. of cold distilled water for rinsing after ammoniacal silver oxide.

No. 132. *Pure gelatino-bromide of silver*, prepared with ammoniacal oxide of silver.

a { 165·0 grammes Simeon's homogeneous hard gelatine
12·0 ,, K Br, from Th. Schuchardt } Melted; temperature at the commencement of the mixing, 38° C.

b { 15·0 grammes $Ag\,N\,O_3$, from Th. Schuchardt
150·0 c. c. of distilled water
$N\,H_3$ added until the precipitate is dissolved } Cold, $16\frac{3}{4}$° C.

c 25 c.c. of cold distilled water for rinsing after ammoniacal silver oxide.

The gelatine of all three preparations was, before being mixed, melted in the same water bath, and it was not until the last emulsion had been thoroughly shaken up that the three bottles were dipped into a water bath of 39° C. to be digested; the temperature fell in five minutes to 36° C., rose again during the next ten minutes to 37° C., and half-an-hour after the bottles had been placed in the bath the temperature had risen again to 39° C., and the digestion was continued at that temperature for fifteen minutes longer. During the digestion (fifteen minutes after the commencement) both the bromide of silver bottles were shaken for about two minutes, but the iodide of silver one was not shaken.

The preparations set during the night. Seven and a-half hours elapsed between the pouring out and the pressing out of the shreds. The width of the shreds was about one and a-half mm. The washing took place in muslin bags, in running water, the bromide preparations together, and *the iodide preparation in a separate washing cylinder*, on account of the excess of K I. All three washing bags were made of new material. The washing lasted thirty-eight and a-quarter hours.

So far the three preparations were all analogously treated. While the subsequent treatment was applied to the pure bromide and the pure iodide emulsion: the two latter were melted and divided so as to produce ten preparations thus:—

0 ½ 1 2 3 4 5 6 8 10
No. 132, 122, 123, 124, 125, 126, 127, 128, 129, 130,

which, after being mixed, contained respectively about 0, ½, 1, 2, 3, 4, 5, 6, 8, and 10 parts of pure iodide emulsion to every 100 parts of pure bromide emulsion.

After being mixed these ten emulsions were stored light-tight until used for coating plates, which took place thirty-six hours later. During this time the shreds of the iodo-bromide emulsion No. 131, which still remained unmelted, had been left in the washing water. *The preparation No.* 131 *was, therefore, doubly hindered from after-ripening*—firstly, because it had been kept thirty-six hours at the low temperature of the water; and, secondly, because it was melted once less often than emulsions 132 and 132a. I mention this circumstance because I attribute the devious behaviour of some of my test plates to it. The whole of the emulsions were poured upon plates one after the other, and these were placed to dry in two drying-boxes heated by petroleum. Each 5 × 12 c. m. plate received 3 c. c. of emulsion, and the 10 × 12 c. m. plates twice that quantity, viz., 6 c. c. The plates as a whole were surprisingly matt; only a few had a high gloss, which made its appearance upon all those plates which lost emulsion after the distribution, generally in consequence of the edges of the plates having been touched.

The spectral behaviour of the emulsions No. 122 to 132 was tested with Steinheil's large spectrograph by cloudy skylight, magnesium light, and petroleum light. Every iodo-bromide plate was exposed for the same time as and along side of a pure bromide plate, the only exception being a few absorption plates. For developing I used Eder's normal developer, the behaviour of which offered fewest difficulties to the production of series.

I shall consider the forty plates which follow for the most part under two aspects and not as a series, especially because the result of my work has not turned out quite as I should have liked—first, because sunlight failed me altogether, and I had to be contented with cloud light; and, secondly, because the equal illumination of the large slit of the Steinheil apparatus offered some difficulties to me. *In spite of everything, it, however, clearly follows from the results given by my plates that the gelatino-iodo-bromide of silver* (which for the sake of simplicity I shall call "mixed" gelatino-iodo-bromide of silver), prepared by mixing separately-prepared gelatino-iodide of silver and gelatino-bromide of silver emulsions (both prepared with ammonia silver oxide), *exhibits a sensibility to colour quite different from that of unmixed gelatino-iodo-bromide of silver.*

The mixed gelatino-iodo-bromide approaches very nearly in its spectral behaviour to pure gelatino-bromide, but is distinguished from the latter by a diminished sensitiveness between G and *h*, where, indeed, the loss of sensitiveness increases with the proportion of pure iodide emulsion.* Towards the red and violet both preparations are about equally sensitive, but in no single one of my series of preparations of mixed iodo-bromide emulsion can anything approaching to the great sensitiveness to colour of unmixed iodo-bromide emulsion be discerned. Whether the lessened sensibility to colour of the mixed emulsion result only from the separate formation of the precipitates of the silver salts, or whether it be a peculiarity of the method of emulsifying employed by me in the case under consideration, the experiment I have in progress at present will perhaps furnish an explanation. I shall as soon as possible publish the result, and then also mention my today's series of mixed gelatino-iodo-bromide of silver more comprehensively than is at present possible, owing to the shortness of time at my disposal.

With regard to the spectrographing I shall remark as follows:—The spectra by clouded skylight are of very various intensities, the cause being merely that the horizon was more densely over-clouded during the exposure of the last three plates. The magnesium spectra—particularly the middle one of the pairs of plates—are very unequally distributed upon the two halves of the plates, so that one might conclude them to have been lighted by means of the arrow-shaped slit; but I have really only used the arrow slit for the first and third spectrum of each plate, the middle one, on the contrary, being taken with the parallel slit. I blame the nearness of the magnesium flame, and, above all, the after-glow of the hanging magnesium spiral, for it. I adjusted the magnesium ribbon very carefully, and also altered its distance from the slit (from about 7 c. m. to about 300 c. m.), but, as my plates show, obtained no equal action over the whole width of the spectrum; and for that reason I have omitted the plates composed of strips, which I had planned.

It was something the same with the spectra of the petroleum flame. In all of them the preparations under comparison—the mixed and unmixed iodo-bromide of silver and the pure bromide of silver gelatine emulsions—differ so distinctly as regards their spectrum that their character is sufficiently recognisable.

Lastly: I must mention the plates showing the absorption, five sets of which I exposed. As already mentioned, I laid various plates with the film sides next each other and exposed them through the glass in the stereoscopic camera. Upon grounds of expediency I have not combined the plates as at first intended, as will be seen from the four diagrams. In the whole of the plates the absorbent power of the unmixed gelatino-iodo-bromide is more or less recognisable, and they show, on the other hand, how transmittent pure gelatino-bromide is for many rays which yet work upon the former. The diagram representing seven plates—which were all exposed at once, and which represent a table covered with apparatus—is a noteworthy deviation. Here the unmixed gelatino-iodo-bromide is positively behind both the neighbouring plates in sensitiveness; this is surely the consequence of this preparation having been left in the water after it was already sufficiently washed—a neglect already alluded to. All the other plates coated with the same emulsion are also partly distinguished by a lessened sensitiveness. I have not neglected to take into account the influence of the sheet of glass which the light had to penetrate before it could reach the two films of emulsion.

The neatness of today's consignment of plates leaves a good deal to be desired. In order to get on fast I made the divisions with the glass rod, without the glass ruler; hence the flaws. In developing, the thin plates (which had sometimes to be developed in pairs, or even in fours, in the same dish) partly overlapped each other occasionally; hence the cause of many spots. There were no blisters, nor was there any tendency to slipping off—the usual consequence of the eight hours' action of the strong ammonia of the ammoniacal silver oxide, of which, however, no instance has occurred to me while using Simeon's gelatine.

—*Wochenblatt.* V. SCHUMANN.

* I have before me spectra upon mixed gelatino-iodo-bromide of silver containing one part of iodide emulsion to one part of bromide emulsion, respecting which I shall shortly report.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATIONS FOR PATENTS.

No. 393.—"Photometer." A. J. Beer.—*January* 24, 1883.

No. 843.—"Apparatus for Holding Dry Plates or Films before, during, and after Exposure, and for Changing them in the Photographic Camera." T. Samuels.—*February* 15, 1883.

No. 896.—"Improvements in the Production of Printing Plates or Blocks by Photographic Means." J. R. Meihe; a communication from J. Allgeyer and C. Bolhoevener, from abroad.—*February* 19, 1883.

No. 1007.—"Improved Apparatus for Supplying Sensitive Plates in Photographic Cameras."—J. H. Hare and H. J. Dale.—*February* 24, 1883.

No. 1061.—"Process for Sensitising Photographic Paper and Developing Pictures thereon." W. R. Lake; a communication from R. B. and B. C. West.—*February* 27, 1883.

No. 1095.—"Washing Photographs." J. W. Tattersall.—*February* 28, 1883.

No. 1229.—"Process, System, or Method of Producing Permanent Coloured Photographic Card Pictures." A. H. Dawes.—*March* 7, 1883.

No. 1380.—"Improvements in the Preparation of Pictures and Photographs to be Used in the Preparation of Pictures by the Art of Photography and Photo.-Engraving, and in the Production of Gelatine Reliefs and Printing Surfaces therefrom." R. Brown, R. W. Barnes, and J. Bell.—*March* 15, 1883.

ABRIDGEMENTS OF BRITISH PATENTS.

No. 3058.—"Improvements in the Manufacture of Certain Rollers and other Elastic Surfaces used in Transferring, Printing, or the Like on the Various Materials to which such are Applicable." A communication from Dr. Wilhelm Grune, Berlin.—*June* 28, 1882.

Elastic rollers, films, and other surfaces have been made of glue and treacle, glue and glycerine, and other matters. It has also been proposed to treat such surfaces with bichromate of potash in order to produce a grain. This invention consists in treating such surfaces—preferably manufactured from a compound of glue and glycerine known as "summer printers' roller mass"—with tannic, pyrogallic, or similar acids or tanning materials, whereby a tough and durable non-grained surface is obtained. Before tanning it is advisable to rub the surface with fine silica or similar substance, afterwards well washing with spirit to remove grease; and the operation may be repeated after tanning if necessary. The tanning solution may consist of a 25 °/ₒ solution of tannic acid in spirits of wine or methylated spirit; but these proportions cannot be adhered to, as the strength of the solution and time of immersion will vary according to the degree of hardness required, or the purpose to which the roller, film, or surface is to be applied.

No. 3072.—"A New and Improved Process for the Manufacture of Hyposulphite of Soda." Gerald Wenzeslaus, of Berlin.—*Dated June* 29, 1882.

This process consists in mixing "tank waste" (that is, the residue of the manufacture of soda, consisting chiefly of calcic sulphide, calcic carbonate, and lime) with sulphate of soda and water, exposing to the air, and lixiviating the product in water. The "tank waste" is mixed with ground sulphate of soda in quantities equivalent to the sulphide of calcium it contains, and sufficient water added to dissolve the sulphate of soda. The mixture is piled in heaps, the size of which should be limited in order to prevent the temperature rising above 100° C. By the action of the oxygen of the air the mixture is converted chiefly into sulphate of lime and hyposulphite of soda, the latter of which is extracted by lixiviation. Any sulphide of sodium contained in the lye is converted into hyposulphite by means of oxygen and sulphurous acid in the manner well known.

No. 3232.—"An Improved Stand for Photographic Cameras." Jean Frederic Plücker, of Antwerp.—*Dated July* 7, 1882.

This stand is formed of brass or other metallic tubes sliding telescopically one within another, each leg being composed of three such tubes; the lower ends of the two outer tubes of each leg are provided with clips formed by slitting the end and surrounding it with a sliding collar which, by means of a split screw-shank carrying a nut, is made to grip the tubes firmly together in any position. The legs are pivoted to a head-piece fitted with ball-and-socket joint for the adjustment of the camera at any angle. The lower extremity of each leg terminates in a foot formed of a semitubular piece of metal provided with lateral projections or ears, which serve as thumb-pieces by means of which to draw out the inner sections. The stand is very portable, and collapses into a small space without any detachable pieces.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 2	W. Riding of Yorkshire	Godwin-street, Bradford.
,, 3	Sheffield	Freemasons' Hall, Surrey-street.
,, 3	Halifax	*Courier* Office, Regent-street.
,, 4	Benevolent	181, Aldersgate-street.
,, 4	Edinburgh	Hall, 5, St. Andrew-square.
,, 5	London and Provincial	Mason's Hall, Basinghall-street.
,, 5	South London	Society of Arts, John-st., Adelphi.
,, 5	Leeds	Mechanics' Institute.
,, 5	Bolton	The Baths.
,, 5	Glasgow	172, Buchanan-street.
,, 5	Dundee (Annual Meeting)	Lamb's Hotel, Reform-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday evening last, the 27th instant, Captain W. de W. Abney occupied the chair.

Mr. J. Spiller said that at the last technical meeting some coloured photographs were shown which it was understood were produced otherwise than by hand colouring, the work of M. Cellerier, of Geneva. As two specimens were left with the Society he took it as a challenge of their genuine character, and therefore he had dissected one of them, and Mr. T. Sebastian Davis took the other. The conclusion at which he (Mr. Spiller) arrived was that there was a photographic base; then washes of colour were laid on, and the paper was resensitised and printed up to its full strength. The method, therefore, referred to as necessary to produce the result was, he inferred, a registering-frame, so that the second printing should coincide with the first.

Mr. W. E. Debenham remarked that every now and then a paragraph was sent the round of the papers to the effect that some wonderful discovery of photographing in natural colours had been made. He noticed that the claimant to the honour of the invention was generally a Frenchman, and he believed that the explanation given was commonly that he coloured the photograph so naturally that it was entitled to be called "photographing in natural colours."

Mr. A. Cowan asked the Chairman why it was that when photographing with a pinhole stop instead of a lens he could not obtain a really sharp result. He showed negatives taken with an aperture of $\frac{1}{50}$th of an inch. The distance of the plate from the orifice was three inches.

The Chairman replied that blurring resulted from two causes—first, that every point must be represented by a circle at least as large as the aperture used; and, secondly, that with a very small opening there was confusion caused by diffraction. A greater distance of plate from aperture—say eighteen inches—would be better, although the aperture might be larger, because one of the causes of confusion (diffraction) would be got rid of or minimised.

Mr. Arnold Spiller had that day been experimenting with photographing the sun with a pinhole aperture, instead of a lens, four feet from the plate, but the result was useless from blurring.

Mr. W. B. Bolton exhibited an emulsion filter, as described by Mr. C. Beckett Lloyd in last week's Journal, consisting of a flask, in which he created an atmosphere of steam by boiling a little water in it. A funnel with cotton wool in the neck was then fitted to the flask by an air-tight rubber cork, and liquid poured in. The condensation of steam in the flask caused a partial vacuum, which rapidly drew the liquid through the filtering medium. He also showed a variation of the same contrivance, in which the steam was made in a separate tin vessel connected with the flask by a tube and stopcock.

Mr. T. Bolas said that a partial vacuum might be conveniently made by attaching a length of rubber tube—say of one inch bore. By drawing this tightly through the fingers the expansion of the tube caused a suction from the end at which the fingers began.

Mr. W. Bedford said that he used swan's-down as the filtering medium, tied over the mouth of an inverted funnel. This funnel was let down nearly to the bottom of the jar of emulsion, and air being blown into the jar forced the emulsion upwards through the funnel and tube attached to it.

Mr. Cowan used several (eight or ten) thicknesses of very fine muslin, and let the emulsion run through without pressure.

The Chairman showed a shutter working by electricity. The quickest exposure it would give was about one-sixth of a second, but it could be held open for any longer time. He had used a pair of these shutters, connected in one circuit with a Leclanche cell, on lenses 300 yards apart, to photograph clouds and ascertain their distance trigonometrically. He had found by this means that the clouds of a mackerel sky were 20,000 feet away.

A question was read—What is the best way of imitating the effect of a light fall of snow upon the glass-room roof?

Mr. Debenham said that he had had a studio glazed with Hartley's roll, the lines inside, to equalise the light and avoid harsh effects, which sometimes resulted from a very bright cloud in one part of the sky.

Mr. W. M. Ashman had also used the same glass, and did not find the exposure at all increased thereby. The snow effect might be imitated also by coating the glass with strong solution of Epsom salts.

In reply to questions as to whether this glass was liable to change,

Mr. Ashman and Mr. Debenham said that they had not found it to do so.

The Chairman inquired whether anyone had any experience of flint glass that remained unchanged. He had recently seen some with a slight yellow tinge, which was so unstable that he would warrant it to tarnish in three weeks.

Mr. W. Ackland said that light flint, such as was used in portrait and ordinary view lenses, was very little liable to change. In some doublets a denser flint was used, which did suffer.

The Chairman asked which was the best way of removing the image from ground opal glass so as to render it fit for use again. He had tried various agents, including *aqua regia*, without complete success.

Mr. Cowan said that the finest emery flour rubbed on with felt would do it. He remarked that there was evidently a change for the better in the manufacture of opal glass; for, whereas formerly it was impossible to keep it ready ground for any length of time on account of the stain which soon set in, that which was now supplied did not go in this manner.

Mr. Bolton remarked that collodio-bromide emulsion development with ferrous oxalate brought up the remains of a former image, and showed dirt stains upon the plate which did not result when using pyrogallic development.

The Chairman read an invitation to photographers to send their works to an international exhibition to be held at Calcutta in 1883-1884. Mr. Dilworth, of No. 4, Westminster-chambers, is the agent in this country.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on the 22nd inst., Mr. A. L. Henderson occupied the chair.

There were two questions in the box. The first discussed was:—Is it possible to have equal fineness of division in two emulsions, both of one

pidity, but prepared in different ways—the one by boiling and the other the use of ammonia?

Mr. A. Cowan remarked that with the ammonio-nitrate plan he always und the emulsion blue to start with.

On the point as to whether sudden or gradual mixture tended to produce ieness,

Mr. W. Cobb said that, using the ammonia process, he added the silver owly.

Mr. W. H. Prestwich, on the other hand, stated that he poured the lver in all at once—in fact, he "flopped" it in.

Mr. E. J. Golding said that he had mixed an emulsion on the plan advised y Mr. W. K. Burton—that is, he had added crystals of nitrate of silver to he bromised gelatine and shaken up. He found the result was that the bro- iide was formed in a coarse, even sandy, condition; but upon boiling it ecame finely emulsified and yielded very clear plates. He had put in the rystals when the temperature of the gelatine solution was about 120.°

The Chairman remarked that whether the silver might safely be poured n all at once or must be stirred in gradually, depended upon the gelatinous trength of the solution to which it was added. With five grains of gelatine to the ounce the silver might be "flopped" in, but with a solution half-a-grain strong in gelatine it must be mixed by degrees.

Mr. A. Haddon thought that the connection between coarseness of grain and rapidity might depend upon whether this coarseness was of the nature of crystallisation of the bromide of silver from its solution in whatever solvent the emulsion contained, or whether it was a mere agglomeration of the particles, in which latter case coarseness could not be expected to give sensitiveness.

The next question from the box was:—Does an unwashed emulsion ripen in the set condition in the same manner as a washed one?

Mr. Golding's experience was that it did.

Mr. Cowan said that it did unless the full sensitiveness of that emulsion had already been obtained, by boiling or otherwise.

Mr. Prestwich found no gain in sensitiveness by keeping.

Mr. Cobb said that with the boiling process there was a gain in keeping, as proposed by the question.

The Chairman suggested that a gain in rapidity might be accounted for by the partial decomposition of the gelatine during keeping, making it softer. If any one would make the experiment of adding soft gelatine to a washed emulsion he would find considerable gain in rapidity.

Mr. W. E. Debenham said that he had made this experiment, but could not find any gain in sensitiveness. He had added Nelson's No. 1 gelatine in the proportion of one-third of the gelatine, which was a hard one, contained in the emulsion originally.

The Chairman suggested the addition of as much as half the weight instead of one-third.

Mr. W. Coles said that he had been in the habit of developing plates, made with hard gelatine, sometimes alongside of commercial plates of various manufactures, but had found that the latter had developed more slowly than those which were known to be made with hard gelatine.

Mr. G. D. Plomer was elected a member of the Association.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Association met on the 19th January, the chair being taken by Dr. H. W. Vogel.

The first subject discussed was the injurious action of certain mounts upon the prints pasted upon them, several mounts ornamented with bronze lines had a very bad effect upon the prints.

Herr Rückwardt had found that a greenish-grey pasteboard had a harmful effect upon the prints. That he attributed to the apparent presence of ultramarine in the colouring matter. When the water used for making the paste was filtered the harmful action did not appear, but it was perhaps only delayed. He now generally used yellowish mounts, which as yet had appeared harmless. He (Herr Rückwardt) presented a number (fifty) of large architectural views, all taken upon wet plates.

Herr Schwartz promised a series of interiors for the Society's album.

A lively discussion followed upon the comparative artistic value of wet or dry plates, the conclusion arrived at being that on the whole wet-plate portraits showed the softest modelling.

Herr Hartmann had attempted to photograph the Leipziger Platz by electric light. He exposed a gelatine plate for a quarter of an hour, and estimated the exposure as equal to that of four seconds on a dull day. The lamps were distinctly shown, but only faint traces of the houses were visible.

Herr Prümm thought, from the appearance of the picture, that in order to get an exposure equal to that of four minutes' daylight on a dull day an exposure of at least an hour would have been required.

A long discussion followed (in which several of the gentlemen who had taken out licenses took part) respecting the Obernetter emulsionising process, from which it appeared that none of the fourteen licensees had as yet got satisfactory results with the emulsion.

Herr Schippang had procured an emulsion which, though rather insensitive, was not useless, by mixing the Obernetter emulsion with some Schippang emulsion.

Herr Mulert, a chemist and amateur photographer, had several times prepared some Obernetter emulsion, but always obtained an insensitive preparation. Increasing the bromide fluid and continuing the emulsification for fifty hours did not secure the desired effect. He then took this emulsion (which was useless for glass negatives), coated paper with it, and then exposed it in a printing-frame under a negative. In that way he obtained a good developable picture; the sensitiveness of the paper so prepared left nothing to be desired. He was unable to offer any explanation of this phenomenon.

The Chairman was inclined to think that the numerous failures must be at least partly owing to the coldness of the weather, which had caused the bromising and washing to be unusually difficult. *He warned them earnestly against too hasty a judgment of the process*, and advised them to wait for further advice from Münich.

The contents of the question-box were next disposed of, and the meeting was shortly afterwards adjourned.

This Association met on the 2nd February,—Professor H. W. Vogel in the chair.

Inquiry was made, on behalf of the Geological Institute, where microphotographs of thin shavings of stones and minerals could be made, and it was suggested in reply that perhaps Herr Wenske would make them; but, as the requisite apparatus was expensive and there was not likely to be a sufficient demand for these microphotographs to recoup the outlay, it was feared that no private individual in Berlin was in a position to take microphotographs.

A number of cloud negatives were presented to the Society by Herr Kössler.

The Chairman showed a piece of negative film which had been drawn off the glass, and upon which a name was printed. It was intended to be placed on the corner of a landscape negative, from a corner of which its own film had been scratched away.

The sender inquired how the name to the plate could be affixed so that it should not spring off again.

The Chairman remarked that that was not such a simple matter as it might perhaps appear. He had as yet failed to find a reliable adhesive medium by the use of which he could feel sure of the film not springing off again.

Herr Schwartz recommended a mixture of gelatine and starch, used warm.

Herr Wight suggested the addition of a little chrome alum to that mixture; and some one else recommended isinglass.

Herr Reichard announced the premature death of Herr Janssen, the well-known teacher of retouching, and the memory of the deceased was honoured in the usual way.

Herr Martini exhibited a petroleum lamp for the dark room furnished with double ruby-red cylinders, the outermost of which was removable. He also showed some bottles for use when travelling, which were closed by a screwed-on capsule.

Herr Suck showed a model of a background which could be used either flat or cylindrical. When used in the cylindrical form the material was kept expanded by a steel arrangement. The object of this background was to have a dark background at the light side of the face, and a light background at the shadow side.

Herr Prümm (who had long worked with a cylindrical background) thought the present model looked very practicable, but feared that the cloth or material of the background would be covered by fine creases.

The Chairman read Herr Obernetter's reply to the complaints made regarding his emulsion, the gist of which was that he had used the process himself successfully for three years, and invited the Berlin licensees to send one of their number to Münich to see how he (Herr Obernetter) proceeded, and he would bear the expense. Herr Baumann, of Münich, is to go to Berlin to demonstrate the process. He attributed the non-success of the Berliners to the temperature and the properties of the Berlin water.

Several gentlemen wrote to say that the process had been quite satisfactory in their hands.

Herr Prümm thought there were still some points regarding this matter which needed to be cleared up, but the discussion of the subject was postponed until further information should be obtained.

Herr Schuster showed a number of photomechanically-produced prints from copper plates, which he called "light copper etchings." Some of them were reproductions of line pictures; others of oil paintings, one of which was a metre long. They looked like Goupil's photogravures. He (Herr Schuster, says the process by which they are produced is quite different, and he also affirmed that the copper plates were unretouched, while Goupil's plates are considerably indebted to the engraver upon copper; so that the new process would seem to be somewhat the simpler of the two.

It was then agreed to have the annual winter banquet in March, and the meeting was then adjourned.

This Society met on the 16th February, the chair being occupied by Professor H. W. Vogel. Several new members were admitted.

Herren Schwartz and Rückwardt presented some interiors on gelatine plates to the Society, whereupon a discussion arose respecting the comparative merits of wet and dry plates for long exposures.

Herr Rückwardt showed a large view of the interior of the Emperor's business-room, taken upon a wet plate with an exposure of three-quarters of an hour. The speaker said this was the most difficult view he had ever taken; he had used twenty-three plates. An attempt made with dry plates had completely failed, as a large halo spread out from the window.

Herr Prümm thought that the comparative behaviour of wet and dry plates under abnormal circumstances had never yet been sufficiently investigated. It was admitted that by strong white light, whether daylight or electric light, the dry plate was the more sensitive; but when the light was weak, as in dimly-lighted interiors, there did not seem to be any very great difference between the two kinds of plates.

Herr Rückwardt undertook to experiment by exposing in an interior (where a wet plate would require an exposure of an hour) two dry plates—one for an hour and the other for half an hour—and to communicate the result.

Herr Schwartz thought that with exposures of an hour and a-half gelatine plates would be found less sensitive than wet plates. Once, when photographing a monument in St. Mary's Church, he exposed a gelatine plate for five hours, and he felt convinced that, under the same circumstances, a

wet plate would have proved more sensitive if he could only made sure of its not drying.

Some photogravures from the State Printing Establishment were then shown. They were by a secret process.

The CHAIRMAN did not think the authorities would be willing to publish the process, as papers and documents of value were printed by it.

A discussion followed on various methods of producing a reticulated surface upon a negative, as photographing a net, drawing a net work on paper and then photographing it, placing a sheet of glass, upon which a number of fine parallel lines are engraved, between a transparency and the lens, interrupting the exposure when half completed, and placing the engraved glass in a position at right angles to what it occupied before, and then completing the exposure. This last is Meisenbach's process, and is the subject of a patent.

Herr Braun's thimble for protecting the tip of the little finger from the developer was then shown, and shortly afterwards the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

THIS Society met on the 6th February,—Dr. Hornig in the chair. Several new members were admitted.

The CHAIRMAN mentioned that he had had an interview with Herr Pfaff, the manager of the international electric exhibition to be held in the Rotunda, in the course of which the feasibility of having a photographic glass house lighted by electric light as a feature of the exhibition was discussed. The difficulties in the way, however, appeared so great that the idea was abandoned.

A discussion followed, in which Baron Schwarz-Senborn and Herren von Reisinger, Kramer, Luckhardt, and Schrank took part.

The CHAIRMAN further said that he understood from a letter received from Herr Déchy that the Hungarian Government contemplated passing a law affording protection to literary and artistic copyright. The proposed law also contained a section devoted to photography. The draft of the bill was at present the subject of discussion at the meetings of the Society for Pictorial Art, and at the Authors' and Artists' Club. Herr Déchy also requested information respecting the copyright laws of other countries, which was furnished to him by the Chairman.

A discussion on copyright followed, in which Herren Kramer and Schrank and Baron Schwarz-Senborn took part.

The report of the committee appointed to adjudge the Voigtlander prizes was then read, the awards being as follow:—1. Silver (*vermeil*) gilt medal to Herren Angerer and Göschel, for their excellent photozincotypic productions.—2. A silver medal to Herr Kurkdjan, for a series of views of Armenian monuments taken under circumstances of great difficulty.—3. A silver medal to Herr Scolik, for his diligent studies of the gelatino-bromide process, and for a collection of platinotypes.—4. A silver medal to Herr Fäschler-Signer, for a series of views of the Bernese Oberland on gelatino-bromide of silver plates, and for platinotype copies of the same.—5. A bronze medel to Lieutenant David, for a series of views of monuments taken on dry plates, and for zealous study of the gelatino-bromide of silver process.—6. A bronze medal to Herr Gröger, for a large collection of stereoscopic views.—7. An honourable mention to Herr Karl Kroh for the assistance rendered by him to Herr Scolik.

Captain PIZZIGHELLI showed two instantaneous shutters which had been sent him by Herr Braun, of Berlin. One was on Guerry's principle, and the other Herr Braun's own invention, and placed inside the camera.

Herr SCOLIK reported concerning his experiments with Morgan's paper. The colour was satisfactory and details good. He exposed by gaslight for fifteen to twenty seconds and developed with ferrous oxalate, to which he added a little bromide of potassium, and also with Edwards's pyrogallic developer. He also prepared some paper for himself by coating it with iodo-bromide of silver emulsion. He (Herr Scolik) also mentioned that he recovered the silver from old gelatine emulsions by placing the residues in old fixing-baths, by which the silver compounds were dissolved out and the gelatine remained behind. The silver was then precipitated from the solution by zinc, and the precipitate washed in hot water to remove any particles of gelatine that might still be adhering to it.

The contents of the question-box having been disposed of, the meeting was adjourned.

Correspondence.

LANTERN QUERIES.

To the EDITORS.

GENTLEMEN,—I have been much interested in Mr. George Smith's fifth article in the last number of your valued Journal, since it contains just the information I have been in want of.

For some time my aim has been to obtain perfect quarter-plate negatives, with a view to making enlargements from them on Morgan's argentic-bromide paper. I have produced some fair results, but have never felt happy about my optical lantern, which is home made. I have a five-inch condenser and a three-wick paraffine lamp, and for a front lens use a portrait combination, by Cook, the lenses of which are two and a-quarter inches diameter. Having placed my quarter-plate negative close to the condensers and focussed it on the screen, if the negative were removed I always found a very badly-lighted disc with an indistinct image of the flame down the centre. This I now imagine arises from the fact that my "Cook" lens is of too short focus. I shall procure a suitable lens and first focus the light, and then move the negative until it is sharp.

There is, however, one point I am not clear about, and that is—W[hich] end of the portrait combination should be presented to the negativ[e] be enlarged? What I mean is—Should the negative to be enlarged t[ake] the place of the sensitive plate in the camera, and be presented to [the] back of the combination, or should the combination be turned ro[und] and have its front presented to the negative and its other end to [the] screen?

If Mr. Smith or some other of your numerous contributors wo[uld] kindly instruct me on this point, and also tell me of any books publi[shed] on the lantern, I should be greatly obliged.—I am, yours, &c.,

March 23, 1883. S. E. PHILLIPS

CALCUTTA INTERNATIONAL EXHIBITION.

To the EDITORS.

GENTLEMEN,—I am sending you a programme of the Internatio[nal] Exhibition to be held here in December next.

As you will observe, *Photographs* are admissible in Section A—*Fi[ne] Arts;* and *Photographic Apparatus, Chemicals, and other Appliances* [in] Section B—*Education and Application of Liberal Arts.* Gold, silve[r] and bronze medals will be awarded to exhibitors.

Full particulars regarding the Exhibition can be obtained fro[m] W. P. Dilworth, Esq., 4, Westminster Chambers, London, the agent i[n] Great Britain; but, as a member of the Executive Committee, I sha[ll] be glad to give any information or do anything I can to assist intendin[g] exhibitors in the two classes above mentioned if they will write to m[e] here, and I should be obliged by your inserting a note to this effect i[n] the Journal.—I am, yours, &c., J. WATERHOUSE.

Surveyor General's Office, 1, *Wood-street, Calcutta,*
March 6, 1883.

[A copy of the full programme and the form of application for space, together with the rules and regulations, may be seen by intending exhibitors at our Publishing Office, or may be obtained from the London agent, as above.—EDS.]

THE COMPARATIVE VOLUMES OF WATER AND STEAM.

To the EDITORS.

GENTLEMEN,—I shall be glad if you will allow me to correct an error which has crept into the description of my filtering arrangement for emulsion in your last issue. It is there stated that "the relative volumes of steam and water at ordinary pressure are as 216 : 1." The ratio should be "as 1700 : 1," or, according to the most accurate modern measurement, as 1696 : 1.

The figures originally given were derived from a calculation of the capacity of a vessel that would be filled with steam by the vaporisation of one drachm of water at 212° Fahr. and the pressure of one atmosphere. Subsequently, deeming the statement of the ratio of the respective volumes a clearer mode of expression, and writing hurriedly, I compared the quantity of water in *drachms* with the volume of steam in *ounces* of capacity.

Apologising to your readers for this carelessness,—I am, yours, &c.,

March 26, 1883. C. BECKETT LLOYD.

THE HYPO. FIXING BATH.

To the EDITORS.

GENTLEMEN,—Had Mr. W. E. Debenham confined his remarks to the real question at issue, instead of introducing several matters altogether foreign to it, I would not have troubled you for another word or two by way of correction. Your own able article very fittingly puts the real question to be "whether the use of a *discoloured* bath is permissible;" and you very modestly say that you "are not in a position to speak from practical experience of the difference between new and old baths," although you "almost invariably make it a practice of employing the same fixing bath over and over again, merely strengthening it when its action becomes slow, and filtering it when muddy." These words put the matter in a nutshell, are worth a bushel of Mr. Debenham's theories, and go to prove one or two points he appears to persist in overlooking.

Let me, however, remove a wrong impression which my last communication appears to have created. I am *not* the "distinguished amateur" in question, nor am I acquainted with him or Mr. W. H. Warner. The warmth with which I took up their "curious notions" must, therefore, be attributed to some other cause.

It should be borne in mind that I did not accept the position that "a solution saturated with bromide of silver could be used to fix any number of negatives." I accepted only what was evidently to be understood by such a statement, viz., the use of an *old* hypo. bath as possessing many advantages over the popular method of a freshly-mixed one. And the further illustrations given by Mr. Debenham have not disproved this position. The tests he advises do not relate to common practice, but to uncommon treatment of negatives, from periods extending from a few hours to a whole night; hence they are of little practical value.

The point we contend for, therefore, is that the length of time required t *horoughly fix* a negative in an *old* bath—one approaching even the c ditions of saturation with bromide and sulphide of silver—is not s ficient to give discolouration worthy of the mention, and which will r t dissolve out by the chloralum bath, leaving the shadows perfectly c ar.

Assuming, then, that there is a trifling discolouration (I decline to a mit a hopeless one), but that it easily dissolves out, what, might I a k, is Mr. Debenham striving for? If a question of quality: I am s isfied of being able to produce a better result by my method, taken a a whole, than by the present one of a clean and fresh hypo. bath f each plate. If a question of perfect fixation: I have equal satisfac- t n on this head during my eight months' practice, and have found n such troubles as those instanced by Mr. Debenham arising from im- rfect fixing.

I demur, also, to the statement that negatives treated with an old er are necessarily stained, and that intensity is obtained by such ain causing slow printing. This argument might have a little force, true. Experience has proved that the use of an old fixer sustains the tensity obtained in development, and is not due to sulphur staining, Mr. Debenham appears to aver. As before stated, after the plate sses through the chloralum bath this "brilliant" soon removes stains any should be present, leaves the original density untouched, and ves a rich printing colour.

Let me remind Mr. Debenham that when I plied him with argument y analogy, and which he says is inconclusive by itself, I only used his wn weapon when he advised the fixing of a plate "for a night." He ust, therefore, take his sword back to its scabbard, and give us in uture illustrations which pertain to practical results and not to experi- ients to be valued only for the theories they possess. It is not a uestion of the best developer, but the best fixer and the testimony of hose who have had a lengthened practice of both old and new hypo. aths.

The chief advantages I claim for the use of an *old* fixer are—the reat saving of time and labour and the minimum of water required in evelopment, the non-necessity for intensification, less waste of hypo., c.—all of which are items of considerable importance.

In regard to the colour of an old fixer: might I ask Mr. Debenham o give another term, other than the "deepest ruby," which will be nore appropriate?—I am, yours, &c., CHAS. J. HALL.

50, *Stanley-street, Cheetham, Manchester, March* 27, 1883.

To the EDITORS.

GENTLEMEN,—Both Mr. W. E. Debenham and yourselves assume that I made a mistake in asking the question I did on this subject at page 125. Such was not the case. In the presence of four witnesses the statement was made by the "eminent professional" and the "distinguished amateur" photographers (both prize medallists), as you read it there. There was no mention made of strengthening the bath by the addition of fresh hypo., and, because it appealed to my common sense as an impossibility, I therefore deem it of such importance as to ask the question in the Journal.—I am, yours, &c., W. HARDING WARNER.

Bristol, March 24, 1883.

VARNISHING GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—In your issue of the 16th inst. you ask for the experience of the effects of varnish on gelatine plates. I give mine, if you think it worthy of insertion.

On going over the negatives taken two or three years ago, I must say that the varnishes now used are not at all suitable for gelatine plates, and that a strong collodion is safer in every way. When I first worked gelatine plates varnish was used. In damp weather a trouble would spring up, giving red spots all over the plates. I attributed it to the sea air attacking the paper and depositing silver on the negative. I next tried collodion, and since then the spots have disappeared, with the exception of a few plates, on which I presume the printer carelessly put damp paper. For ordinary portrait negatives or local views I find it perfectly safe. The collodion I make myself. It gives a tough, repellent film, and costs about one shilling and sixpence per pound.

Another fault in varnishing was to find the film of gelatine peel from the edges upon applying the heat, and sometimes ruining the negative. This fault arises from cutting the plate from the *glass side* and breaking the film of gelatine. I have never found one go that had *the film* cut through.

The cause of stained negatives lies chiefly in imperfect fixation. To make sure of them being safely fixed I keep them in a grooved bath holding a gallon of hypo. until clear, and then pass them through another bath of hypo. in a dish. The large bath is renewed weekly; small one daily.

To remove silver stains from the plate I find the following plan very effectual:—Soak the plate in a saturated solution of chloride of sodium, and then in hypo.—I am, yours, &c., SEASIDE.

March 21, 1883.

TRAVELLING PHOTOGRAPHERS.—The following letter appeared in the *South Hampstead Advertiser*:—"Will you permit me through the medium of your paper to call the attention of your readers to two men who have been for some time going the round of the neighbourhood of Hampstead and St. John's Wood—one carrying a photographic apparatus; the other soliciting orders at gentlemen's houses, stating in some instances that he had called from the owner of the house, and in others from the architect, to take the photo. of the house. Then, where the ruse succeeds, he shows the negative to the servants, and tells them that it is "on the quiet," but if they like they can have a copy, so they pay some 4s. 6d. for two, others 6s. for four. Then an address at Hoxton is sometimes given, where persons have written, after waiting months (one years) for the photo., but to find that no notice is taken of their letters. My advice to servants is not to part with their money on any account till they receive value for it. But that is not my object in troubling you. It is to see if someone who has been duped will just be so bold as to step forward to prosecute. I have myself seen the inspectors at Hampstead and St. John's Wood police stations respecting the subject, but in both instances they stated that they were powerless in the matter till someone came forward to prosecute. I hope, sir, that by your inserting this letter someone will be induced to come forward, and so put an end, at least for a time, to the false pretences of these gentlemen.—Yours truly, G. REEVES.

A PHOTOGRAPHER IN A FIX.—Photographers, particularly those who are given to the reproduction of the lineaments of fashionable beauties, or people who are otherwise famous or notorious, have at times some curious experiences. A Philadelphia firm was a short time since honoured with some sittings by a *premiere danseuse* rejoicing in the name of Mdle. Asteggiano. She could not speak a word of English, and, as there were no linguists in the establishment, there was great difficulty in conversing, The lady came out of the dressing-room with a hop, skip, and a jump. and pirouetted in front of the camera. The artist tried to explain to her that she was too near, but she did not understand, and immediately began a mazourka movement with lightning rapidity all over the studio. In and out of the chairs, round the camera stand, up and down the room went the nimble dancer in every possible attitude of grace, except that of repose, but a photograph was not feasible. An interpreter was accordingly sent for as a last resource, and while awaiting the advent of that person the ballet-queen continued her dancing, looking at the artist from time to time with a puzzled and impatient expression. Finally the interpreter arrived, and Mdlle. Asteggiano paused for breath. "Is it finished?" she asked in Italian; "I am tired." On it being explained to her that she was expected to remain still for a few minutes, she laughed very heartily. "Dear me!" she exclaimed, "here I have been performing a complete ballet in front of the camera, under the idea that all my movements were being instantaneously photographed. However, I am ready now." She gave a bound in the air and landed on the tip of the big toe of her right foot, and remained motionless for over half-a-minute while the picture was being taken.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange 150 *English Mechanics*, clean and consecutive, for anything useful. Wanted, stereoscope. — Address, T. J. LLOYD, Spon-street, Coventry.

I will exchange a rolling-machine, good as new, 18 × 14 plate, by Bury, for a full-plate landscape lens by Dallmeyer, Ross, or Grubb.—Address, J. BORLAND, Palatine-buildings, Bolton.

I will exchange a whole-plate double-geared rolling-press, size of steel plate 8 × 12, for rustic balustrade or window.—Address, A. BERRICK, 2, Holly-terrace, Lansdown-road, Worcester.

I will exchange a first-class Dallmeyer's studio camera for cabinets and *cartes*, good as new, for a portable tourist apparatus 7½ × 5.—Address, ROBERT W. STRAHAN, 24, Henry-street, Dublin.

I will exchange a very well-made, trunk-body, studio 10 × 8 camera, with rack movement, for a lens or anything useful in photography.—Address, W. E. DEBENHAM, 158, Regent-street, London, W.

I will exchange *Hunt On Light*, published at nine shillings, now out of print, for Abney's *Instructions in Photography and Silver Printing.*—Address, HERBERT GOVER, 29, Piccadilly, Hanley.

I will exchange a good whole-plate portrait lens, with Waterhouse's diaphragm, for one of Marion's "academy" cameras, smallest size or the next to smallest, together with one of Lancaster's *Meritoire* quarter-plate cameras complete, or for either of the above and £1 cash.—Address, B. P. SCATTERGOOD, Park-square, Leeds.

I will exchange a bellows-body camera and dark slide, for plates 14 × 12, a fine instrument for copying and enlarging, also a small camera and lens, the whole in splendid clean condition. Wanted, a 12 × 10 studio camera in good condition, with one or more dark slides.—Address, HARRISON'S CARBON AND SILVER PRINTING WORKS, Falmouth.

I will exchange a number of club specimens, 12½ × 10½, for a large, well-covered silver bath or anything useful in photography.—Address, C. W., artist, 36, Orbel-street, Surrey-lane, Battersea-park, S.W.

I will exchange a nice violin, case, and bow for a half-plate bellows-body camera, with double slides, or for anything really good and useful in photography.—Address, N. WEBB, chemist and photographer, Calne, Wilts.

I will exchange a fifty-two inch bicycle, Palmer and Co.'s "Interchangeable," nearly new, ball bearings to both wheels, in perfect order, honestly worth £9, for a good dry-plate camera and lens.—Address, J. EDWARDS, 111, Bristol-street, Birmingham.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

NOTICE.—*Each Correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

SYNTAX.—The lantern is of the ordinary construction. We have not examined it in order to see who is the maker.

TYRO.—We have published all that is known of the process, and we fear you will not be able to procure fuller information.

T. H. S.—The series of articles on *Portraiture for Amateurs* appeared in pages 352, 365, 383, 398, and 540 of our last volume.

H. B. H.—Letter forwarded as requested. We shall be very much pleased to receive fuller particulars of the filter, if convenient.

MARKS.—It is not necessary that the word "copyright" should appear on the print, but it is better that it should. It often deters from an infringement.

A. Z.—You will not now require a license to produce carbon prints developed on glass and mounted with the enamelled surface; but you must not call them "chromotypes."

PHOTOGRAPHER.—1. Apply to Messrs. Marion and Co., Soho-square.—If you really require information on queries 2 and 3 we should advise you to write to some of the medical journals.

STUDIO.—By all means erect the studio as shown in your sketch No. 3. By so doing you will save yourself much trouble in working, as well as expense for blinds and curtains. The room will also be much cooler in summer.

J. J. J. (Leeds).—You had better have an entirely new front to the camera. This will cost you less than further alteration of the old one. With the new one you can add the "improvements," if you think they would be an advantage. We do not.

O. BOWMEN.—Do not use red blinds in the studio; the colour would be far too trying to the eyes of sitters. With such a colour, when the sun is shining, we imagine it would be next to impossible to obtain anything like a satisfactory expression.

S. HARDMAN.—"Arrowroot paper" is not, we believe, an article of commerce at the present time; you will have to prepare it for yourself. The formula and method of working are quite correct. You should experience no difficulty whatever in the preparation.

THULIE.—As you do not say by what process you are making your opal pictures we are unable to state what is the cause of the pictures appearing "dim and sunk into the glass." Give us further particulars, sending us, if possible, an example of your failure, and we shall be happy to assist you.

SMASHED.—Under the circumstances we think you may recover the value of the broken opals from the railway company, particularly as you opened the case in the presence of their carman, who admitted that they had been carefully packed and marked "fragile." We think they will not dispute the claim.

INQUIRER.—If the lens be only chipped at the edges it will cause no serious inconvenience; but you had better just cover the broken places with a little black varnish, so as to avoid reflections from them. If the lens be really broken you will have to procure a new one. This you had better get from the maker of the instrument.

MECHANIC.—Collotypes are generally printed by an ordinary typographic press in this country; on the continent presses similar to those used for lithographic printing are largely employed. Your copperplate press would be useless for the purpose, as it would certainly break the plates, unless, perhaps, they be of very small dimensions.

C. MCFARLANE. — The dense brown precipitate thrown down on the addition of liquor ammonia to a solution of nitrate of silver is the oxide of silver. Probably, if you have added liquor ammonia to the sensitising bath that will account for the dead surface of the paper. We should fully expect the addition to destroy the brilliancy of the paper to some extent.

A. W. WATSON.—Zinc is not a good material with which to line a wooden vessel to be employed for washing prints from the hyposulphite of soda, notwithstanding the major portion of the salt has been washed out before the prints are put into it. There will always be some risk of the pictures being stained if they lie in contact with the metal. Far better employ earthenware.

GLASGOW.—If you were allowed four-and-sixpence per ounce for the silver obtained from your residues you obtained a very fair value for it. It must have been very pure metal, or you would not have received so much.

EBRAC.—"Precipitated chalk," or common chalk, should be used, not "prepared chalk." Whiting is to be avoided, as this is frequently adulterated with plaster of Paris, obtained by regrinding the moulds used for pottery purposes. Neutralise the gold immediately before adding the acetate. If the bath will not keep, as stated, the result must be due to impurity in some of the chemicals employed.

R. P.—1. The cause of your trouble is evidently that the solvents are too weak; that is, they contain too large a proportion. Methylated solvents may be used, but it is seldom that the methylated alcohol of commerce is strong enough to be employed for making a good collodion.—2. Employ marine glue, or you may, if you prefer it, use paraffine; but the glue will be found the better medium with which to secure the glass.—3. Is it a fact that a collodio-bromide plate does not give so sharp an image as a bath plate? Try the experiment for yourself.

RECEIVED.—"Blaikey's pocket slide." In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, April 4th, the subject for discussion will be—*On the Sensitiveness of Gelatine Plates by Various Formulæ.*

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—At the next meeting of this Society, to be held at the House of the Society of Arts, John-street, Adelphi, on Thursday next, April 5th, at eight o'clock, Mr. H. Trueman Wood will read a paper *On the Methods by which the Vocal Organs have been Photographed.* The following, from the question box, will also be discussed:—*When Large Pictures are Required, is it Better to Take them Direct, or to Take Small Negatives and then Enlarge Them?*

THE AMERICAN EXPEDITION AND THE TRANSIT OF VENUS.—Lieutenant Samuel W. Very, the chief of the United States Transit of Venus Expedition to Santa Cruz, Patagonia, writes from on board the steamship "Patagonia," under date the 19th instant, to the Hon. S. B. Packard, United States Consul in Liverpool, that he would arrrive at that port yesterday (Thursday), the 29th inst. He adds:—"The expedition has been very successful. Four of the contacts were observed and 224 photographs taken during the transit." On inquiry we find that Lieut. Very had not arrived at Liverpool up to the time of our going to press, but was expected to land at a late hour last night.

TRANSMISSION OF SIGHT BY ELECTRICITY!—A remarkable paragraph (originating, we believe, in an Otago newspaper) is going the rounds of the press, to the effect that electrical experiments by a Melbourne gentleman have resulted in the transmission by telegraph of sight as well as sounds, and that some forty or fifty people witnessed the projection on a screen of a view sent by telegraph, every detail being visible by the aid of a binocular! Mark Twain recommends people "not to prophesy unless you know;" but, notwithstanding such valuable advice, we cannot help expressing our opinion that this alleged exploit, which, of course, if it had occurred would be followed by photographing the scene on view, is pure nonsense. We have already alluded to Professor Boltzman's method of photographing sound vibrations, but that is far removed from such hoaxes as this.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Weeks ending March 28, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M

March	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
15	29·63	E	36	33	—	39	30	Cloudy.
16	29·57	W	31	—	—	43	22	Cloudy.
17	29·56	W	39	37	—	48	27	Cloudy.
19	29·79	NE	38	36	—	44	33	Overcast.
20	29·68	E	40	39	—	49	33	Overcast.
22	30·09	E	31	—	—	35	27	Snowing.
23	30·12	E	31	—	—	40	25	Hazy.
24	30·02	NE	29	—	—	45	21	Cloudy.
26	29·29	NW	37	34	—	46	31	Cloudy.
27	29·50	N	35	33	—	44	26	Overcast.
28	30·06	NW	37	34	—	47	27	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1196. Vol. XXX.—APRIL 6, 1883.

THE PREPARATION AND PRESERVATION OF THE FERROUS OXALATE DEVELOPER.

There cannot be a doubt as to the growing popularity of the ferrous oxalate developer in preference to the older alkaline form, over which it possesses many advantages without, as some of its friends claim, any corresponding shortcomings. That it does possess certain qualities which recommend it will not be disputed; but that the general adoption of ferrous oxalate development would prove an unmixed benefit few indeed will be content to agree. The mere fact that, after several years' employment of dry plates, some of the oldest and most regular workers still adhere to the alkaline developer proves that practice is not entirely in favour of iron—in this country at least; for on the continent and in America it is more in favour than it is here.

From numerous communications which are continually reaching us we know, however, that for studio work, at least, the ferrous oxalate is gradually supplanting pyro. in consequeuce of its greater convenience and the diminished risk of stained films; but whether, these claims in its favour being granted, the change will ultimately prove beneficial remains for time to show. For the present, in response to a large number of inquiries, we desire to say a few words on the preparation and preservation of the iron developer, upon which much of its convenience and economy depend.

In the first place, much has been said in the past on the importance of employing pure ingredients—that is to say, ingredients of a quality somewhat higher than the ordinary commercial products. After five or six years' experience with the ferrous oxalate developer in its various forms we have not the least hesitation in saying that the ordinary commercial products are quite pure enough for every purpose, and that where failure has resulted from their employment it has been caused not by the contained impurities but by the manner and the proportions in which they have been employed.

This question of the class of substances usable is one of the very highest importance in connection with the economy of iron development; for if pure chemicals must be employed then the developer is undoubtedly an expensive one. As we have said, however, no such necessity for more than ordinary *commercial* purity exists.

All that will be necessary for the installation of the iron developer for the first time will be oxalic acid, carbonate of potash (salts of tartar), and sulphate of iron. The two first can be obtained at from sixpence to tenpence per pound each, while the last, of sufficiently good quality, costs twopence or threepence. Procure a jar or bottle capable of holding ten or twelve pints of liquid; in this dissolve three pounds of carbonate of potash in (say) twice its weight of water—the latter preferably hot. Weigh out two pounds of oxalic acid, and when the carbonate is dissolved sprinkle into the solution the crystals of acid, stirring well to assist their solution. Be careful not to add too much acid at once, or some loss may occur from too violent effervescence. If the carbonate and acid are of ordinary quality and the former tolerably dry, when these quantities have been mixed and effervescence has ceased the solution will not be far from neutrality; test it with litmus, and whatever may be its state bring it just on to the side of acidity.

The mixture will now have a very milky appearance, and there will be a plentiful crop of crystals at the bottom. Make up the bulk of solution to ten pints; allow to settle or filter out the oxalate of calcium, which gives it the milky appearance, and keep this as the stock solution of oxalate of potash.

In another bottle or jar prepaie a solution of sulphate of iron by dissolving the crystals in twice their weight of cold water, filtering and adding one minim of sulphuric acid to each ounce of the solution. It is better not to make too much of the iron solution at once, as it soon oxidises and loses its power, though with the addition of sulphuric acid the oxidation takes place far more slowly than when the solution is nearly neutral.

When required for use the solutions are mixed in the proportion of one part of iron to four or five of oxalate of potash, pouring the former into the latter. Nothing is gained, except under special circumstances, by using too large a proportion of iron. It is usually recommended to mix the saturated solutions of oxalate and of iron in the proportions of three to one. When this is done the solution contains the greatest amount of oxalate of iron it is capable of holding in solution, and it may therefore be considered to be in its most energetic state. But, in addition to that, it is far more prone to decompose; it is less easily controlled in case of over-exposure; is liable to give thin, flat images; and to deposit a granular sediment on the negative film. For these and other reasons we prefer to recommend the proportions of four or five (preferably the latter) to one.

Many operators make an addition of bromide to the developer to act as a restrainer; but we have never, except in cases of very considerable over-exposure, found this needful when the developing solution is made in the manner described. The sulphate of potash formed by the interchange of elements between the two solutions is itself a restrainer, and the free acid also acts in the same manner.

It will be seen that such a developer is a very economical one if we take the following figures:—Three pounds of salts of tartar at 8d., two shillings; two pounds of oxalic acid at 8d., one shilling and fourpence; one pound of sulphate of iron, twopence—total, three shillings and sixpence. The carbonate of potash and oxalic acid are dissolved to make ten pints of solution, the iron to make two pints, and these, if mixed in the proportion of five to one, make twelve pints of developer for three shillings and sixpence, or at the rate of threepence halfpenny per pint. As a pint of developer will develope a large number of plates, ferrous oxalate so employed ceases to be the expensive luxury it was formerly considered.

With regard to the keeping qualities of such a developer, much will depend on the conditions under which it is employed and the number of plates developed. Where uniformity of result is aimed at we should distinctly recommend the mixture of a fresh batch of developer every day, and the limitation of its use to a certain number of plates. If (say) a pint of solution be used in a dish or well-bath for a certain number of negatives it will last longer and show less variation in its action than when a smaller quantity is used, though the latter may be applied to a proportionately smaller number of plates. Hence, the operator who knows pretty well his daily requirements will make up a bath in the morning to last for

that day, after which it may be applied to intensifying purposes or for developing plates which are known to be over-exposed.

Since the above was written we have received another complaint, which appears in our correspondence columns, with regard to the vagaries of ferrous oxalate. The result is evidently due to the employment of too large a proportion of iron, the solution being quite saturated with ferrous oxalate. If such a solution be made and kept in a moderately-warm room it will, upon removal to a colder atmosphere or if poured out into a dish, become muddy from deposition of a portion of the oxalate held in solution, though it may have been quite clear and bright previously. It is, in fact, supersaturated for the lower temperature. The loss of power, resulting in weak images complained of by our correspondent, is due to the absence of a sufficient proportion of restrainer.

ON GELATINE RELIEFS.

One of the difficulties frequently met with by experimentalists in the different processes which are dependent upon the relief obtained by the action of light on bichromated gelatine—such as the Woodbury or the stannotype processes, or any of the so-called "swelled gelatine processes," for the production of printing blocks—is that of obtaining sufficient relief in the mould or matrix. This difficulty often arises from an entire misconception of the principles upon which the action of light on the gelatine film depends. Many appear to imagine that when the relief in the print is not sufficient for the purpose intended it arises from the film of gelatine not being thick enough to begin with; but in nine cases out of ten this is not the cause of failure, for had the film been several times as thick as it was no greater amount of relief would have been obtained. We shall now endeavour to render this matter clearer, as many of our readers have from time to time sought our advice on the subject.

It may be remembered that, some two years back, we pointed out that in making carbon transparencies from weak negatives—such as were then frequently obtained with gelatine plates—a better result could often be obtained by employing a tissue containing comparatively little colouring matter than one more highly charged with it, such as that usually sold for the purpose. Since then we know that the plan we suggested has been largely adopted. We will briefly explain the reason why the better result is obtained. With a weak negative, when the tissue contains a large proportion of colouring matter, the light, acting through the more transparent portion, does not penetrate deep enough into the film to render sufficient of the pigmented gelatine insoluble to give a dense image when developed, because the pigment itself has obstructed the light. But if we employ a tissue thin of colour, then the light will penetrate deeper into the film, and, consequently, a larger proportion of it will be rendered insoluble. Although the image so obtained may not contain sufficient pigment to constitute a dense transparency, it may afterwards be intensified without difficulty, while that produced with the more highly-pigmented tissue cannot, because of the small amount of gelatine that is present to be acted upon by the intensifying agent.

If we examine two transparencies from the same negative—the one made in a tissue containing but little and the other much colouring matter—we shall at once notice a great difference in the relief between the two; hence it will be seen that, when a high relief is required, the film must contain but little colouring matter, and this brings us to the first point for consideration. Let us take the case of a matrix for the Woodburytype or the stannotype process. Here a considerable degree of relief is essential; hence a much thicker film of gelatine is necessary than in the case of carbon printing. But it is manifest that, however thick the film be, if it contain too much pigment the mould will be flat, simply because the colour, in conjunction with the yellowness conferred by the bichromate of potash, has prevented the light from penetrating deep enough into it to produce, when developed, sufficient relief to yield a good printing mould. It may be asked—Why use a pigment at all, seeing that its addition prevents the access of light into the gelatine? The necessity of the colour is to avoid the lateral spread of the light in the film, which would have a tendency to destroy the sharpness of the image, which the yellowness of the bichromate of potash by itself is insufficient to prevent.

Having explained the effect the proportion of colouring matter in the gelatine has in affecting the amount of relief obtained, we come to another matter of far greater practical importance, namely, the character of the negative itself which is necessary in order to produce a mould with a highly-raised surface. Supposing we have a gelatine film of the requisite thickness to yield a good relief, that it contains the minimum of colour allowable, and we print it with a feeble negative—one that is lacking in contrast—we shall find, when we develope the image, that we have a result that is useless for our purpose, as it is too flat. Now, with a view to getting the light farther into the film, let us expose another print, and this time carry the printing to a far greater depth than before. On developing we shall find that we have gained no practical advantage, as this image is as flat, or nearly so, as the former one; because, whilst the shadows have been printing, the light has penetrated through the denser portions of the negative and rendered the film in the high lights of the picture insoluble, so that, although we have a greater amount of insoluble gelatine than in the former case, we have no more relief. Therefore it is manifest that, however thick the gelatinous film may be made, no greater relief can be obtained with this negative.

Now, let us take another piece of the same film and expose it behind a negative the reverse in character to that we have just employed—namely, one with somewhat strong contrasts—and print to the proper depth. We shall find on developing that our film, which before yielded a poor and flat result, now gives us one that is bold and vigorous and well suited to our purpose. From this experiment it will be seen that the amount of relief obtained is not so much dependent upon the thickness of the gelatine itself as upon the strength of the negative, and that no advantage whatever is gained by having it thicker than is absolutely necessary to avoid its being printed through. Indeed, it is a great disadvantage in practice, for thick films are very difficult to get dry without their becoming spontaneously insoluble.

With a given negative, however thick the film may be, the light will not penetrate over a certain distance, and all the gelatine beyond that must be washed away in the development. Hence, from what has been said, it is clear that if we wish to obtain the slightest degree of relief with bichromated gelatine, we must employ negatives containing the greatest range of tones between the highest lights and the deepest shadows, and not attempt to do it by simply increasing the thickness of the gelatine itself. These remarks, though specially directed, by way of example, to the production of Woodbury reliefs, apply equally well to all analogous processes, as well as to those based upon the swelled gelatine methods of obtaining printing surfaces.

PHOTOGRAPHY AND THE EYESIGHT.

Photography in its relation to the general health has occupied the attention of more than one learned physician, but in its particular application to the health of the eye we do not remember any investigation having been entered into. That the functions of the eye are influenced to a considerable extent by the state of the body does not admit of a doubt; but we are concerned at the present time rather with the direct effect upon the eye of the various and manifold operations which the photographer engages in than upon the indirect action from the effect of photographic work upon other organs of the body.

It will not escape the attention of the thoughtful observer that more, almost, than in any other profession or trade has the photographer constant demands upon the organs of sight, not merely of a perfunctory character, but in a manner calling forth his utmost acuteness of perception, while in some departments there is, if wise precautions be not taken, a strain of an intense character that must prove most injurious. A medical man may be consulted by a patient and a lawyer by his client without either requiring to use his eyes carefully for

tithe of the time the interview lasts; but a photographer, from ie moment a sitter enters his studio to the time he leaves it, needs to se his eyes with the utmost acuteness of observation continuously, icessantly, and under conditions of the greatest strain, and, through ie excursions to and from the dark room, with a suddenness of iriation in the illumination that can scarcely avoid becoming an :tual shock.

If we turn from the principal to his subordinates, or assistants, e find the same thing. The printer, with a broad expanse of ight sky continually before his eyes, which have always to be on ie alert examining his prints; the dark-room operator, being all y in a light which, though perhaps not always very strong, is just the colour that taxes the eyes most; and the retoucher, with the osest strain of all upon these organs, working all day through with ent chest and eyes tried to their utmost capabilities to see the minu- st touches or alter details of the finest character—all place, as we ive said, a strain upon the eyes such as perhaps is needed in few her professions.

It is, therefore, incumbent upon everyone engaged in photographic irsuits not to lightly strain or overwork those wonderful instru- ents, their eyes, but to use every precaution to save and strengthen iem. We have already devoted space to the consideration of the se of the eyes by the retoucher, and the aids to their preservation hich he can make use of, so that there is little need here to repeat iem. We may briefly say, in this connection, that the eye may be rained just like the muscles of the body. If a man engage in fting or pulling a weight beyond his strength and injure himself either he nor anyone else is surprised, and, in fact, it is rarely ne, so fully are the consequences known. But, with regard to the es, most people consider themselves free to strain them morning, on, and night to the very utmost, without the slightest idea that ey are injuring them, and subsequently, when they find them pidly losing their power, are alarmed and astonished, not under- anding the cause in the slightest.

The eye—and everybody ought to know this—possesses a power focussing itself for objects near to and distant from it; as youth is ssed the power of focussing gradually becomes restricted, and the mits of what are termed the " near point" and the " far point" are duced. This is usually called " the accommodation of the eye." ow, as this accommodation for objects near to the eye involves actual muscular exertion, the greater the nearer the limit is proached, it must be obvious to the most thoughtless that when ie eye is continuously exerted to the utmost—that is, to see objects near to it as possible—the effect is liable to be analogous to a uscular overstrain in any other part of the body; for, after all, the cussing of the eye is brought about by the action of muscles ithin the orb of the eye itself. If a retoucher, however, employ ectacles he need not use the whole of his power of accommodation, id so can at once remove the strain, provided the spectacles be iitable in focus and have glasses of good quality.

The printer is surrounded by influences of another nature entirely. t is not so much the muscles of his eye that are strained as the elicate and sensitive structure at its posterior inner surface—the tina. This membrane, when strained by too bright a light, has tendency to become weakened or perhaps inflamed, which leads complications of many kinds, and even if not injured in this ianner its power of discriminating subtle tones and tints is apt to ecome blunted and weakened.

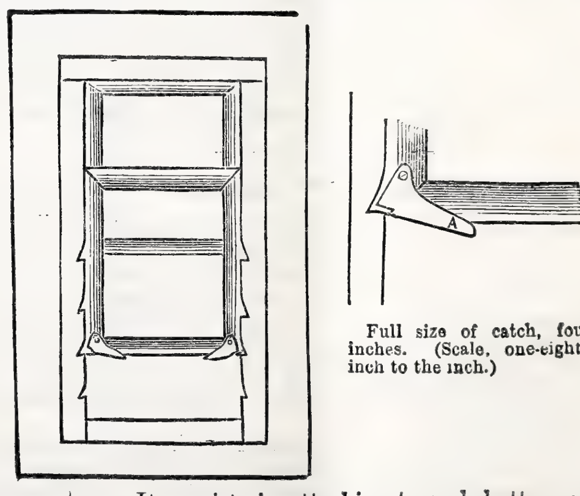
It has often struck us, when we have observed in establishments here the operation is performed in the old way—by the heat of a oal fire—how very apt the varnishing of negatives must be to cause iflammatory affections of the eye. To see a man toasting his eyes r a long time together as negative after negative passes through is hands for the varnishing, must lead anyone to think that the sing some of the other known methods—hot water, steam, hot air, c.—where the plate is heated by conduction instead of radiation, iust be much more advisable, and likely to remove one at least of he dangers or evils of photographic processes to the eye.

Again: the photographer who poses the sitter, then focusses, hen perchance hurries into the dark room, his eyes intent upon he sitter and his illumination, then peering at the plate in a dim developing light—can it be expected that his eyesight will remain good? The sudden contrast from the dim light of the dark room to the bright glare of daylight is likely to affect the retina, and when to this is added the strain of focussing the image—an operation which so many perform without optical aid when they really need it—no one can wonder at the complaint, not seldom heard, of the deterioration of the eyesight among busy photographers.

We believe that one of the most important factors of all in this matter will be found to be the effect upon eyes of the light and the lighting of the dark room. The subject is too important to be dismissed in a paragraph at the end of an article, and we intend, therefore, in our next number to discuss the question of how best to illuminate the dark room so as to present the fewest obstacles to the preservation of the eyesight.

The continuous photographing of the sun's face is not confined to English official observatories, for, from the *Seventeenth Report of the Board of Visitors of the Melbourne Observatory*, we gather that "sunspottery," as it is irreverently termed by a well-known writer in a weekly journal, is pursued with considerable ardour at the antipodes. In the year ending June 30th, 1882, no fewer than two hundred and seventeen such pictures were secured by the aid of the photo-heliograph; and very likely, if treated as the British sunspot views are, they may be useful to investigators some fifty or a hundred years hence.

The necessity of a chamber with a flue, to contain chemicals giving off noxious or disagreeable fumes—such as, for instance, occur in the manufacture of pyroxyline from the mixed acids—is well known, and a fume chamber, with sliding doors held by balance weights or springs, is to be found in every well-appointed laboratory. The liability to stoppage through corrosion of the cords by destructive vapours sometimes leads to accidents, and to prevent such contingencies occurring an ingenious arrangement has been devised by Mr. Thomas Fletcher to supersede the ordinary method of holding



Full size of catch, four inches. (Scale, one-eighth inch to the inch.)

up the window. It consists in attaching to each bottom corner of the sliding window a hard-wood catch, of such shape that it drops by its own weight into one or other of a series of steps cut into the uprights in each side of the window. The catch is released by the simple act of using it as a handle when raising or lowering the window. We append a sketch of this useful addition to any photographer's laboratory.

Our readers may remember several cases of fires occurring in studios through concentration of the sun's rays by lenses of one form or another. Perhaps the most curious was that caused several years ago by the sun's rays striking a bull's-eye in a studio roof, and being concentrated by it so that they ignited the floor covering. We narrated an accident last year due to a similar concentration of the sun's rays through the open window of a show-room by means of a photographic lens; and now we have to record a narrow escape from a similar danger by the one instrument, to be found in most studios, that would be the most dangerous of all if it were in

a position to receive the sun's rays at any portion of the day. We refer to the graphoscope. A correspondent, writing to a scientific contemporary, narrates how, as two ladies were standing in a drawing-room, the dress of one of them was observed to be in a state of ignition, which was found to be due to the sun's rays having passed through a graphoscope lens and been concentrated upon the dress. This is a timely warning, as, owing to the number of these instruments spread over the country, it is a most probable thing that cases would arise where at one time or another persons would be placed in a position of danger. It may be expected that this narration will bring to light other similar cases.

The use of citric acid to neutralise the alkalinity of sulphite of soda before adding to the pyrogallic solution has often been recommended, and some explanation of the slowing or restraining action said by some observers to be possessed by that salt may, perhaps, be traced to such use. A recent chemical writer points out that litmus paper as an indicator of the neutralisation point of citric acid is very defective, and this he explains by the fact that normal citrate of soda is alkaline. The writer, Mr. Robert T. Thompson, recommends in place of litmus a solution of methyl orange or of phenacetolin, which will show when the point of neutrality is reached with double the delicacy obtainable with litmus.

Some time ago we described a little "dodge" we had seen in a professional photographer's dark room for holding negatives while washing. It consisted of a pair of laths or bars of wood of triangular section placed parallel to one another across the trough in any suitable position, thus giving support with a minimum possibility of contamination from any previous chemical that might have been used. We lately had an opportunity of seeing what some would consider an improvement of the original method carried out in the dark room of an able amateur. Expecting the wooden laths might bend or break, this gentleman obtained iron bars of triangular section and sent them to be "galvanised," which, our readers are aware, is the popular way of speaking of coating with zinc. They appear to answer excellently, as their own weight is found to keep them in position and to do away with any necessity for fastening them down. The bars we saw had been drilled to secure them to the trough, but the holes were found unnecessary.

A WORD OF WARNING.

Some few weeks ago a notice appeared in the columns of the Journal of a new preparation for clearing the shadows of negatives and removing slight fog. The instructions directed that the clearing solution should be applied to the negative on its removal from the fixing bath and previous to washing. The Editors in their notice deprecated such a mode of procedure; but I fear, in their kindness, they did not lay sufficient stress upon the folly and viciousness of such a course of treatment when applied to any negative possessing the slightest value.

Whatever may be the *exact* composition of the ferric salt which forms the basis of this preparation, there is little doubt—even if so much had not been admitted by the makers of the preparation—that it decomposes the hyposulphite of sodium which may remain in and upon the film. What is the next result? I reply, simply, "fog"—if not immediately visible, certainly there, and, if the negative should require intensification or other treatment, fog that will make itself very painfully apparent in a remarkably short time, even if spontaneous change do not occur.

We have only to ask ourselves what remains in and on a gelatine film when it is removed from the fixing bath and before washing. We have hyposulphite of soda in large quantity on the surface; we have the double hyposulphite of soda and silver *in* the film, together with bromide of sodium resulting from the decomposition of the silver bromide. The different substances which have from time to time been recommended for the purpose of destroying or decomposing hypo. in prints or negative films do so by oxidation of a portion of the hyposulphite, with, perhaps, the deposition of sulphur or the evolution of sulphurous acid. When, however, a silver salt is held in combination or solution the same treatment brings about the precipitation of sulphide of silver, as a very simple experiment will show. Thus, even if using a perfectly fresh bath of hypo. for the first time, the fixed plate on removal must of necessity contain very considerable "traces" of silver in the shape of double hyposulphite of sodium and silver. Let such a plate before washing be immersed in alum, acid, or any of the clearing solutions that are in general use, and what is the result? Simply that the hyposulphites are decomposed and certain harmless salts are formed; but, so long as silver is present to commence with, a certain proportion—small it may be, truly—of sulphide of silver is formed in the film; and this, though probably not immediately apparent, will make itself so if any other chemical operations have to be performed on the negative.

To try the effect of a clearing solution on an unwashed plate, a solution of pure hyposulphite of soda of ordinary fixing strength was made, carefully neutralised, and filtered. In half-a-pint of this six unexposed plates ($6\frac{1}{2} \times 4\frac{3}{4}$) were "fixed," thus giving, as far as possible, a solution of pure bromide of silver in pure hypo. Negatives were developed with every condition favouring clear glass shadows, ferrous oxalate development being adopted; and after very careful and prolonged washing they were dried, and, subsequently, one half of each was dipped into the argento-hypo. solution, the whole surface slightly rinsed, and the plate dipped into various "clearing solutions." In every case *a visible veil was produced.*

If this result occur with a perfectly-pure solution of silver haloid, what must be the result of following the singularly-dangerous recommendation to remove the negative directly from an already-used fixing bath into the clearing solution?

H. Y. E. Cotesworth.

PRINTING IN ANILINE.

A period of eighteen years has elapsed since Mr. Willis first made known his discovery of a method of producing positive pictures in aniline, and with the exception of one or two editorial articles, and a few communications from Mr. M. Carey Lea and Dr. J. Emmerson Reynolds, published in 1865 and 1866, very little further investigation seems to have taken place on the subject; on the contrary the process seems to have sunk into oblivion. No doubt there are still existing some of the older experimentalists who have tried it; but, in all probability, at the present time the great majority of photographers know absolutely nothing about the process, simply because the subject has not been brought prominently forward for so many years. One reason for this may be because the process was protected by patent, and licenses to practice it commercially were not to be obtained; so, naturally, photographers ceased to take interest in a process of which they were debarred from making any practical use. But such restrictions no longer exist, as the patent has expired, and it is, perhaps, worth while to bring the subject to the front again, as not only being a very beautiful method of printing, but one capable of so many useful and interesting applications.

The process is founded upon the property which an acid solution of bichromate of potassium or ammonium has of decomposing aniline, whether brought into contact in the form of solution of its salts or as a vapour. In Mr. Willis's original communication to the then Photographic Society of London, published in The British Journal of Photography for April 21st, 1865, he enters into a most interesting description of the numerous experiments which gradually led up to the accidental discovery of the developing power of aniline vapour; and he also incidentally refers to vapours of other substances—some of which he names and others holds back—that have a similar power, and which he states have a greater resisting power to various reagents than aniline. As these further particulars have never been published, or, at least, I can find no reference to them, there is a very interesting field of investigation still open in this direction, as well as in various modifications of the sensitising substances.

A brief account of the actual method of working the process will perhaps be acceptable. For the sensitiser, take of—

Saturated solution of bichromate of potassium... 6 ounces.
Dilute phosphoric acid (pharmacopœia strength) $1\frac{1}{2}$ ounce.

This is to be applied to the paper by means of a camel's-hair brush or piece of cotton wool, in preference to floating, taking care to give an even coating, and then dried in the dark as rapidly as possible. It is better not to attempt the drying at the fire, as too much heat either sets up a decomposition of the bichromate or else drives out the free phosphoric acid, and prevents any development taking place afterwards. The dilute phosphoric acid, as ordinarily sold by the chemist, is of very indefinite strength, so that the quantity given is only an approximate one; but a trial will soon show how much to add, as the character of the image indicates in a very

marked manner the effect of too much or too little. If a large excess of acid be present the image will develope of an intense green, and as the quantity is diminished the colour changes to a blue, a violet, or a black. Too little is shown by slow development of a red or brown colour. With the sample of acid I have used the above quantity gives a very fine rich black.

Other acids may be substituted for the phosphoric, such as sulphuric or nitric, and good results obtained, provided it be an acid containing oxygen; but the phosphoric or hydrofluoric give the best results and the purest whites. The exposure is very rapid, being not more than one-fourth what would be required with silver paper. The paper, which is when sensitised of an orange colour, rapidly bleaches in the light, leaving the protected parts yellow, so that the progress of the printing may be watched, and after a little experience accurately timed. It is the unexposed parts which produce the picture, so that exposure must take place under a positive to produce a positive, and be continued until all yellowness is gone from the whites of the picture.

The development is extremely simple and requires no attention. Lay the exposed print, face upwards, on the bottom of a shallow box either of wood or cardboard. For small experimental pictures one of the boxes in which dry plates are sent out answers very well. On the inside of the lid scatter a few drops of a solution of aniline in benzole, and close the box. The common mineral benzoline, such as is used for lamps, answers the purpose. The strength is of very little importance, only a few drops of aniline to the ounce being required. After a short time the benzoline evaporates and carries in its vapour a portion of the aniline, and the picture is gradually developed, the colour depending on the amount of acid in the paper. The development also fixes the print, as when it is complete the picture may be exposed to daylight without any change taking place. A slight wash in water, however, improves the whites by removing some of the soluble salts.

The principal difficulty met with is a lack of definition in the deep shadows. This is caused by the solution penetrating too deeply into the paper and developing *in*, rather than on, the surface. Albumen is of no service, as the colour will not *take* with either albumen or gelatine. A preliminary coating of arrowroot to fill up the pores of the paper, and the addition of a little gum arabic to the sensitiser, improves matters very much and gives excellent results.

It will be seen from this brief description what a very simple, cheap, and useful method of reproduction this is. As far as cost of the chemicals required is concerned a few pence suffices to produce some hundreds of prints, whilst the attention necessary is much less than by any other known process. Its applications are too numerous to detail here, and will be obvious to every practical photographer.

What is the nature of the chemical change involved in the process? When paper is sensitised with a solution of bichromate and exposed to light under a negative the exposed portions darken considerably, potassium hydrate and chromic oxide are formed, the latter causing the darker colour, and, by combining with the organic matter of the paper, remains as an insoluble substance after the paper is washed. But if an acid be added to the bichromate a different result follows exposure to light. The exposed portions are bleached instead of darkened, because the chromic oxide combines with the free acid to form a salt of chromium. In the case of phosphoric acid a phosphate of chromium is formed, and probably also a phosphate of potassium. When the action of light is complete the bichromate of potassium is decomposed and the acid neutralised, or nearly so. An acid solution of bichromate is well known to be one of the most powerful oxidisers the chemist has in his laboratory. When the vaporised aniline comes in contact with this reagent it is at once oxidised and aniline black produced.

Aniline is an organic basic body, having the formula $C_6 H_5 NH_2$. It is probable that this base unites with the acid bichromate, and thus precipitates the hydrocarbon as black. This disposition of aniline to form black is pointed out by M. Koechlin as well known in the actual experience of dyeing establishments, where the mere fumes of aniline floating about the establishment give rise to the production of "germs" of black, afterwards developing themselves by mere exposure to the air. This black is the most permanent of all the colours produced by aniline. There is no known solvent capable of removing it from the tissues impregnated with it. I have soaked prints produced with it in strong solutions of sulphuric, nitric, and hydrochloric acids, and in solution of caustic potash and soda without in the least degree obliterating the image. On the contrary, they seem rather to be intensified by the treatment. The colour is changed, for acids render the picture green and alkalies violet, whilst a saturated solution of chloride of lime made acid with hydrochloric acid slowly attacks the image and renders it of a pale brown or drab colour; but washing in water and subsequent exposure to the air gradually restores the colour to its previous vigour.

I do not know any other process in photography that would stand such strong tests. Even an engraving would give way before caustic soda. Lengthened exposure to sunshine seems only to deepen the image. The reproach so often urged against aniline, that it is fugitive, does not seem in any way to apply to this substance. The coloured modifications, whether produced in development or by reagents afterwards, do not appear so stable as colours, but have a constant tendency to return to the black. In cases where the colours are required for special purposes—such as in botanical reproductions—I should advise not to depend upon the colour produced by development, but on that produced by reagents afterwards, leaving the reagent in the paper, and not washing it out. For instance: if a print produced from a fern leaf be washed after development, and then brushed over with a solution of gallic acid made slightly acid, it will give a very fine green. Wash away the gallic acid and the print will gradually return to the black; but, f left in, the green remains very permanent. And so with any other of the numerous tones it is possible to produce by this process. The only tendency to change that the black seems to possess is to a greenish colour; but this may be traced to free acid in the paper. If this be neutralised and washed the black seems unalterable.

EDWIN BANKS.

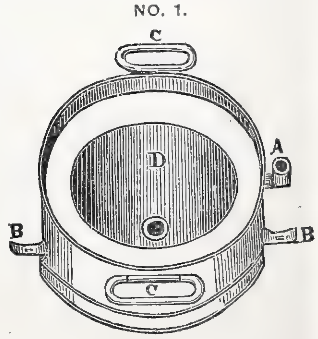
FILTERING APPARATUS FOR GELATINE EMULSION.

SEVERAL very ingenious and, I doubt not, effective contrivances for filtering emulsion from time to time (notably one in your issue of March 23, on the *exhaustive* principle) have been described in the Journal; but many of them appear to me to lack simplicity, and, moreover, do not in themselves contain the power of keeping the emulsion warm for a long period, and, at the same time, perfectly free from all light, with a minimum of trouble.

At the February meeting of the Bristol and West of England Amateur Photographic Association I had the pleasure of exhibiting a filtering machine, which in practice I, with others, have found most convenient; and, as I have been requested to give a fuller description of it than appeared in the report of the meeting in the Journal of March 9th, I will at once apply myself to the task.

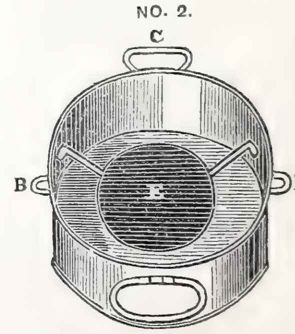
From the accompanying sketches it will be seen that it is composed of two separate parts, which are made to fit one on the other; and when put together look (as a facetious friend remarked) "very much like a steam-boiling saucepan for potatoes." The upper part (No. 1), standing about seven inches high and eight inches in diameter, con-

NO. 1.



TOP PART OF FILTERING APPARATUS.

NO. 2.



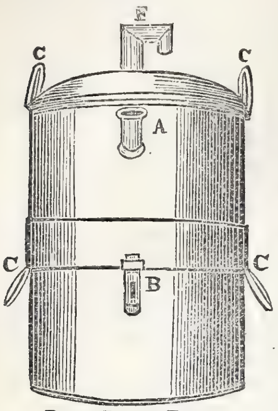
LOWER PART OF FILTERING APPARATUS.

tains a socket (D) for the funnel, let in flush, and soldered, so as to make all surrounding it perfectly water-tight, with the sides extending both upwards and downwards beyond the *depth* of the socket about one and a-half inch—in the former case to allow the glass or porcelain funnel to project up above the top of the socket, and in the latter case to form a *lapping* cover for the lower part of the apparatus. *Boiling* water is poured in at the nose pipe (A) and a cork inserted.

The lower part (No. 2) is simply a receptacle of nearly about the same size and shape (only a little longer, about eight inches, and is *open* on the inside), with three little loops soldered on about half way up the side to receive a wire holder, forming a ring (E) to clasp the vessel (into which the filtered emulsion passes) *tightly* so that it cannot float or be toppled over when the hot water (not boiling) is poured in.

The receiving vessel then being in its place, and the water put in both compartments, No. 1 placed on the top of No. 2, and the fastenings (B) secured, a short funnel with the emulsion (it is not necessary to dissolve the *shreds* first) is put in the socket. A glass plate is put over the top to prevent any condensed steam falling into the funnel, and the filtering can at once be comfortably and safely left to itself. If during the coating any air-bubbles should arise the filter is ready, and the emulsion can be passed through a second time. There are handles (C) both to the upper and lower parts, as when not using the lower part for filtering I often boil my emulsion in it. In the cover at (F) I have a small steam escape bent, to keep out light, and which serves also the purpose of a handle. The cover fits both compartments.

NO. 3.



BOTH PARTS FITTED TOGETHER.

Any tinman can make the apparatus. My own was made by Mr. Hillier, of Frome, at the cost of a few shillings.

H. B. HARE.

ABOUT CAMERAS.

It has often occurred to me as being singular that improved forms of cameras have been brought before the public by the makers at such a comparatively slow rate. Yet a little thought given to this matter should show that there is really nothing to marvel at; and the conclusion I have for some time arrived at was verified to me in a rather edifying manner a few weeks ago, while making a round of calls at the leading first-class makers in London. "What have you new, Mr. A.?" I said to the first. "Nothing at all, and I have orders six months' old on hand," was the reply. "Well, Mr. B.," I said to another, "I suppose you'll have more orders than ever this year, there are so many amateurs 'going in' for photography?" "Good gracious! Mr. Webster! I hope not," was his answer. To one I expressed my surprise that double backs should continue to be made hinged, as I could see no valid reason why an easily-managed arrangement should not be devised to enable plates to be put in from the front, and so save weight and avoid one risk of light-leakage. "Very likely," I was told; "but all my patterns are made to hinge, and I have no time to bother over devising new arrangements which perhaps nobody would buy."

Who can say this maker is not right? He is not behind the age; in fact, I consider there is no maker to surpass him in excellence of work and novelty of construction. With more work in hand than he can get through, and orders coming in constantly to keep him up to the same pitch, it is evident that to bring out a novelty (which always takes time, even when of the simplest kind, to perfect and bring into a saleable form) a maker must lose a considerable amount of money through orders being lost and routine interfered with. Hence, as a camera-maker—however proud he may be of his art—"makes cameras to live rather than lives to make cameras," as someone has said, he is not likely to get out of the usual groove unless trade be bad or competition become too keen. Our indebtedness to amateurs is shown here also. Many important improvements of manufacture have originated with them. They have borne the expense and risk of having new forms of apparatus constructed, and whenever a novelty has been a success the whole body of photographers have benefited; when a failure, the inventor only has lost. The actual expense of getting a new piece of apparatus made can only be revealed by those who have tried the experiment. A simple little apparatus, through conferences with workmen, minor changes introduced, and a host of other time-consuming causes, becomes astonishingly costly, and could usually be duplicated for a half, a third, or even a smaller proportion of the charge of the first one made.

Among improvements that could be apparently made with advantage is that named by Mr. J. Harmer, in last week's issue, of focussing by means of a mirror at an angle of 45°, the plate being uncovered and exposed to the open lens by hinging the mirror out of the way. As, he says, for children it would be invaluable, for the exposure could take place instantly after focussing without any necessity for adjusting slide and shutter. If I saw such a camera, possessing all other improvements, I should very soon purchase one; the difficulty that presents itself to me is the adjusting to the double swing, which I always employ. I daresay Mr. Harmer will be surprised to learn that a camera on such principles is not new; some twelve years ago I saw one at a Manchester camera-maker's. I cannot recal his name, and, if I remember aright, the mirror was in two pieces, so as to afford a more ready means of exposure.

When the pneumatic shutter first made its appearance—by-the-bye, I often wonder how I managed before I had this valuable addition to the camera—I soon found that for children's portraits its value would be increased greatly by placing it out of sight. It is now made so as to be able to be fixed in the interior of the camera, though it was not at first so arranged; but its motion is to and fro, like the old sky-shade of a lens, and this for wet-plate work did not fall in with my views at all. In consequence I got a well-known maker to fix it in a camera so as to work edgewise; and, as this did not allow the velvet shutter to come into close contact with the lens, I had a screen or false front made *inside* the camera and pierced with an aperture a little smaller than the disc. No light gets in to fog even a gelatine plate (though the apparatus was devised in pre-gelatine days), for wet plates no dust is raised, and altogether I have found it a complete and unqualified success. The camera-maker informed me long afterwards that he had only made one other like it, and it was *not approved of!* This is an argument strong enough against the introduction of any reforms by a busy camera-maker.

Some of my friends have been lately rather self-deceived in purchasing new cameras. There are, it is quite true, new forms in the market; but the purchaser should be most careful, in looking over manufacturers' lists, to ascertain, among the capabilities of any camera that strikes his attention, whether a short-focus lens can be worked in it. I have one or two cameras in my mind's eye which, beautifully made though they are, cannot be rendered available for short-focus lenses on account of projecting parts of the instrument being included in the field of view. This, I think, is worthy of mention, as, unless attention were drawn to the matter, it would be very possible to escape the notice of any but the most experienced.

I do not wish my gossip to appear like a grumble, yet I cannot close it without enjoying an Englishman's privilege. I think dark slides for studio use might, in the majority of cases, be greatly improved. Utility is apt to be sacrificed to lightness where wet plates are in question, while for dry plates a slide that is likely to be submitted to plenty of wear and tear will not unlikely be found to be not quite light-tight if exposed to light for any length of time previous to being placed in the camera.

But, all in all, I consider an English-made camera, of best construction, a marvel of workmanship, skill, and ingenuity; and I feel personally obliged to the maker when I employ such a one on occasions when certainty, accuracy, and dispatch are required.

G. WATMOUGH WEBSTER, F.C.S.

ON GELATINO-CHLORIDE EMULSION IN THE CAMERA.

[A communication to the Photographic Society of Great Britain.]

The only apology I can offer in bringing before you this evening the subject of gelatino-chloride emulsion is the fact that, whilst on all hands the beauty of the process is acknowledged, yet there somehow exists the idea that it is of necessity a slow process, and only useful for contact printing from negatives of the same size as the positive required, and is not available for artificial light or for reduction in the camera. That this opinion does exist and has often been expressed I know; and in proof of this I should like, for a moment, to quote a paragraph from an article in THE BRITISH JOURNAL OF PHOTOGRAPHY of 23rd February last, in which the writer says:—

"Where negatives are specially taken of the required size, and when contact printing consequently is possible, nothing can exceed the beauty of the results producible by means of collodio-bromide, carbon, Woodbury, or gelatino-chloride, with ferrous-citrate or citro-ferrous-oxalate development; but, unfortunately, these methods are too slow as a rule for employment in the camera when reduction is necessary, so that the wet collodion process continues to be used by the majority of makers of lantern slides."

Again: a little further on the writer of the article, after remarking on the beautiful tones that the gelatino-chloride plates are capable of producing, says:—

"However, as I have said, gelatino-chloride is too slow for camera work, at least for the majority of amateurs."

Every one who visited the exhibition at the Society of Arts was struck with the beauty of the transparencies by the gelatino-chloride process exhibited by Dr. Eder, and the sight of them no doubt induced many besides myself to try the process. I believe the article, as published by him in the *Year-Book of Photography* for 1882, contains all the information required for anyone at all conversant with emulsion making. For convenience, however, I will give the exact formula and

mode of working in English weights and measures, and I should like to add at this time that I can tell you nothing original, but all that I can tell you has been begged or borrowed from every available source at command.

The proportions for emulsions such as these pictures have been printed on are the following:—

Silver nitrate	950 grains.
Sodium chloride	480 ,,
Gelatine (Heinrich's)	960 ,,
Distilled water	30 ounces.

The silver is dissolved in ten ounces of the water; the chloride and half the gelatine in fifteen ounces, and the other half of the gelatine in the remaining five ounces of water, after having been allowed to swell for some time previously. All the vessels are heated to about 120°, or sufficiently to thoroughly melt the gelatine, and are then removed to the dark room, and the silver solution mixed with the gelatine, and then slowly emulsified into the gelatine and chloride; this is then poured out into a flat dish and cooled rapidly with running water, and, when thoroughly set, washed in the usual manner. This makes from forty to fifty ounces of an exceedingly-fine emulsion, and very slow—just the thing for making transparencies by contact printing and development by ferrous citrate or ferrous-citro-oxalate, but for camera work is certainly under ordinary circumstances too slow.

I will now hand round some slides taken in the camera, and give the formula used to make the emulsion. I should like to say, before doing so, that, as far as I have experimented, I have not tried to obtain the extremely-warm tones on plates exposed in the camera, for reasons which I will explain further on. For the emulsion for quick plates the same proportions are taken, with the addition of forty minims of a ten-per-cent. solution of hydrochloric acid; but only one-quarter the bulk of gelatine is used. Half of this is mixed with the chloride, and half with the gelatine as before, and the remaining three-fourths left to swell in water. As soon as the silver and chloride are emulsified together, the vessel is removed to the boiling arrangement and boiled for fifteen to thirty minutes or longer according to the rapidity required, and then the remainder of the swelled gelatine at once stirred in, a leaf at a time, put by to set, and washed in the usual way. The developers used in the experiments I am about to detail were—

The ordinary ferrous oxalate;
The ferrous-citro-oxalate of Captain Abney;
The ferrous citrate of Dr. Eder.

The first plate I hand round is printed out direct on citro-chloride after Captain Abney's formula; but as I have as yet had so little experience with it I have no remarks to make.

The other two contain a series of transparencies printed in contact by gaslight, and developed by various modifications of the developers I have mentioned, and as they are all numbered I can give any information respecting any one of them if required; but as I propose to show you some others of which I have noted more exactly the conditions observed in each case, I will pass them on without any further comment. The two slides of group are the first trials I ever made in the camera, and were exposed to reflected light from a bright sky for forty-five seconds—one developed with ferrous citrate without any restrainer, and the other with the addition of a trace of ferrous oxalate. The next series are printed by gaslight on slow plates, and will be explained by those that follow.

I have not found, when using the ferro-citrate-oxalate developer, that the length of exposure has any effect on the colour of the image, and I think the following experiments will illustrate this:—Six plates were exposed to the same light, viz., three inches from a gas flame, each plate having one-half more exposure than the other, the first having forty seconds and the last 303 seconds; and I think you will see that there is no difference in tone, but only an increasing depth of the same colour. The whole of them are developed for the same length of time, viz., thirty seconds.

The first of the series of comparative experiments I propose to show you contains six exposures made in the camera on a very dull day, with varying exposures from five to ten minutes, and developed as the last, with varying proportions of the same developers; but the remarks I have to offer further on will explain any differences that may be noticed in them.

With ferrous-citro development I have been able to get a variety of tones, as the examples handed round will show. The majority of these plates have been exposed to artificial light, as being more constant when experiments have to be taken up at any leisure moment. The first plate was exposed sixty seconds, three inches of gas flame, and developed with ferrous citrate (made with liq. ammonia) for ten minutes. The next plate treated exactly the same; but the developer was made with carbonate of ammonia, and gives an image of double the density. The next plate had only half the exposure, and was treated the same, and still gives a denser picture than No. 1, thus proving to my mind that the developer made with the carbonate is much more powerful than that made with liq. ammonia; so for all subsequent experiments I have used the carbonate.

In the next plate, No. 4, I gave eight times the exposure of the last, and developed only one quarter the time (two and a-half minutes), to see what effect long exposure had on the colour of the image, and to my mind it conclusively proves that great alteration in colour is not to be gained by great differences in exposure when using a constant developer; but I think that the further examples will show that, with very prolonged exposures and the same developer powerfully restrained, a great variety of tones may be produced. The next plate, No. 5, will, I think, explain this, as it was treated in all respects the same as the last, but with the addition of one grain of chloride of sodium added to each ounce of the developer; this plate took forty minutes to develope, but you will notice a very distinct change of colour. In the last plate on this series only half-a-grain of restrainer was used, and only fourteen minutes' time of development, and I think these last two examples show the great restraining power of the chloride.

In the next series I determined to test this point more thoroughly, and, as the exposures to gaslight would be tedious, I made the next six plates by daylight, giving the first one five seconds and using two grains of chloride as restrainer, and developing ten minutes; this, although a great over-exposure for an unrestrained developer, was not enough, so the second plate was given twenty seconds to daylight and developed the same time, and proved about the right exposure, although, from the experience gained by the previous series, the exposure was twenty times more than would be required by the same developer without any restraining chloride, but the colour of the image is totally different.

In the next plate, No. 3, I again doubled the exposure, giving forty seconds, and doubled the chloride, using four grains to each ounce of developer, and developed for the same time—ten minutes—the result being a distinct change in colour. Up to this stage I should say that I had entirely used slow plates; but in order to see whether the same tones could be obtained on the quick plates, which under ordinary treatment gave cold tones, I made the next exposure on a quick plate, requiring only one-sixth the time, and I was pleased to find the result very similar. The fifth plate I treated the same way as the last, but added one-quarter the volume of ferrous citro-oxalate, with the result that the development only took three minutes, but the whole tone is altogether colder. The last on the series was treated with exactly the same developer, but had eight grains of chloride to the ounce, the colour being the same; but the lights of the picture remained a little brighter.

I feel that I have not nearly exhausted the subject of development of these plates, but trust that some others will give us the benefit of their experience in this direction. ALEXANDER COWAN.

THE HYPO. FIXING BATH.

My name having been brought prominently forward in connection with this subject by Mr. W. E. Debenham, it becomes necessary for me to state the circumstances briefly under which the question was asked, so as to throw as much light as possible on what must be of very common occurrence, or we should not hear so much of dense negatives.

It would be well to state that there are two classes of negatives made by disciples of the camera, one directly opposite to the other, namely, some with contrast, density, and gradation of tone combined with detail, and which may be called fine negatives of medium density, obtained only by a careful exposure and a well-thought-out developer, the two being in exact harmony one with the other, so as to ensure always a beautiful result; the other a very thin, delicate negative, wanting somewhat in contrast, and sometimes flat and poor, at other times very opaque in the high lights and very thin in the shadows, with very little detail—the fruit of too rapid an exposure in a good light on the one hand, and direct under-exposure in a bad light on the other. Yet this class of negative has its admirers, and when carefully printed—the former on good Saxe paper *not* highly albumenised, the latter on *thin* Rive *very* highly albumenised—both parties are satisfied.

Now, these two classes of negatives require different kinds of gelatine, different modes of development, and different strengths and time of immersion in the fixing bath; and unless the whole business be conducted very carefully and with thought—that is, brains—one is apt to go wrong. Assuming that the development has been correct and a thorough washing has followed it, the fixing next comes to the front, and this should not be done in a hurry. The first or denser sort of negative will require a longer immersion in a solution of greater strength than the latter. This is my own experience. I prefer the first class of negative as giving results more nearly approaching a wet plate; with the latter I cannot get on at all.

I have stated thus much, because it prominently bears upon the subject before us. A photographer accustomed to fix the thinner class of negative would be more likely to err, seeing only clear glass, the yellow bromide having apparently departed. One used to a denser negative knows that the plate *must remain some time longer after the yellow bromide has disappeared to ensure proper and complete fixation.* The fixing bath must be made of a freshly-saturated solution—in the former case six ounces to the pint, and in the latter four ounces. The "reason why" is that the first plates contain iodide as well as bromide of silver, and they have also a certain proportion of chrome alum in

their composition, which tends to harden the film against the penetration of the fixing salts.

And, now, to turn to the case more immediately before us. It is, I daresay, within the recollection of many of your readers that during the autumn of 1881 I stated that it was possible to completely develope a plate, wash it, then immerse it in methylated spirit, and when dry it might be looked at in weak daylight without deterioration, thus enabling the operator to judge of its quality before fixation, and doing away with the carrying of hypo. when on a journey. All the plates I took in that year were so done, brought home, and fixed in a fresh and strong solution of hypo. These turned out well—so well that, on leaving home this last summer of 1882, I arranged to do the same. The first batch of negatives that were sent home in August all turned out well, giving most satisfactory pictures. The second batch did not fare so well. They comprised pictures of the late Eisteddfod, held at Denbigh, North Wales, and others. They left me in a similar condition to the former lot, with the yellow bromide well showing up, so that the quality of the negative might be readily discerned, and I naturally anticipated fine results therefrom. The same arrangement held good as in the former case—as to the fixing. The larger plates were done, I fear, somewhat hurriedly; but I was informed that with few exceptions they were all very good. The smaller ones were turned over to the assistants. Ultimately I heard that these were so dense that they must be reduced ere they could be printed.

Upon inquiry I found that a very great number of both large and small negatives had been fixed on one day in one bath; *that they were considered fixed when the yellow bromide could not be seen at the back of the plate*, and one of the assistants told me that at the end of the day the bath smelt of rotten eggs. On his own responsibility the day following he made up a new bath, and those negatives that were then fixed turned out clearer and gave better results in the printing. The plates were the productions of three well-known makers, who I shall designate as A., B., and C. A.'s plates were chiefly intended for the thinner class of negative, were very rapid, took a long time to start in development, but gave very good results. B.'s were bromo-iodide plates, very rapid or very slow according as the exposure and development were managed. C.'s plates were of the medium class, giving fine pictures full of detail, but not so rapid as A.'s or B.'s.

The large plates that were pronounced good turned out very slow printers; indeed, quite as bad as the smaller ones, some of them taking four days to print in the sun, although they were of a different colour and did not look so dense. Unfortunately their colour was deceptive, and they were varnished in that state. Many of the smaller ones, however, before varnishing (at my written suggestion), had a second treatment in a fresh hypo. bath, cleared afterwards with hydrochloric acid and alum, and they were pronounced better for it. Upon hearing this I was then quite sure I knew what had taken place. The plates had all been cleared of the apparent bromo-iodide in the shadows, but they were not properly fixed. They had the appearance without the reality. This I proved most conclusively afterwards. Some should have had a clear, thin, yellowish-brown colour—others a light olive-green; instead of which it was a *dense, dark olive-green*, with a veil over it. These negatives were shown to a professional photographer of eminence and to a distinguished amateur for their verdict, and pronoced by them to be over-exposed and over-developed though properly fixed, and the yellow sulphide in them was called "ammoniacal deposit" (which I always thought was pink), and that there was no bromide in them. I suggested sulphide or chloride of silver.

Now for the correctness of my surmises and a complete refutation of the dictum pronounced by the eminent "professional photographer" and the "distinguished amateur." It so happened that, after sending these unfortunate negatives home, I took about a dozen others on B.'s plates —the same that I had been using before, which were all developed and treated in the same way with the spirit and dried. These, taken in October, were not fixed until March, and I kept them as test plates against the others. They were first carefully washed for half-an-hour in tepid water, then immersed in a fresh solution of hypo. of the strength of six ounces to the pint. In this they remained from half-an-hour to an hour, the weather being very cold. They were then thoroughly washed in running water for two hours; then placed in a bath of hydrochloric acid one and a-half ounce and chrome alum one ounce to the pint of water for fifteen minutes; then again washed in running water for two hours, afterwards taken out, drained on a rack, immersed for five minutes in methylated spirit, and then put into a draining-box to dry thoroughly. Every plate was a perfect negative, with clear glass, exactly like a "wet plate" (the grand characteristic feature of B's plates). I was watched during the whole time by either one of the two assistants who took part in the second fixation, and they pronounced the negatives to have had the same appearance as the latter batch *before they were fixed by them*, but they both state that the results *after* were totally different. In their case it was a mechanical action, the success being dependent only on their seeing no yellow bromide on the back of the plates, while in my own it was a matter of care and thought, taking much time, and was not undertaken in a hurry.

I beg personally to thank those gentlemen, many of them being the first photographers of the day and prize medalists—well-known names of long standing, both professional and amateur—of London and the country who have written to me upon the subject; and some, having seen the negatives, pronounce *that they were all right up to fixing, but were then damaged*; that they probably contain, some sulphide, others chloride of silver; that they will darken on printing (which they do), and will finally be useless. The gentlemen referred to, one and all (without exception), advocate fresh fixing baths, as the *sine quâ non*, in order to ensure good and permanent negatives.

In conclusion: I have made three experiments with a view to reduce these plates—the old formula of iodide potassium, iodine, and cyanide, also hydrochloric acid and alum—with only partial success. That which has succeeded best was common salt, two ounces to the pint of water, after the negative had been previously soaked for a week in water, then immersed in fresh hypo. five ounces to the pint, and allowed to remain until sufficiently reduced. The same idea was mentioned by "Seaside" in your last number. Commercially speaking, "the game is not worth the candle," and the negatives are, for all practical purposes, spoiled.

W. Harding Warner.

NOTES ON CELESTIAL PHOTOGRAPHY.

[A communication to the Liverpool Amateur Photographic Association.]

Great expectations were formed, on the discovery of photography, that faithful autographic records would be obtained by its means of the wonders which are revealed by the telescope; but, excepting as regards the two most conspicuous of the celestial bodies, the sun and the moon, these expectations have not yet been realised.

The best photographs of the moon—such as have been taken by Draper, De la Rue, Rutherfurd, and Ellery—come far short of representing all the detail which can be perceived with high telescopic powers. Those who have not access to a large telescope which is capable of bearing powers of from 500 to 800 diameters can judge for themselves of the truth of this assertion by comparing any particular spot on the moon, as shown by the best photograph (for instance, the well-known crater Copernicus, or the lunar Appenines), with the drawing of the same spot given in Nasmyth and Carpenter's monograph on our satellite.

These remarks apply also to the sun, excepting that an extraordinary reticulated structure has recently been photographed by M. Janssen, of Paris. This reticulation has not been perceived by eye observation, and its nature and cause have yet to be discovered.

The principal reason why photography has failed in this respect is because too much has been expected from it. A longer or shorter interval of time is necessary for light to act upon the plate, and during this interval countless disturbances are taking place in a cylindrical column of air some fifty miles in length, and having a diameter equal to that of the object-glass or speculum employed. It is only on those rare occasions when the air is in a state of almost absolute serenity that it is possible to obtain a fine photograph. Besides this, in photographing the stars, either singly or in groups, so long an exposure is generally required that the telescope has to be driven by a clock which will make it accurately follow (or rather counteract) the diurnal motion for a space of one or two hours. Notwithstanding the great improvement in electric and other controls this is still a most difficult thing to accomplish.

By the discovery of the rapid gelatine process a great impetus has been given to astronomical photography. The nebula in Orion has been photographed by Dr. Henry Draper, of New York, in 1880-82, with an achromatic telescope of eleven inches aperture and gelatine plates. Exposures respectively of 51, 104, and 137 minutes were given. While a good representation of this irregular nebulosity has been obtained, the most striking result is that with the longest exposure the images of stars which are almost the *minima visibilia* with this telescope are recorded; and the legitimate conclusion is arrived at "that it is not unreasonable to hope that, by still further prolonging the exposure, and by still further study of photographic processes, stars and details (of the nebulæ) entirely invisible to the eye may be obtained."*

The late Mr. C. E. Burton, also, last year photographed the images of Mizar and its faint companion in ten seconds, the stars being about one-tenth of an inch apart.† As the interval between these stars is only fourteen seconds of arc, this gives promise of a useful application of photography for the measurement of double stars, or the charting of stellar groups or clusters.

Mr. David Gill, the energetic Director of the Royal Observatory at the Cape of Good Hope, has recently sent home some wonderful photographs of the great comet of last autumn. With a portrait lens of two and a-half inches aperture and eleven inches focus, and a camera strapped to the tube of the equatorial, and with exposures varying between thirty minutes and two hours, the best photographs ever taken of a comet have been secured. But these photographs are chiefly remarkable from the fact that an immense number of stars of all magnitudes are accurately depicted on one plate. These stars extend over a considerable extent of the heavens, and point out the possibility of accurately

* *Monthly Notice*, Royal Astronomical Society, vol. xlii., page 367.

† *Ibid.*, vol. xlii, page 424.

arting at one operation a space of about twenty degrees square. It plain that if this can be successfully accomplished an exposure of two, even three, hours will be worth attempting.

On examination of a negative on which are the images of a great mber of stars it will be seen that these images are all circles of nearly e same size, and that the various magnitudes are shown by the inasity of the discs. If the driving-clock of the telescope has not been ost accurate in its rate the discs are slightly oval, and this is nearly ways the case. It is not on this account much more difficult to easure their respective distances, and there is then no fear that an cidental spot on the film may be mistaken for a star.

As might have been anticipated, from the variety of colour which exts among the stars, the photographic magnitudes frequently differ from e apparent ones, and from this fact great possibilities of the value of iotographic charting are at once opened up. We know that our optic erves are insensible to rays having vibrations of less than about 325 llions per second. These are the ultra-red rays; and, conversely, that e cannot see rays beyond the ultra-violet end of the spectrum, which ive vibrations exceeding in number about 763 billions per second. Yet oth of these groups of rays can be photographed on plates which are nsitised with appropriate salts; and it seems quite likely that, by the se of negatives so prepared, the existence of stars which will for ever e invisible to the eye of man may be ascertained, and the autographic ecords may be the means of elucidating some of the mysteries of the iotions of binary systems, or of finding out the position which is occupied y a great central sun.

The difficulty of detecting evidence of change or of motion in nebulæ, nd in the richer clusters in which thousands of stars are aggregated, is o great that the attempt to solve it has been scarcely made. In these wo classes of celestial objects the application of photography may lead o discoveries of the supremest interest. R. C. Johnson, F.R.A.S.

A TOUR IN ITALY WITH THE CAMERA.

No. V.

Though I have dwelt long on the art-wonders of Venice I have not, nor can I hope, to do justice to the famous art city. One has not really to search for artistic "bits;" they almost thrust themselves before one. The difficulty is, as I have said before, in selection. One class of views in Venice I think especially interesting. These are the canal scenes, one of which forms an illustration in this week's Journal. These scenes, I need scarcely say, are extremely varied and picturesque, and may be obtained practically all over Venice. These views, which are easy enough for the painter to handle, are, however, frequently somewhat difficult for the photographer. This difficulty is owing to excessive contrast. Often they are a glare of light and deep shadows. In such cases the only chance is to wait for a suitable time of day and, if possible, for cloudy weather, when the light is more diffused. The annexed view is taken from the Campiello Querini, somewhat between the churches of S. Marco and S. Maria Formoso. In the same neighbourhood, within a few yards of each other, some half-dozen or so very charming views of canal scenes may be obtained. Very pretty "bits" of Venetian shipping may be secured along the Riva Degli Schiavoni, leading to the Public Gardens. Thereabouts we get those picturesque fishing boats lying at anchor or moored to the shore, decked with their lacework of nets hanging out to dry, their sails flapping gently to and fro in the light breeze, and manned by sailors in quaint, foreign-looking garb, all apparently busy with something, but most of them preferring the *dolce far niente* in the Italian sunshine.

Then, again, as vessels, especially those artistically-rigged Venetian barges, are ever leaving port, very pretty pictures of them with a background of Venetian scenery may be obtained from the Public Gardens or thereabouts. Patience is necessary for this sort of work. On one occasion I spent several hours and did not expose a plate. Thus I might go on, did space permit, pointing out an interminable list of objects worthy of being portrayed, so that the time the tourist photographer might pass in Venice should scarcely be measured by days but by weeks.

With regard to Venetian photographers: their work is by no means the best; it mostly belongs to that category of "cheap and nasty." However, M. Naya is far in advance of his brethren, and has lately turned out some really fine work. Venetian pictures lie under the defect of chalkiness, with great want of half-tones—common defects with the larger proportion of Italian pictures. Then, again, their apparatus is not always of the best; in fact, it is frequently quite antiquated. I remember, later on in Rome, a photographer coming up to me, asking for permission to examine my apparatus, his perfect amazement at Mr. Hare's exquisite work, and his appreciation of fine English lenses. He was not content until I allowed him to take down the name and address on both camera and lenses.

After getting through some five dozen or so plates I decided on pursuing my "tour with the camera" southward towards Florence. I therefore left Venice one afternoon at five o'clock, *en route* for Florence, *viâ* Verona, the ordinary route *viâ* Padua being interrupted by floods. In an hour or so we got to Ponte di Brenta, the scene of former troubles. Arriving at the "Ponte" we had to get out and carry, or allow some Italian "Arabs" to carry, our luggage across the broken bridge, which was covered with planks for passengers to walk across. Arrived at the other side a train was in readiness, which, in the course of half-an-hour, started. We then passed Padua and came nearly as far as Pojana, where another bridge was broken. This time it was pitch dark, and we had to shift as best we could and form a torchlight procession. We had half-a-mile to walk, and then twenty minutes to wait for a train, so that when we got to Verona it was 11 p.m.—just six hours doing seventy miles! But Italians are not accustomed to rapid travelling. "Slow and sure" is their motto, and their *ordinary* trains on long journeys frequently do not make more than ten to fifteen miles per hour. At Verona I changed for Modena, *viâ* Mantua.

Leaving Verona in a train which happened to be what they call "express," or, rather, "diretto," I was not long before I found out that a fellow-passenger in my compartment was in anything but a sound state of mind—in fact, he was a lunatic at large. Italians do not take much notice of these species of humanity, provided they exhibit no homicidal tendencies. Such was the quality of the lunacy of my companion *en voyage*, which took quite a harmless direction, for he seemed to imagine that the compartment was his bedroom; therefore, as it was already late, he would be doing the correct thing to undress himself, lie down, and go to sleep. Of course I was powerless to prevent him divesting himself of everything; but when he wished me also to undress, and urged his request in a somewhat energetic manner, I protested rather more than gently. I was, nevertheless, extremely relieved when we drew up at Villafranca, about ten miles from Verona, when I at once called the station master's attention to my fellow-traveller lying down in a state of semi-nudity. An explanation ensued, and the result was he had the compartment to himself for the rest of the journey.

Another change at Modena brought me to Bologna, where a final change landed me safely at Florence. For one who has time it would be a pity to pass over the last three towns. Mantua—Virgil's reputed home—is quite worthy of a visit; then Modena contains one of the finest Campanili in North Italy, erected in 1224-1319, is 335 feet in height, and is higher than the famous one at Venice. Like many of the Italian bell towers, the one at Modena is a leaning one, but only slightly. Bologna should receive a flying visit, for it is a very fine town. It contains a celebrated University—one of the oldest in the world, formed early in the twelfth century; and with its venerable churches and quaint-looking towers the place has quite an original character. Its famous School of Jurisprudence had once nearly 10,000 students, but now scarcely 400 attend the lectures. It is a remarkable fact that many brilliant members of the fair sex have been included at various times upon the staff of its professors. This fact probably gave to Shakespeare his *Portia*. It was in Bologna also that Galvani discovered galvanism, not yet a century ago.

So we reach Florence, the art city of Tuscany, once the capital of the Grand Duchy of Tuscany, and in more recent times of the kingdom of Italy. The city is situated in the fertile valley of the Arno, and is surrounded by gently-undulating hills. The country around is lovely and salubrious, studded here and there with pretty villas and well-tended gardens Its proud position with regard to art is well known to all, and needs not much comment; for it was here that the three great princes of art, Raphael, Leonardo da Vinci, and Michael Angelo (the greatest of the triad), were at one time labouring together. Florence was also the home of Benvenuto Cellini and Giotto. The Uffizi and Pitti Galleries each contain a magnificent collection of art treasures. The "Tribuna," a small room in the Uffizi, alone contains an unparalleled collection of *chefs d'œuvre* of ancient sculpture and modern paintings. At Florence I was not so fortunate as elsewhere with the camera. There are many interesting views in and about the city. The best general views are from the S. Miniato and along the Viale dei Colli; from many points along this height several well-known and effective views of Florence may be obtained. In the city itself, which is usually a busy one, are many points of interest to the photographer. The Ponte Vecchio, heavily weighted with its burden of quaint shops, which have belonged to the Jewellers' Guild for the past 300 years; the court yard of the Palazzo Vecchio and view of the Fountain of Neptune, &c., in the Piazza Della Signoria, once the Forum of the Republic; the views of the Campanile, or Giotto's Tower; the Cathedral, or Duomo; and the Baptistery, with its three bronze doors immortalised by Michael Angelo, who styled them "fit for the gates of Paradise;" and numerous little "bits" in and about the city may, with some little trouble, be obtained. In the neighbourhood of the city many interesting views may be secured in the Val d'Arno and about the surrounding hills.

Leaving Florence I proceeded to Rome, staying a day at Orvieto on the way to get a picture of the famous cathedral of that town. It is a splendid specimen of Italian gothic, and, with its beautiful mosaics, frescoes, and grand symmetry is one of the wonders of Italy. Many people not members of the "Blue Ribbon" go to Orvieto for the sake of the fine wine to be had there, and renowned even at Rome.

To those who have time it would be a pity to miss Terni and the magnificent waterfalls. I much regretted I had to reserve them for a future occasion. Arrived at Rome I found, when not otherwise employed, plenty of work for the camera. By the way, I believe one is not allowed to carry a camera in Rome without a *permesso*. However, I did not take the trouble to get one, and was not asked to show it. The views in and about Rome are very extensive. Those I found most interesting were of the ancient city—the Rome of the Cæsars; and the focus of attraction will be found to be the neighbourhood of the Roman Forum, with its ruined temples and palaces, triumphal arches, and Colisseum. First, the Forum—where, since the days of Romulus (supposing that gentleman to have ever existed), some of the grandest scenes of Roman History have been enacted, and whose walls used to ring with the world's most famous oratory—was, until lately, buried under the rubbish and *débris* of centuries, to a depth of thirty to forty feet. In the Basilica Julia adjacent there used to be, for many centuries, lime-kilns for converting into lime the marble "*quarried*" from palaces and buildings of ancient Rome. From the middle ages, and even down to our own times, the Forum was commonly known as the "Campo Vacino." Teams of oxen and buffaloes driven by Campagna peasants used to roam about its precincts. A few column tops protruding here and there alone spoke of departed glory. It was only in 1871, when Italy became mistress of Rome, that energetic measures were taken to carry these excavations to their fullest possible extent, and it is only quite recently that the Arch of Septimus Severus has been cleared down to its base. These excavations are still going on daily, and frequently the superimposed work is so strongly built that blasting alone will clear the ground. There can be no question the old Romans intended their work to stand the test of time. The Cloaca Maxima is an instance of this; for, after the lapse of some twenty-five centuries, it still drains the Forum and low-lying districts.

J. J. Acworth, F.I.C., F.C.S.

NOTES ON PHOTOGRAPHY.

Lecture XVII.—Optics.*

The Refraction of Light and Lenses.—When a ray of light passes obliquely from one transparent medium to another of a different character or density it is refracted (bent out) from its former direction. If a perpendicular be drawn on the surface separating the two media at the point where the light enters, it is found that when the second medium is denser than the first the light is refracted *towards* this perpendicular, and when it is rarer than the first *away* from the perpendicular. In passing through an ordinary sheet of glass light is bent in this way; but, owing to the second surface being parallel to the first, the emergent light proceeds in a path parallel to its former one. When the two surfaces are not parallel with each other the emergent light makes an angle with its former path, which is greater the larger the angle enclosed by the surfaces. On examining these cases by the rule given it will be found that the light on emergence is always refracted towards the thickest part of the glass. Depending on these facts, *lenses* are made. When thickest in the centre they cause light passing through them to converge towards the centre, and when thickest at the margin to diverge towards the margin. The first kind are called "converging" lenses, and the second kind "diverging" lenses. There are three forms of each:—

1. Double convex	Converging lenses.
2. Plano convex (one side flat)	
3. Convexo-concave (convexity greatest) ..	
4. Double concave	Diverging lenses.
5. Plano-concave (one side flat)	
6. Concavo-convex (concavity greatest) ...	

Nos. 3 and 6 are usually called "meniscus" lenses—either converging or diverging. Whenever light passes through a lens the emergent ray is weaker than the incident one, more or less being invariably lost by *reflection* from the surfaces.

Chromatic Aberration (Dispersion).—White light, after passing through a single lens, is found to be fringed with colour, and objects viewed through it also appear fringed with colours. This is due to dispersion, or that the different-coloured lights are refracted by the lens to different extents. It is corrected in converging lenses by combining with a converging crown glass lens a divergent flint glass lens. The dispersion of the two lenses, being opposite in direction, neutralise one another. The dispersion with flint glass being greater than with crown glass for an equal amount of refraction enables the required refraction to be obtained. Such a lens is said to be "achromatic."

Spherical Aberration.—Owing to the spherical curves given to lenses, rays from the same point falling on their margins are not brought to the same focus as those falling on their centre. the consequence being that images formed by them are blurred and indistinct. This evil is reduced to a minimum by the employment of small sections of curves and by the use of stops.

Curvature of Field.—Sometimes, on focussing the centre of an object on the ground glass, the margins are found to be indistinct, and if the margins are brought into focus the centre becomes indistinct. This is due to the fact that the natural focus of an image formed by a lens is curved, not flat. In order to obtain a sharp image on a flat surface a meniscus form of lens, with the concave side next the object, is employed, and a stop used *some distance in front of it*. In this case the centre of the lens is used to form the centre of the image, and the margins of the lens *nearest* the respective margins of the plate to form the image of obliquely-placed objects, the result being that only those rays which come to a focus nearest the flat plate are employed. At the same time, however, distortion is introduced and the angle of view curtailed. [Consult diagrams.]

Distortion.—When rays from an object fall obliquely on a lens, those which pass through the margin nearest that part of the plate where the image is formed fall on it nearer the centre than they should do for correct proportion, and those which pass through the opposite margin fall on it further off than they should do; hence, if a stop be placed some distance away from the lens so as to use the margin to form portions of the picture, distortion is produced—barrel if the stop be in front, and pincushion if it be behind. This defect is effectually cured by using two lenses with a stop between them.

Inequality of Illumination.—This is produced by three causes.—1. The more obliquely light falls on a given aperture the less there will be transmitted.—2. The more obliquely it falls on a surface the greater area it covers.—3. With inferior lenses the centre of the plate may be illuminated with reflected light from the lens (flare spot).

E. Howard Farmer.

Note.—It is particularly requested that all the members of the class will be present tomorrow, or the next Saturday, at 7.30 p.m.

* Read *A Treatise on Photography* (chapter xxix).

ON PYRO. DEVELOPMENT.

[A communication to the Photographic Society of Philadelphia.]

In presenting for your consideration a short paper on *A Modified Pyro. Developer*, I am well aware that you will find nothing strictly original in it; and my only excuse in offering it is to bring to the notice of members certain modifications in the pyrogallic acid developer, so that, before the season for outdoor photography opens, members so disposed may for themselves make comparison by trial against the ferrous oxalate developer, which, from its simple combination and cleanliness in using, has become quite a favourite with both practical and amateur photographers. From my means of observation I am able to say, however, that the pyrogallic developer is fast displacing the ferrous oxalate, especially by portrait photographers, and I have no doubt that on trial many who have hitherto exclusively made use of the iron developer will, on trial of the pyro., give it the preference.

The several objectionable features hitherto met with in the use of pyro. I think will be fairly met in the formula I present to you, and for the benefit of the young members present I mention the objection that many have to the fumes of ammonia and the tendency of it to produce pink, green, and other stains in the film, and to the dislike of

formula where a few drops of this and a few drops of that chemical are required. Although the sulphite of soda recommended by Mr. [illegible]. B. Berkeley, of England, as a preventive of the ammonia stain has been found fairly efficient, the substitution of another and cheaper alkali or the ammonia and in combination with a citrate, as recommended by Mr. G. Watmough Webster. is what will, in my opinion, make pyro. in the future the preferable developer for gelatine dry plates. I have from the first issuing of a formula for a developer for dry plates recommended citric acid, both with pyro. and ferrous oxalate, early recognising that it had a special value.

Some months since I made a series of experiments with the various citrates with pyro., and of those tried citrate of ammonia gave results so like a wet plate on the surface that any one not having seen it developed would have taken it for a collodion plate; but the development was very slow—something like fifteen minutes. Some two years since I made trial of carbonate of soda in connection with pyro., but, owing to its so quickly discolouring the pyro. solution and yielding such dense and strongly-coloured negatives, it was given up. Decolorising the negative had not then been discovered. Now, however, all is changed, thanks to our photographic brethren across the water, upon whose investigations formulæ have been based that will, I doubt not, give pyro. the preference as a developer for gelatine plates—at least to those with whom time means money; for it not only allows of shorter exposure in the camera and shorter time to develope the plate, but allows of more latitude in exposure and modification during development to suit existing circumstances than does the oxalate developer. The staining of the plate to such an intense unprintable colour need no longer be a cause of alarm; and, of the various methods recommended for discharging the colour out of the film, I until recently preferred the dilute sulphuric acid. Citric acid, in combination with alum, will do it; but I found it to endanger the plate, causing it to exfoliate entirely if left in the solution. Knowing the effectiveness with which oxalic acid will remove organic stains. I made trial of it, and found it to remove the yellowish-green colour of a negative developed with pyro. and sal soda most effectually, and have combined it with the alum bath, so that hardening and bleaching of the plate may be effected at one operation; and I can promise you that a gelatine plate, developed with a formula I will now describe and afterwards demonstrate, will yield a negative that, while wet, will present the nearest approach to a collodion plate yet seen.

I prefer to make the solutions of ten-per-cent. strength, the proportions only being changed when using them, and all in measurable quantities, excepting the bromide, which is prepared in case of need rather than as a required component of the mixed developer; for it is only in case of greatly-exaggerated over-exposure, or for the purpose of producing great contrast, that it will be needed.

The working formulæ are as follow :—

Solution No. 1.

Citric acid	100 grains.
Pyrogallic acid	1 ounce.
Water	8 ounces.

Label—"Ten-per-cent. pyro. solution."

Dissolve the citric acid in the water, pour into the one-ounce bottle of pyro., then into a glass-stoppered twelve-ounce bottle (having previously marked, with a file, on its side, a correctly-measured quantity of ten ounces), and fill up with water to the ten-ounce mark. I have pyro. solution so prepared since last July, and it is quite as active as freshly-prepared solution.

Solution No. 2.

Carbonate of soda (washing soda)	16 ounces.
Water (one gallon)	128 ,,

Label—"Soda solution."

Solution No. 3.

Soda solution	2 ounces.
Citric acid, in powder, just sufficient to neutralise and change a strip of blue litmus paper red.	

Label—"Citrate of soda solution."

Solution No. 4.

Bromide of potassium	90 grains.
Water	2 ounces.

Label—"Bromide solution."

Solution No. 5.

Pulverised alum	2 ounces.
Oxalic acid	½ ounce.
Water	20 ounces.

Label—"Hardening and bleaching bath."

The solution of carbonate of soda may also be prepared as a saturated one, and a portion diluted for the day's use. Four or five ounces diluted with water to twenty is a good strength to use with the strong pyro. solution.

To develope the exposed plate, for 5 × 8 size: in a minim graduate measure half-a-drachm of pyro. solution; pour into a graduate of four or six ounces capacity two and a-half ounces of soda solution, add the pyro., stir with a strip of glass, and pour over the exposed plate in the developing tray. Six to ten seconds is the average time at which the image makes its appearance on a properly-exposed plate. Let the developer act until the image is well out, and the finer details well covered over. The high lights should show plainly on the back of the plate. Should the image be twenty to forty seconds in appearing, add from one to two drachms of the saturated solution of soda, or two to four drops of liq. ammonia, which will usually bring up a slightly under-exposed plate. If, on the contrary, the image makes its appearance rapidly, showing over-exposure, at once remove the plate and wash off the developer. To one ounce of water add half-a-drachm each of No. 1 and No. 3, and mix with the developer. Lay the plate in it. The development should be more like a properly-timed plate, and if it still develope too fast add a few drops of the bromide solution. The development being completed, wash off the developer, and immerse for a couple of minutes in the alum bath; give a good rinsing, and fix in hyposulphite—one part to five parts of water—and finish with a thorough washing.

Finally: I consider that the addition of citrate of soda to the pyro. developer is one of the best controllers of that developing agent that I am acquainted with. Its action is different to the bromide. The former acts as a retarder of the light's action, while the latter acts as a restrainer, and, if freely used, will destroy the light's action. I will now, with the aid of my *multum-in-parvo* lantern, expose some plates under a sensitometer and also under a negative, purposely giving four times the exposure required, and in developing retard with the citrate of soda.

JOHN CARBUTT.

GELATINO-BROMO-IODIDE OF SILVER.

By my series of mixed bromo-iodide of silver gelatine preparations prepared with oxide of silver and ammonia I have proved that these emulsions have, when mixed after digestion and washing, a sensibility to colour quite different from what those I call "unmixed" possess. I repeat that by unmixed gelatino-bromo-iodide emulsion I understand those of which the gelatine, bromide, and iodide of potassium salts are all dissolved together, and whose silver haloid salts are precipitated simultaneously and alongside of each other, or brought into suspension.

The high sensitiveness to colour of unmixed bromo-iodo gelatine seemed to result from the simultaneous precipitation of the silver salts in the same gelatine. But I found afterwards that one could obtain a highly-sensitive emulsion—highly sensitive, at least, to daylight—by mixing the *separately*-prepared emulsions before digesting them.

I had prepared such a preparation in March, 1881, but I only tested its behaviour as regards taking in the camera, and did not then test its behaviour towards the light of the spectroscope. I therefore repeated my March experiment and lighted these plates in the large Steinheil spectrograph, when it became evident that a gelatino-bromo iodide so mixed and ripened was as sensitive to colour as my unmixed bromo-iodo preparation. If one dissolve the KI with an equal quantity of gum arabic, and then pour the silver solution for the *whole* emulsion into it, the AgI will remain in suspension as a *fine* precipitate. This gummy iodo emulsion, rich in silver, when added to bromised gelatine gives an emulsion which, after half-an-hour's boiling, is not only equal to, but in certain particulars even surpasses, the similarly-treated unmixed bromo-iodo emulsion. I have found that photographs taken upon such plates show more details in the shadows, even of brown-coloured objects, and the high lights are always somewhat clearer than in plates coated with unmixed bromo-iodo emulsion exposed under the same circumstances.

So much for the present regarding mixed bromo-iodo emulsion of high colour sensibility. The following are the details of its preparation, and I merely remark that I shall soon make a further communication regarding the spectral behaviour of mixed bromo-iodo gelatine, and show how ready-prepared bromide and iodide gelatines may be converted into mixed emulsions of high sensibility to colour, under which circumstances the minimum at G disappears, and how it can be obtained by increasing the sensitiveness to colour.

Here is the formula mentioned above:—*No. 133. 5% gelatino-bromo-iodide of silver mixed before digestion.*

Grammes.

a { 0·06 gum arabic / 0·06 K I / 5·00 distilled water } Dissolved warm, then allowed to cool.

b { 1·50 Ag N O_3 / 10·00 distilled water } Cold.

(a) Added drop by drop to b, and then added in small quantities to c.

Grammes.

c { 1·2 K Br / 1·5 Simeon's hard gelatine / 15·0 distilled water } Melted at 85° C.

d 2·5 distilled water for rinsing out the silver solution.

Cooked thirty minutes in the water bath; temperature of the emulsion only 92·5° C.

The nodules are then pressed, washed, and the emulsion poured on the plates.

V. SCHUMANN.

—*Wochenblatt.*

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATIONS FOR PATENTS.

No. 1608.—"Formation of Gelatino-Bromide Film Paper for Photographic Negatives." A communication from A. C. A. Thiebaut.—*March* 30, 1883.

No. 1650.—"Photographic Shutters for Instantaneous Photography." R. Reynolds and F. W. Branson.—*April* 2, 1883.

No. 1654.—"A New or Improved Clasp for Albums and other Books." A communication from A. Pflüger.—*April* 2, 1883.

ABRIDGEMENTS OF SPECIFICATIONS.

No. 3268.—"Improvements in Photographic Cameras." William Ford Stanley, 5, Great Turnstile, London.—*Dated July* 10, 1882.

This invention consists of the application of a peculiarly-divided scale by means of which the camera can be focussed by measurement only instead of by means of the ground glass. An ivory scale indicating distance of focus and proportion of image is inlaid in the base-board in such a position that an index attached to the sliding portion may show the focal value of the measurement. By moving the body of the camera the focus is set for any given distance of the object to be photographed. The camera, or the stand on which it is fixed, has also a slide by which the camera can be moved a short space to finally adjust the measurement to the scale.

No. 3491.—"Improvements in the Method of Producing Photographic Images and in Apparatus Applicable Therefor." Edward Gardner Colton; a communication from Wm. Kurtz, New York. *Dated July* 22, 1882.

This invention consists of a method of producing photographic images by which the object to be photographed and the photographic apparatus are simultaneously moved during exposure, so that the lights and shadows are forced to pass over the object; and, secondly, of a movable platform supporting the object to be photographed and the camera, means being provided for moving the platform during the time of exposure and for communicating a rotary motion to the sitter or object. Upon the platform are supported at one end the sitter or object, at the other the camera. A lever or other mechanical, pneumatic, or hydraulic appliance is arranged at the end of the platform carrying the camera, by means of which the platform is set in motion when required. When everything is ready for exposure the platform is turned on its pivot, so that the face of the sitter will be compelled to pass through a series of different lights, and so the shadows become softened. Very little retouching is necessary, and the portraits have more softness and rotundity.

THE PHOTOGRAPHIC ARTISTS' CO-OPERATIVE SUPPLY ASSOCIATION (LIMITED).

SUPREME COURT OF JUDICATURE.—COURT OF APPEAL, *April 3.*
[*Before* Lord Justices Baggallay *and* Cotton.]

This was an application on behalf of the respondent that the company, which was on the 15th of February last ordered to be wound up by Mr. Justice Chitty, and had presented an appeal, which was now pending, against that order, might be ordered to give security for the costs of the appeal.

Mr. Davey, Q.C. (with whom were Mr. Romer, Q.C., and Mr. Boone) in support of the application by the respondent, the petitioning creditor, relied upon the dictum of Lord Justice James in the "Diamond Fuel Company's Case" (13 Ch. D., 400), that whenever an order absolute for winding up a company has been made, and that order is appealed from by the company itself, without anyone else being made responsible for costs, the Court will entertain an application for security for costs.

Mr. Ince, Q.C., and Mr. Bramwell Davis for the company, who had lodged an appeal from the winding-up order made by Mr. Justice Chitty, opposed the application, and submitted that the Court, if the appeal should be unsuccessful, had power to direct the costs of the respondent to be paid out of the assets of the company, which were ample for the purpose, so that there was no necessity for directing security to be given. [Lord Justice Cotton.—The ground on which the winding-up order was made being that the company after paying its debts would be insolvent, can we rehear the petition upon this application?] The costs of the petitioning creditor who obtained a winding-up order are made by the Companies' Act a first charge on the assets, which are quite sufficient to meet this and the other debts, since it appears that the provisional liquidator has a sum of £1 000 in hand, and has made a profit of £400 since he was appointed. The effect of making such an order as was asked for might be altogether to prevent a company from appealing against a winding-up order in cases where some outside person could not be found to come forward and give security of costs.

Lord Justice Baggallay was of opinion that security for costs must be given by the company. It had been suggested that the proper mode of dealing with the application would be to direct the costs of the respondent, in the event of the appeal being unsuccessful, to be paid out of the assets; but the effect of that would be to pay them out of assets which ought to go to the creditors. The general principle, as stated by Lord Justice James in the "Diamond Fuel Company's Case," was, in his opinion, quite correct; and as a general rule, where a company was ordered to be wound up and appealed from that order, they ought to give security for costs.

Lord Justice Cotton was also of opinion that security for costs must be given by the appellants (the company), who had been ordered to be wound up on the ground that they were unable to pay their debts. In such a case it was only just and reasonable that the company who put the Court of Appeal in motion, in order, if possible, to reverse the winding-up order, should give some security for the costs of the appeal, in order to relieve the assets from the burden of bearing those costs in case the appeal shou[ld] be unsuccessful. In future, as a general rule, where a company, which ha[d] been ordered to be wound up on the ground that it was unable to pay i[ts] debts, appealed from that winding-up order, security for the costs of th[e] appeal ought to be required from them.

Our Editorial Table.

Blaikley's Pocket Slide.

Glasgow: George Mason and Co.

We have received from Messrs. George Mason and Co., the agent[s] what appears to be a useful piece of apparatus which bears the abov[e] designation. It consists of a thin case or dark slide strongly made o[f] light materials and capable of holding a single plate, its entire thickness not exceeding that of a couple of ordinary glasses. This pocke[t] slide fits into the wooden framework of an ordinary dark slide, by means of which it is introduced into the camera. In this manner th[e] sensitive plates may be securely carried in separate "pocket slides," [a] single wooden frame sufficing for any number, and enabling the touris[t] to work in comfort and without fear of damaging his plates by accidental exposure to light when changing them.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 10	Great Britain	5A, Pall Mall East.
,, 10	Newcastle-on-Tyne	College of Science.
,, 11	Cheltenham Amateur	
,, 12	Manchester	Mechanics' Institution.
,, 12	London and Provincial	Mason's Hall, Basinghall-street.
,, 13	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on the 30th ult., the chair was occupied by Mr. A. J. Brown.

Mr. A. Cowan said that he had, carrying out an experiment suggested by Mr. A. L. Henderson, added soft gelatine (Nelson's No. 1 photographic) to an emulsion immediately before coating. He produced two negatives—one on a plate coated with the emulsion before the addition of the soft gelatine, and the other on a plate coated after the addition, which was in the proportion of five grains to the ounce. He could not find, as stated by Mr. Henderson, that the addition of the soft gelatine had increased the rapidity of the emulsion. There was, however, a trifling increase of density; but this he (Mr. Cowan) thought was due to the plate being more thickly coated.

Mr. J. Barker considered that the use of soft gelatine made very little difference if the plate were used soon after being made; but if kept for a considerable time (say twelve months) the plate prepared with soft gelatine would be much better than the one which had been made entirely with a harder kind.

The subject of chloride emulsion plates, which had been arranged for discussion, was then entered upon.

Mr. Cowan showed a large series of transparencies in the lantern, illustrating his experiments. He said that he had found no great difference in the colour of the image to be obtainable with any given developer, especially if oxalate entered into its composition; but that by using a large quantity of restrainer in the developer and greatly increasing the exposure very warm tones could be produced. Some of the specimens he exhibited were developed with ferrous oxalate only, which it had been said would not develope a chloride plate. Other plates shown had been developed with ferrous-citro-oxalate with acid citrate, after Dr. Eder's formula, and with citrate prepared upon the same formula, but with carbonate of ammonia of equal weight with that given by Dr. Eder for liquor ammonia used in place of the latter. This last plan he considered, on the whole, to be the best. These various forms of ferrous compounds had been employed alone and in combination with chloride and bromide as restrainers. He found that with ferrous oxalate or ferrous-citro-oxalate chlorides had but very little restraining power.

Mr. A. L. Henderson observed that in the transparencies which had been shown and had a warm tone this colour pervaded the lights very strongly, and he thought the same effect would be produced by dyeing the film.

Mr. W. E. Debenham said he found, like Mr. Cowan, that with an unrestrained developer there was no obtaining any other than a cold tone; but with bromide added the same developer would give a range of tone from nearly black to a very warm brown, merely by varying the exposure and adjusting the time of development accordingly. He showed in the lantern transparencies produced by development on gelatino-chloride, and printed out by simple exposure on citro-chloride plates. Of the last mentioned he showed toned and untoned examples. The toning employed was the mixed gold and hyposulphite as formerly used for toning and fixing silver prints simultaneously. This gave the most pleasing result so far as his experiments went, and if used fresh he did not think there was any risk of fading introduced by the mixture.

A set of transparencies was then shown in the lantern, printed from negatives taken from the car of a captive balloon by Mr. Henderson, on the occasion of the Easter Monday review at Brighton. The exposure had been made by a spring shutter, and the camera had been held in the hand, as the movement of the balloon, owing to the wind and the strain upon the holding cable, was too violent to allow of the use of the camera while attached to the car. These appeared to be the best specimens of balloon photography that had yet been sent. Transparencies of Mr. Henderson's "Derby" pictures, and of river and snow scenes by Mr. W. Cobb, were also shown.

It was arranged that at the meeting to be held on the 13th instant portrait lenses should form a subject for discussion, and all interested were invited to attend.

Mr. E. Wills was elected a member of the Association.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The monthly meeting of this Association was held at the Free Public Library, William Brown-street, on Thursday, the 29th ult.,—Dr. Kenyon, Vice-President, in the chair.

The minutes of the February meeting having been read and confirmed, Messrs. Allmand, Clarke, Ellsworth, Plimpton, Pierce, and Kirby were elected members of the Association.

The Rev. G. J. Banner exhibited two very fine negatives on Wonderschönen plates. These had been taken quite recently, after the plates had been in his possession two years and eight months.

Mr. W. H. Kirkby inquired where the plates had been kept, as in his experience the keeping qualities of gelatine plates depended mainly upon the absence of damp.

The Rev. G. J. Banner said that the plates in question had been kept during the whole time in a warm cupboard, where they must have been perfectly dry.

The Chairman remarked that freedom from moisture did not always involve the preservation of sensitive plates. In his experience some plates which had been carefully guarded from damp had proved worthless after the lapse of a certain time; whereas others which had received no special care did not seem to deteriorate in the least.

Mr. R. C. Johnson, F.R.A.S., read a paper on *Celestial Photography.* [See page 192.]

The Chairman, in expressing the pleasure with which he had listened to Mr. Johnson's interesting paper, remarked that it was somewhat disappointing to note the paucity of detail in photographs compared with that to be found in a good etching or engraving, and asked Mr. Johnson if he could give further information on the adaptability of astronomical lenses to photographic purposes.

Mr. Kirkby said it was an interesting fact that Nasmyth's original drawings of Copernicus were in the possession of a member of the Association, Mr. King.

Mr. Johnson, in reply to the Chairman, said that the length of focus of telescopic lenses rendered it exceedingly difficult to use them advantageously for photographic purposes. These lenses, too, were seldom corrected for photographic work, and for this purpose reflecting telescopes were better.

Mr. L. Hughes remarked that in astronomical pictures produced by hand peculiarities were wont to be exaggerated by the artist, and especially when the mind of the observer was resting with special emphasis on some one feature of the object depicted; whereas in the photograph absolute accuracy, combined with perfect balancing of every portion of the detail, might be relied on.

Mr. E. Roberts said that possibly absence of detail in celestial photographs might be accounted for by want of precision on the part of the clockwork apparatus.

Mr. Rogers exhibited two slides of the same object—namely, the rice-grain granularity of the photosphere of the sun—to illustrate the difference between handwork and photography.

After some further discussion, and the examination of numerous photographs and slides exhibited by Mr. Johnson to illustrate his paper, on the motion of the Rev. G. J. Banner, seconded by Mr. Kirkby, a cordial vote of thanks was accorded to Mr. Johnson for his very valuable and interesting communication.

The Hon. Secretary then exhibited and described an instantaneous shutter sent him by Mr. Banks, the optician, of Bolton. This shutter seemed to combine the three advantages of efficiency, simplicity, and inexpensiveness.

Mr. Hughes gave a very kind invitation to the Association to pay him a visit at Conway during the coming season, promising the members not only the hospitality of his house, but also a profitable photographic day's work under his guidance among the interesting nooks and corners of the quaint old town.

The Chairman, on behalf of the Association, conveyed to Mr. Hughes his cordial thanks, and instructed the Hon. Secretary to make the necessary arrangements.

Mr. Adams then gave a demonstration of his mode of employing his new preparation, "brilliant," for the reducing of over-dense negatives, and the general improving of their printing qualities. Numbers of negatives were dealt with by Mr. Adams with much success.

A vote of thanks to Mr. Adams was proposed by Mr. E. Roberts, seconded by the Rev. G. J. Banner, and passed unanimously. The meeting was shortly afterwards adjourned till the last Thursday in April.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held at the Wedgwood Institute, Burslem, on Saturday evening last, the 31st ult.,—Mr. A. Humboldt Sexton in the chair.

Several new members were enrolled. Mr. A. Humboldt Sexton, F.C.S., was elected President of the Association.

A Committee of Management—consisting of two amateurs and two professionals—was appointed, to hold office until Martinmas next.

The Secretary having read letters from local gentlemen expressing regret at their unavoidable absence, it was resolved that the next meeting be advertised in the local newspapers some days previous to its appointed date.

Notice was given to the Chairman of the following papers to be read:—April 14, *Experiences with Various Emulsion Processes*, by Mr. J. Lockett.—April —, *Microphotography*, practical illustrations by aid of the microscope, camera, and lantern, by Mr. W. B. Allison.—May —, *Light and Lenses*, by Mr. H. Jones.

It was resolved to organise a few photographic excursions during the next summer. Committee appointed:—Mr. H. Jones, Mr. W. C. Potter, Mr. R. S. Burgess, Mr. W. B. Allison.

The meeting was then adjourned.

Correspondence.

THE HYPO. FIXING BATH.

To the Editors.

Gentlemen,—As there might possibly be some few photographers who may be so far influenced by Mr. Charles J. Hall's "eight months' experience" as to follow the plan he recommends, and "repent at leisure" when they find some of their most cherished negatives going hopelessly to destruction from imperfect fixation, it is, I think, worth while to write one more word of warning against depending upon a nearly silver-saturated hypo. bath for dissolving away the silver not forming the image.

Mr. W. Harding Warner, whose letter of the 2nd ultimo opened the question, put the subject as one for discussion, and as asking for information, without expressing an opinion either way.

Although your editorial article of the 23rd ultimo was in favour of the fresh solution that I have advocated, Mr. Hall assumes that the Editors are with him, and says:—"The point we" [the Editors and himself] "contend for, therefore, is that the length of time required to thoroughly fix a negative in an old bath—one approaching even the conditions of saturation with bromide and sulphide of silver—is not sufficient to give discolouration worthy of the mention." I think you will scarcely accept the partnership in such a statement.

Mr. Hall also says:—"Let me remind Mr. Debenham that when I plied him with argument by analogy, and which [*sic*] he says is inconclusive by itself, I only used his own weapon when he advised the fixing of a plate for a night. He must, therefore, take his sword back to its scabbard, and give us in future illustrations which pertain to practical results," &c. My argument was closer than a mere analogy. If twelve hours in a moderately-old bath will give a ruinous stain, a much less time in a much-more-used bath will give the same result, and a time sufficiently long to fix a slow-fixing plate will be quite long enough to set up a stain which may be either ruinous or only injurious.

As Mr. Hall is so liberal in his advice and direction to me as to how I am to write, perhaps he will allow me to suggest that he should devote his energies to the subject in hand rather than to the employment of metaphors, such as taking "back a sword to its scabbard," which do not help to clear up a disputed point, but rather tend to draw away the attention from the real question at issue.—I am, yours, &c.,

158, *Regent-street, W., April* 2, 1883. W. E. Debenham.

FALLING FRONTS FOR CAMERAS.

To the Editors.

Gentlemen,—Mr. W. H. Harrison, in his communication on *The Wants of Photographic Tourists*, in last week's issue, writes:—"There is no tourist's camera in the market that I know fitted with a falling front."

From this it would appear that he has not the pleasure of being acquainted with Mr. George Hare's work. My own camera, now nearly two years' old, has it; and, from what Mr. Hare told me, I have reason to believe that all his tourists' cameras are fitted with this convenience —in addition, I may add, to every other that can possibly be desired.—I am, yours, &c., L. H. Carter.

Forest Hill, March 31, 1883.

FERROUS OXALATE.

To the Editors.

Gentlemen,—I shall feel obliged if you can help me in the following difficulty:—I use the ferrous oxalate developer and make it by the two saturated solutions, one of iron to four of oxalate—the latter just acid to test paper with oxalic acid.

I am at times troubled by the formation of a precipitate in the developer, either soon after putting in the plate or after the liquid has stood a few minutes in the glass. In the latter case it generally adheres rather strongly to the glass, so that it has to be rubbed off or even scraped off before I can remove it.

The developer in this state seems to lose its power, or, at all events, gives a poor, weak negative. Sometimes the deposit will appear on the film after fixing, and, although it can be removed with a brush, there is evidently something wrong. At times a hard, crystalline deposit will form in the glass, which I can only remove by sulphuric acid.

The precipitate is usually a light yellow colour—not the rusty oxide of iron colour. I may mention that I always make the solutions with rain water and filter the oxalate quite clear. This latter I find always necessary.

If you can give me any help I shall feel obliged.—I am, yours, &c.,
Leamington, March 31, 1883. BROMO.

[Our correspondent will find the subject treated in a leading article in the present number.—EDS.]

EXCHANGE COLUMN.

I will exchange a large outdoor showcase, with two shutters, strongly built, for a camera and double slides for dry plates.—Address, F. J. MATTHEWS, St. John's-road, Ryde, I.W.

I will exchange a steel-plate roller, size of plate 10 × 8, for anything useful; also one of Solomon's lanterns and lamps, in good order.—Address, M. BATISTE, 29, London-road, Reading.

I will exchange *Wilson's Photographic*, 1881, new, for half-plate landscape lens or dry plates by any good maker—Britannia preferred.—Address, Rev. A. MALAN, M.A., Perranarworthal Vicarage, Cornwall.

Two half-plate portrait lenses, ditto cameras, quarter-plate portrait lens, embossing-press, and enlarging apparatus—what offers, any or all, in large plate symmetricals or useful articles?—Address, J. LAWRIE, 2, Nun's Island, Galway.

Wanted, Ross's or Dallmeyer's imperial lens, will give good exchange to value; and will exchange large rolling-press, steel bed, for Meagher's 10 × 8 camera, or offers entertained.—Address, A. SMITH, 63, Union-street, Stonehouse.

I will exchange a 5 × 4 bellows-body tourist camera, by Rouch, with four double and one wet plate, dark slides, good as new, for a 7½ × 5 tourist camera and double slides; any difference adjusted.—Address, U., 5, Priory-terrace, Tonbridge, Kent.

I will exchange a good quarter-plate lens, by Sheppard, ditto large quarter-plate with stops, by Derogy, and good rustic chair, stile, and fence, for a good dry-plate camera for half-plates, or anything useful in photography; or what offers for a £7 musical box?—Address, H. REDSHAW, Bourne, Lincolnshire.

I will exchange a 10 × 10 mahogany camera, with two inner mahogany bodies extending from eight to twenty-one inches, focussing-screen, folding tailboard, in good condition, with the exception of dark slide missing. Open to offers.—Address, WEST OF ENGLAND STUDIO, Cheap-street, Sherborne, Dorset.

I will exchange a posing-chair, three backs, in good condition, also a good 10 × 8 mahogany folding sliding-body camera, for interior and exterior backgrounds, grass mat, rustic chair, head-rest, or other useful accessories, in good condition, or for a 12 × 10 Dallmeyer's rapid rectilinear lens; differences adjusted.—Address, C. J. HOPKINS, Hampden House, Epsom.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Z. Y. A.—Some prefer wax and others French chalk. The latter involves less trouble in its application, and in some hands answers quite as well as the wax.

NOVICE.—Dissolve one grain of Castile soap in each ounce of methylated spirit; apply with a pledget of cotton wool; and, when dry, the print is ready for burnishing.

ALPHA (Leeds).—From the insufficient data you have supplied we cannot assign any reason for your failure. Working in the manner stated you should have succeeded. Give fuller details.

S. J. WHITE.—The best plan of preventing the india-rubber bellows-body of your camera sticking together in the folds is to rub the surface over with a little French chalk occasionally. It is almost a pity you did not employ leather in the first instance.

W. COTESWORTH.—We fear you will not be very successful in restoring the negative to its original condition. If, however, the action of the Schlippe's salt was not carried very far a solution of cyanide of potassium will possibly improve matters somewhat.

S. JONES (Carmarthen).—There is no question that there is something wrong with the emulsion, otherwise the plates would not behave as they do. You had better discard it and start afresh. We cannot suggest any method by which it can now be put right.

R. H.—If you have tried the paper on an entirely new silver solution, and still find it behaves the same, then we advise you to write to the maker and ask him to supply you with a fresh sample. Without knowing something of the preparation of the paper we cannot account for the appearance.

MISS A.—Thanks for the *carte* pictures of bouquets. They are very successful photographs indeed, considering the limited experience you have had. We certainly should advise you to essay some larger sizes as the season advances, particularly as you can command such choice specimens of flowers and fruit.

A YORKSHIREMAN.—We imagine that the kind of *passe partout* you are so anxious to obtain is not now made—at least we have not seen any for many years past. Possibly Messrs. Marion & Co., of Soho Square, or Mr. J. J. Atkinson, of Liverpool, might procure them for you in the event of their not having them in stock.

FLEXIBLE complains that when he transfers carbon prints from "flexible support" to opal glass that the support adheres most tenaciously to the picture and cannot be removed. This trouble may arise from two causes—one is that the support may have been insufficiently waxed; the other that very hot water has been employed in the development of the picture. This will frequently injure the coating of the paper, and at the same time melt the wax, thus destroying its property of preventing the adhesion of the picture to the support. It is quite possible that if you allow the pictures to soak in strong methylated spirit for some time the support may be stripped off without injury to the picture.

LUX.—A. By using the back lens only of the doublet you will, from the same standpoint, obtain a larger image and, consequently, a narrower angle of view. The front lens may also be used as a landscape lens; but its focus will be longer than that of the back, and, therefore, the angle included by it will be less still. In any case, with small stops the marginal definition will be quite as good on the size of plate you employ as with the entire instrument.—B. Possibly for purely landscape work either of the single lenses will enable you to produce a more brilliant result; but, of course, the angle of view will be less.—C. The front lens of the orthographic, used as a single lens, will give very good pictures if used for views. Its focus will be less than that of the instrument in its entirety, and will consequently include a larger angle of view, while it will possibly cover the size of plate you are now using. As we do not know its focus we cannot offer an opinion on this point with any degree of certainty.

RECEIVED.—George Smith. Thanks. In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, the 11th inst., the subject for discussion will be—*On Causes of Frilling in Gelatine Plates.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next meeting of this Society will take place on Tuesday next, the 10th inst,, at eight p.m., at the Gallery, 5A, Pall Mall East, when Mr. James Cadett will read a paper on *Photography of the Vocal Organs in the Act of Singing*, and Herr Emil Behnke will show his vocal organs with the laryngoscope.

BALLOON SOCIETY OF GREAT BRITAIN.—The following resolution was carried at the Balloon Society's meeting, held on Friday, the 30th ult., in the Lecture Room, Royal Aquarium:—"That the cordial thanks of the Society be tendered to Messrs. Henderson and Cobb for having successfully photographed from a balloon the volunteer review at Brighton." The Society's first balloon garden party will take place at Lillie Bridge, West Brompton, on Saturday, the 28th instant.

THE TRANSIT OF VENUS.—ARRIVAL OF AMERICAN OBSERVERS.—Lieutenant Samuel W. Very, U.S.N., and Mr. Orlando B. Wheeler, the two principal members of the expedition sent by the United States Government to Santa Cruz, Patagonia, to observe the recent transit of Venus, arrived in Liverpool on Friday last, the 30th ult., by the Pacific Steam Navigation Company's steamer "Patagonia." Lieutenamt Very, who had charge of the expedition as chief astronomer, states that the expedition left the United States on the 6th September last, in the Cunard steamer "Scythia," with a complete outfit for the work of observing, and arrived at Liverpool on the 16th September. On the 20th of the same month they sailed in the Pacific Company's steamer "Galicia" for Monte Video, arriving there on the 20th October. They were then taken by the United States frigate "Brooklyn" to Santa Cruz river, arriving there on the 2nd November. A station was selected, about ten miles to the westward of which was the French observing party. On the morning of the eventful day—the 6th December—the weather broke cloudy and hazy, but at half-past seven a.m. the clouds began to weaken, and as the day advanced the weather improved, so that at the time of contact the sun was almost entirely clear. All four of the contacts were observed, and during the transit 224 photographs were taken, with a continuous improvement in the results. At sunset the weather was changed, and the sun was not seen for four or five days. While the expedition were in camp the temperature changed to the extent of 19° in the course of every twelve hours. In the daytime the heat occasionally was oppressive, while at night the air was very cold, and the party had to sleep with double blankets and heavy clothing upon them. On the 16th December the "Brooklyn" left with a portion of the party, but Lieutenant Very and Mr. Wheeler remained until the 27th January, making observations for the chronometer errors and rates. They then proceeded for Liverpool. They will probably return to New York by the White Star steamer "Germanic."

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THE BRITISH
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No. 1197. Vol. XXX.—APRIL 13, 1883.

LIGHT IN THE DARK ROOM.

We hear from time to time the experiences of different operators with regard to the quality and quantity of light permissible in the dark room when developing or changing plates, and the advice given varies or differs so considerably that it is somewhat amusing to spend a little time in comparing the ideas of the authorities. The character and quantity of light considered usable by different practical men, too, varies very remarkably. We have been in the developing room of a well-known plate maker—the developing, not the "coating" room, be it remembered—where the gloom was so deep that we were compelled to cling to the coat-tails of our guide in moving about the apartment. On the other hand, in the "testing room" of another large plate factory the light admitted is of such a colour and in such volume that a letter or a newspaper might be read without the slightest discomfort in any part of the place.

The question naturally arises, and is very frequently put to us—"Is it necessary to exercise such extreme caution in connection with the light employed for development?" It is, of course, needful to draw a broad line of distinction between the quantity of illumination which is permissible in preparing and developing plates respectively. What would be perfectly safe under certain precautionary conditions for development would probably wholly fail in the preparing rooms, simply because the necessary conditions could not there be fulfilled. But there is no denying the fact that in proportion as the strength and quantity of the light increases so does the necessity for precautionary measures against fog. In the "darkness that is felt" of the dun ruby chamber it is possible to treat a plate in a manner that would utterly ruin it in a room more freely illuminated; in fact, the whole question is one of comparison.

If we go back four or five years we shall find that the first real success with extremely rapid gelatine plates was the outcome of the principle of paying strict attention to the quality and quantity of light under which the plates were manipulated. There was less in the chemistry of Bennett's process that was new to gelatine workers than in the insistance upon working with "two or three thicknesses" of deep ruby glass and similar precautionary measures against fog. Years before Bennett, Colonel Wortley, the late Mr. Sutton, and other workers with collodion emulsion, had pointed out the absolute necessity of developing bromide plates under a different quality of light to that which was employed for wet collodion; and it was long a puzzle to many to explain why a collodio-bromide plate would fog under a light that was perfectly safe for a wet plate that was three or four times more rapid.

The importance of using none but ruby light having been insisted on, and photographers thus educated to believe in the wonderful rapidity of the new plates, the necessity for the strict adherence to the rules in a measure vanished. When a man came to understand that it was not wise to expose a sensitive plate to even the deepest ruby light any more than absolutely necessary, he acquired an instinctive habit of invariably shielding his film from light of any quality as much as possible; and, this being done, it became feasible to employ a much more comfortable quality and degree of illumination in the developing room.

Then it was that ruby glass gave way to orange paper, and the latter in turn was attempted to be superseded by canary medium. Two gentlemen, indeed, went so far as to show that it was quite possible to successfully develope a plate without any coloured screen at all. Mr. J. H. T. Ellerbeck, of Liverpool, we believe, first demonstated the possibility of working by the light of a gas jet simply turned down low; and Mr. W. J. Allsup found it possible to use the light from an ordinary candle or benzoline lamp by merely cutting off the *direct* rays, and utilising only the light reflected from the walls of the apartment.

In such instances as those last mentioned, and in the case of such media as orange- or canary-coloured paper, success depends as a matter of course upon the care exercised in protecting the film from the action of the light as much as possible. It is obvious that if a few seconds' exposure through deep ruby glass suffice to print a positive upon a gelatine plate if the latter be placed behind a negative, canary medium or orange paper can form no safe protection during development if the plate is to be freely exposed during the whole operation. Hence the desirability—nay, necessity—for covering the developing dish with a light and suitable cover, which is raised for a second or two every now and then to examine the progress of the operation.

During a recent break-down of our dark-room window we succeeded, by adopting this plan to its fullest extent, in developing a perfectly clean negative, the only illumination employed being *sunlight*, which came into the darkened chamber through chinks in the temporary shutter, and was reflected from the whitened walls. If this be possible, then, canary medium and orange glass become apparently safe.

ON THE PERMANENCY OF "ENAMELLED" OR WAXED PHOTOGRAPHS.

A few weeks back the methods adopted to secure permanency in silver prints formed an interesting topic for discussion at the Photographic Club. Amongst the points mooted was whether additional permanence or otherwise was conferred by varnishing or treating the print with a protective coating. As on former occasions, when this subject had been discussed, opinions appeared to differ and no really definite conclusion was arrived at, although much useful information was elicited.

Every one knows that if an unvarnished negative—or, by way of better illustration, say a collodion positive—be left exposed to the atmosphere for any length of time, it will undergo a very marked change. If the atmosphere be damp and, at the same time, charged with impurities, as that of large towns generally is, the change will take place more rapidly; but if a similar picture be made secure in an air-tight frame it will remain unchanged for years, although unvarnished. Take the case, also, of a daguerreotype. However carefully that may have been fixed or toned with gold it will, if it be exposed to the air, rapidly tarnish, and thus the picture will become obliterated. But if the plate be carefully protected by enclosing it in an air-tight case or frame, as it was customary to do, experience teaches us that daguerreotypes are amongst the most permanent of all photographs. Again: in the case

of paper prints, long-continued experience clearly shows that pictures which are framed and glazed, or are preserved in albums or portfolios, prove more permanent than those which are exposed to the atmosphere, and that the more impure the latter may be the more rapidly the print will deteriorate.

Now, seeing that the atmosphere, particularly if it be moist, has a deleterious effect upon the prints, it would appear that if they were coated with an impervious varnish—collodion, wax, or even with gelatine—such prints should prove more permanent than those which are simply secured in frames or albums, for the reason that they are the more completely protected from atmospheric influences. Unfortunately, experience does not support this theory. Nearly thirty years ago the Photographic Society (now the Photographic Society of Great Britain) appointed a committee to inquire into the question of the permanency of paper prints, and in their investigations they found that coating the prints with varnish or waxing them did not conduce to rendering an unstable print more permanent, even when it was kept in a damp atmosphere; on the contrary, in some instances it appeared to cause them to fade more rapidly.

During the discussion at the Photographic Club the opinion of several of the members was that prints which had been waxed—that is, treated with the so-called "encaustic paste"—had proved more permanent than corresponding ones not so treated; while other members, on the contrary, had found them to change quite as rapidly. Past experience would indicate that if the print contain within itself the element of deterioration, rendering it impervious to the atmosphere will not arrest it; but, rather, on the contrary, may accelerate its decay. Hardwich, in one of his editions of *Photographic Chemistry*, when alluding to this subject, says "white wax is a substance often adulterated, and oil of turpentine has been shown to contain a body resembling *ozone* in properties and possessing the power of bleaching a dilute solution of indigo." Now, it is clear that if a print contain a trace of the hyposulphites, and it be coated with any substance containing a free acid or other injurious matter, instead of acting as a preservative it will set up a decomposition, and thereby hasten the destruction of the picture in a shorter time than if it had not been so coated; but it is quite possible—nay, probable—that if the whole of the hyposulphites and the albumenate of silver be eliminated in the first instance, and the coating contain no deleterious matter, that it will, by preventing access of the atmosphere, greatly conduce to its permanency.

Complaints have frequently of late reached us that prints "enamelled" with gelatine fade quicker than others mounted plain, and also that some of those prints which are mounted in optical contact with the glass and are now commanding such a ready sale quickly pass into the sere and yellow stage. The cause of this, in many instances, is not far to seek. In enamelling prints it is necessary that the gelatine used should be perfectly transparent, and also that it be free from colour, so as not to degrade the whites of the pictures. For this reason, as a rule, only the foreign varieties are used for the purpose, and these, in almost every instance, are acid—either with hydrochloric, used to extract the bony matter in the manufacture, or with sulphurous from the bleaching process. It frequently contains a mixture of both. Now it is clear that a print that has been but imperfectly fixed or washed will, if impregnated with such a gelatine as this, fade much more rapidly than another which has been simply mounted in the ordinary manner.

In a leading article in our last volume (page 482) we specially cautioned our readers against the employment of a gelatine containing free acid for enamelling prints, as it would certainly be conducive to their fading. This is the more likely to occur if the prints be exposed to a moist atmosphere, or, what comes to the same thing, the "enamel" contain glycerine. This is sometimes added to the gelatine in minute quantities as a safeguard against its becoming too brittle and cracking should the print be bent when very dry. If, however, either of the foreign gelatines be employed for the purpose the free acid should always be carefully neutralised, though it is always far preferable to select a sample which is neutral in the first instance, such as those of Nelson, and other English makers. These, though scarcely so free from colour as some of the foreign varieties, will answer quite as well, as the slight tint they contain may be totally disregarded in the extremely-thin films that are necessary to confer sufficient gloss on the picture, particularly when the question of increased permanency is taken into consideration.

THE DARK ROOM AND THE EYES.

Last week we had some remarks to offer upon the especial manner in which the photographer has to make use of—possibly to strain—his eyes, and of the danger to which those delicate organs are subjected in some of the processes of the art-science. The "dark room," or laboratory, being of particular importance in the matter, we now fulfil our promise of giving special consideration to the questions arising in connection with it.

When we remember that in many studios in the kingdom there are operators who from day to day, almost from year's end to year's end, are confined for many hours—hours taken from the best part of the day—in a room frequently ill-ventilated and always dimly lighted, except with that particular light which is least restful to the sensitive retina; that the eyes are used to their fullest capability the whole of the time; and that often while they are strained to the utmost they are dazzled by this irritating light immediately playing upon them, we are constrained to wonder not that the sensitive organs of sight occasionally give way to the strain, but rather that they do not always rapidly deteriorate. "When I come out of the room of an evening I am as blind as a bat," a dark-room operator was once overheard to observe; and the speech indicates a state of affairs grave in the extreme, and against which, sooner or later, unless stringent remedies be devised, a reaction is sure to set in.

Operator or principal, a man's eyesight ought not to be tampered with; yet we emphatically assert it is so, and to a disastrous extent, by the principle of illumination adopted in many dark rooms. When an operator working by this peculiar light enters into the light of day he is naturally—and it cannot be wondered at—hyper-sensitive to such light, and there are times when it is an actual pain to him. When such a state arrives, unless care be taken, danger may be anticipated. A few drops of chloroform dropped upon the hands and the vapour allowed to ascend to the eyes will sometimes give a wonderful relief to some forms of sensitiveness to light; but it is a relief that must not be relied upon. The eye should be most carefully and gradually brought to bear upon the more strongly-illuminated objects of everyday life, and on no account should bright light under these conditions be viewed by the unaided eye. We enunciate this as a principle to be adopted, not merely as an occasional rest; and the dark-room operator may depend upon it that, unless he follow this or some such plan, he will sooner or later repent it. When the eye has arrived at such a state that ordinary daylight becomes a pain, let him not be content to adopt the chloroform plan we have named, but let him rather consult an oculist.

But better than cure is prevention. We have from time to time entered many dark rooms, and we have quite arrived at the conclusion that there are many simple improvements which might and would be readily introduced therein if only their necessity were pointed out. First, there is the oft-debated question of a little light, or plenty of it of the right kind. Provided it *be* of the right kind, it is difficult to suppose how any one could desire to restrict the quantity. It is only to be imagined that uncertainty as to the true actinic-light-resisting power of the window must prevail, and that as a matter of safety, the smaller quantity is chosen as it is bound to produce the smallest amount of harm to the plate. We feel sure this is often the cause of the dim light of the dark room; yet what real carelessness does it not betray? It is not everyone, truly, who possesses a spectroscope, even a pocket one; but the simple plan of exposing a plate for a fairly-protracted time close to the window will give a very good estimate of its adiactinic quality.

However, a reaction appears to be setting in against this dim, mysterious light, and a more useful mode may be expected to obtain; but this leads to another consideration. With the advent of a sufficient area of window light new possibilities of strain to the eye are introduced. One little square of glass admitting all the light that enters the room could cause no harm; but with a large area there

would be a very considerable risk that the red or orange glare perpetually in front of the eye during the progress of manipulations require that the eyes to be fixed upon the work would lead to irritation and weakening of the delicate structure of the eye. With this danger in view, spectacles of special form and construction have been recommended, and, in default of other arrangements, their use would be undoubtedly beneficial.

We have recently had the *entrée* into a dark room where an excellent contrivance was adopted to prevent this glare. By means of a couple of screw hooks fastened to the window frame a hinge was formed, with an attached string connected with a large piece of board which acted as a hanging shutter, and was capable of being set at any angle by a cord suspended from the ceiling. When adjusted for developing operations it hung a slight distance from the window, and entirely screened the eyes from receiving any direct light from it, but permitted the developing trays to be fully illuminated. The bottom of the shutter was placed at such a distance that it did not obscure the view of the dish. We tried the effect of watching the development of a plate with and without this aid to comfort, and the pleasure derived from it was really so surprising that we most strongly recommend every photographer who has not already done so to provide himself with some such screen if he have a proper regard for the preservation of his eyesight.

We may conclude by pointing a most important point in connection with this subject. If the dark-room window be glazed with transparent ruby or other suitably-tinted glass the glare upon the eye—if, as is most commonly the case, a clear, uninterrupted view of the sky is prevented by adjacent buildings—will be far less than if coloured paper, cloth, or matt varnish be used; for in the case of the latter material a diffusion takes place of a portion of that light which might otherwise fall upon the plate, the plate is robbed of some of its light, and the eye is irritated by a needless glare. We do not wish it to be understood that we recommend the disuse of such useful aids to render the light of suitable colour. We merely call attention to a most important effect of such light modifications, and one which might easily escape notice.

The subject is important, and we trust our remarks may lead to increased care of the eyes and to the ultimate preservation of the eyesight of the photographer.

The communication of our old friend Mr. J. A. Forrest, in another column, on the subject of *Celestial Photography*, recals to our mind a chapter in the history of scientific photography in which the good old town (or city now) of Liverpool is shown to have been well to the front in the very earliest days of our art-science. So far back as 1854 the members of the old Liverpool Photographic Society—the founders of THE BRITISH JOURNAL OF PHOTOGRAPHY—recognised the possible advantage to be derived from the application of photography to astronomical purposes; and a committee was formed for the purpose of "exploiting" this then comparatively unknown branch of the art. In January of that year a few of the members of the Liverpool Society obtained the co-operation of Mr. Hartnup, the Director of the Liverpool Observatory, together with the use of the astronomical appliances of the establishment. Of the number so engaged some have "joined the majority," including Mr. G. R. Berry one of the earliest and most successful daguerreotypists and a keen experimentalist in every branch of photography, and Mr. J. T. Towson, equally well known as an early photographic experimentalist and a great authority on matters connected with navigation. Dr. Edwards, who went abroad some years ago, is, we hope, and for all we have heard to the contrary, still alive, as also Messrs. J. McInnes and C. Corey; and Messrs. Hartnup and Forrest complete the tale of the early pioneers in astronomical photography whose results elicited from so high an authority as the late Professor Phillips the following complimentary statement. In a paper read before the British Association, in 1854, Professor Phillips said, speaking of the labours of the committee appointed by the Association:—"But nothing which they have to show in the shape of photographs of the moon is at all to be compared with the results that have been obtained by the voluntary exertions of the photographers of Liverpool." Interspersed through the first volume (1854) of our Journal will be found numerous allusions to lunar photography; and in a paper read by Mr. Corey before the Liverpool Society the difficulties which beset the astronomical photographer of that day were fully set forth. It is curious, and can only be attributed to an oversight, that in the latest communication on the subject of *Celestial Photography*, by Mr. R. C. Johnson, F.R.A.S.—also made to the present Liverpool Amateur Photographic Association—the early successes of his fellow-citizens should be entirely overlooked. The traditions of the Journal and our own personal recollections of photography are so intimately connected with Liverpool that we are glad to seize this opportunity of alluding to the early triumphs of the little band of workers who produced the first successful photographs of the moon.

A MOVEMENT is being carried on by a certain class of people having for its object an entire change in the system of keeping objects of art and educational interest which has long prevailed in our own metropolis and in continental centres of art and science. The idea is, instead of having one central collection where a student can find all he requires, whatever the direction in which his studies tend, to break up this depôt into loan collections, to be sent up and down the country to the various provincial museums, &c., from time to time. The danger to the objects themselves from the continual carrying to and fro and the evil effect of breaking up a series is, by a large body of artists, &c., felt to be too great to allow of the plan being proceeded with; and a number of distinguished artists, archæologists, and other gentlemen, professional and amateur, are interesting themselves strongly to prevent the revolution being carried out. Among other points made by the opponents of the scheme, they very properly say:—"Why not send out photographs of drawings and other things instead of jeopardising the priceless and irreplaceable originals?" The matter is well put by an artistic contemporary, who says:—"The crafts of the *formatore*, photographer, electrotypist, and copier of pictures can meet the comparatively limited needs of smaller centres."

WHATEVER may be the outcome of it all, it is gratifying to see these continual proofs of the increased store set by photography as time progresses, and the correctness of our views as to the advance of the status of photography is thus upheld. Indeed, photography has conquered to a greater extent than some are aware of, and important works are carried out almost entirely by its aid; thus there is in the British Museum an important biblical manuscript known as the *Codex Alexandrinus*, which is being reproduced by photography. One volume has been already published, and the second is now ready and will shortly be issued. It includes Hosea to Maccabees iv. The process employed is the autotype.

A RATHER singular mode of preserving sulphate of iron from entering into that basic or oxidised state shown by the well-known brown discolouration is described in a foreign technical journal. It consists in placing among the iron crystals a test-tube half filled with an alkaline solution of pyrogallic acid, with its mouth well above the mass. It is stated that, if kept in well-stoppered bottles, the iron salt will remain uncoloured for two or three years. The idea is certainly ingenious, for anyone familiar with alkaline development knows how rapidly the developing solution becomes brown—not through the action of the plate upon it, but by absorption of atmospheric oxygen; and, as this is the active agent in causing the iron to change its colour, it is evident that if it be preferentially withdrawn by the alkaline "pyro." solution no change can take place if further access of air be prevented.

THIS plan is, to speak accurately, to prevent a ferrous salt becoming ferric. Two writers in the *Chemical News* recommend a plan of converting a ferric into a ferrous solution. They also recommend one photographically useful chemical to restore another, as they say that sulphite of soda added to a ferric solution will gradually de-

colorise it, and that the sulphurous acid produced can then be driven off by boiling without contact with air.

A REMARKABLE instance of the effect of light upon certain bodies is shown by green felspar (Amazon stone) from certain veins at Ammeberg. When first taken from the mine it is of a greenish-grey colour, but it assumes an emerald-green colour after exposure to the air for some time. Herr E. Erdmann determined to ascertain if the action were due really to the atmosphere or other causes, and he placed a number of different kinds of fragments in a test tube and exposed them to light for eleven months. The conclusion he arrived at was that light alone, and not air or moisture, was the active agent.

A CLEVER substitute for the ordinary glass stopcock for use with corrosive fluids has been lately described, and is very simple in form, being made out of two glass tubes and a piece of india-rubber tube. The glass tubes are to be of such size that one fits loosely within the other; the inner tube is sealed at the end that is inserted in the wider one, which is connected with the fluid, and a short distance from the sealed end a small hole is perforated. A piece of rubber tube is slipped over the junction. When the aperture lies outside the rubber no communication is formed; but when the inner tube is pushed so as to cause it to enter to a greater distance, the aperture enters the fluid and a flow is established. The idea seems most ingenious, and it ought to be useful for many photographic purposes.

THE advisability of testing various substances—the print itself, the mount, &c.—for the presence of hypo. need not be dwelt upon; but to employ the favourite re-agent, "iodide of starch," one of its constituents, has to be made fresh. This as a rule is considered too troublesome; at least so we should judge from the few instances where we come across it. A ready mode of making a permanent solution has now, however, been published, which does away with this difficulty. Herr O. Müller rubs up the starch with a strong solution of caustic potash, and when the strong solution is diluted with water a preparation is obtained which will last for years. One precaution to be taken is that the suspected liquid should be slightly acid.

FURTHER REMARKS ON RAPID COLLODION EMULSIONS.

IN a contribution to THE BRITISH JOURNAL OF PHOTOGRAPHY, a few weeks ago, I advocated the use of collodion emulsion in preference to gelatine, as being superior in the final results obtained in the ordinary run of the work of the photographer. I do not wish in any way to undervalue the service that gelatine emulsion has rendered to the art-science; but I consider that the firm and almost exclusive hold that gelatine has got upon both the professional and amateur photographer has an evil tendency, and that in more ways than one.

First: the practical knowledge of photography which is attained by the new beginner in the art is of a much more superficial character, since the part requiring most chemical skill—the preparation of the plate—is supplied ready made to his hand. The result is a gradual infusion into the ranks of photography of a large number who, if left suddenly to their own resources, would be utterly helpless and unable to produce anything like a picture

Then there is the question as to whether this mania for extreme rapidity has not been followed up in a large measure at the expense of excellence of results. I think it will be generally admitted, putting aside the relative exposure required, that a perfect negative on collodion is superior in every way to the best gelatine one; and if only photographers could be assured of obtaining the same rapidity with collodion as they have become accustomed to with gelatine there are many who would return to it. It was with the object of offering a few suggestions towards the attainment of this end that I wrote the previous article, also in the hope that other investigators would be induced to give their attention to the subject and communicate the results of their experiments freely to the public.

I am quite aware of the extreme difficulty of saying anything absolutely new on the subject. Collodion emulsions of every kind—both washed and unwashed, wet and dry, with every imaginable kind of organifier or preservative—have had a long run; but, withal, it never managed to work its way into the studio practice of the professional photographer in the manner that gelatine has done. Amongst amateurs it found ready favour, particularly for landscape work, because, although slow, as compared with the present processes, it was nevertheless sure, and almost unrivalled in the beauty of the finished negative. The introduction of gelatine emulsion, however, seemed to give so much greater power by its rapidity, the hope it held out of absolute certainty, and its freedom from many of the difficulties which beset the collodion process, that the attention of the experimentalist was withdrawn from the older method and directed into the new. Nor has this been without its result. The physical and chemical conditions necessary for the attainment of extreme sensitiveness are now so well understood that little difficulty is experienced in that direction.

It is probable that we have already arrived at the end, and that greater sensitiveness is impossible in emulsions; but it is in the direction of development where further improvement must take place. Could a developer be found that would be absolutely inert upon gelatine itself, and act solely upon the silver haloids, then gelatine would take and maintain the first rank in photographic processes. Unfortunately this has not been accomplished; for, at the same time that the picture is being developed, the complex organic substance of the gelatine itself is acted upon and a considerable amount of staining and discolouration takes place. And this is more especially the case where the most powerful reducing agents are used, unrestrained by any retarding substance. Here collodion is decidedly superior to gelatine, since it is scarcely acted upon by any developer, and retains its clearness and transparency throughout. Any discolouration or fog that may appear is not due to the film itself, but to the chemical or physical condition of the silver haloids entangled in it.

I think it may be assumed that an emulsion can be made equally sensitive whether formed in collodion or gelatine; but, as I endeavoured to point out, gelatine has the advantage in the more perfect isolation of the individual molecules, and that by utilising this property, and combining a gelatine with a collodion film, it was possible to attain extreme rapidity and use the most powerful developers; afterwards washing away the discoloured gelatine, leaving the collodion image on the plate. There are, however, necessary conditions to be observed and certain precautions to take. To form a perfect emulsion with a very small proportion of pyroxyline in the solvents is a matter requiring some care. There is a very marked difference, too, in the suspending power of various samples of pyroxyline, more especially when used dilute. For negative work there should always be sufficient silver bromide present to give a rich, creamy film. A great many samples of commercial pyroxyline, if dissolved at the rate of one or two grains only to the ounce of solvents, are quite unable to hold so much in suspension, but allow the bulk to separate and settle to the bottom of the bottle. As the success of the gelatine process largely depends upon the physical quality of the gelatine employed, so in this process the characteristics of the pyroxyline are of the utmost importance. A short, powdery pyroxyline, such as is very suitable for ordinary emulsion, is far from being the best for this purpose. It should rather partake of the horny and glutinous character, such as may be obtained by the action of cold acids on cellulose.

I have at various times tried samples derived from many sources and made by many formulæ; but for this special purpose the best of all was one made by the prolonged action of cold mixed acids upon fine linen. A pyroxyline is thus obtained which dissolves very slowly in mixed ether and alcohol, but does ultimately dissolve perfectly, leaving no sediment behind. A collodion made with this will form a perfect emulsion, with even one grain to the ounce, if proper care be observed in the mixing. A plate coated with this, washed, and dried without any preservative, presents a perfectly-even, uniform film of silver bromide, of a dead matt surface, appearing almost like a fine powder spread over the glass. If one half of such a plate be coated with gelatine before drying, and it be exposed in the camera, giving the same exposure as to a rapid gelatine plate, upon development it will be found that the uncoated half at once fogs all over, showing that there is absolute contact between the silver molecules, whilst the coated half will develope clean and brilliant, and will bear a great deal of forcing without fog supervening.

The method of mixing the emulsion has also an important bearing upon the result. A little consideration will show that the coarser the emulsion the more pyroxyline will be required to keep it in suspension. To form the molecules in the finest possible state of division, then, becomes extremely important; and this is not at-

ta ed by the ordinary method of pouring one solution, however gr lually, into the other. Suppose you are making a pint of emulsi for experimental purposes, and you divide the collodion into two ec al quantities—the one containing the silver and the other the h ids. On mixing, by pouring (say) one ounce of the bromised co odion into the silvered collodion there is a very large excess of ilver present, and the interchange of elements proceeds very ra idily on that account. The silver molecules thus formed will b *comparatively* heavy and coarse. The second ounce added will b by so much slower in its formation as the excess of silver is d inished, until as neutrality is nearly reached emulsification proce ls slowly and the molecules are finer.

Ve thus see that to form an emulsion in as fine a state of division a possible there should never be present a large excess of either e nent at one time. This is much more important with a minimum p portion of cotton than when the full amount is present, because i he latter case the glutinous nature of the pyroxyline checks the t rapid formation of the silver bromide. At the same time, care s uld be taken to maintain an excess of silver—at anyrate in the b k of solution—until the process of mixing is complete.

A very simple method of mixing that I have adopted, and v ich answers perfectly, is as follows:—Have a tall cylindrical jar, s h as confectioners use, fitted with a cover of wood to restrain e poration. At each side of this cover bore two holes to fit the n ks of two funnels. Mark the funnels S. and B., for silver and b omide. Fix in position and place in each funnel a small piece of s onge or tow, or, best of all, glass wool, and through this thread a p ce of worsted, allowing the end to reach through the neck of the f nnel some few inches. Unite the two pieces of worsted underr ath the cover by tying a knot an inch or two from the ends, a owing the ends to hang down. Place the cover on the jar, and c mmence by pouring into the silver funnel a small proportion of t e silvered collodion, allowing it to filter through. This is to aintain an excess of silver in the bulk all through the subsequent ixing. When sufficient has passed through refill the funnel with vered collodion and the other one with bromised collodion. The sult is that the two fluids trickle in a small stream down the eces of worsted, uniting at the point where they are tied, and, in rther running down the rough worsted hanging below the point junction, become thoroughly mixed and drop off into the bulk elow. It is quite self-acting, merely requiring the supply to be ept up in the funnels. By this means a very gradual process of nulsifying is arranged, and at no period is an actual large excess of lver present at the time of mixing.

Another important point in preparing an emulsion of this descripon is the strength or specific gravity of the solvents. This should e kept higher than is necessary when the full quantity of pyroxyne is used. In making a collodion emulsion the usual plan is to issolve the silver nitrate in the smallest possible quantity of water, nd add the requisite quantity of alcohol. This should be avoided. Silver nitrate is sufficiently soluble in alcohol without any addition of water, if a little trouble be taken to dissolve it. First reduce it o a fine powder, put it in a boiling flask with the alcohol, place t in a saucepan of water, and boil until solution takes place. The slight loss of spirit through evaporation is not worth mentioning, and the specific gravity of the solvents is not lowered. If water be added there is a strong tendency to the formation of sandy or gritty films forming just at the moment of setting. By adopting these simple methods a fine, uniform emulsion may be depended upon, and which, if worked in the manner I have indicated, is capable of extreme rapidity.

I have confined myself to the technical part of the subject, such as the mixing of the emulsion, without giving definite fomulæ, as success depends more upon that than upon the particular salts employed. With the permission of the Editors, however, I will return to the subject at some future time, and enter more fully into the practical working of the method. But sufficient has been said to enable experimentalists to try it, and if they do I think they will not be disappointed.

EDWIN BANKS.

GELATINO-BROMIDE EMULSION WITH BROMIDE OF ZINC.

BY this time of the year I have no doubt many, both amateur and professional photographers, are either contemplating or are actually at work making their stock of plates for the coming season, and it is to be hoped that we shall have more favourable weather than we had last year.

Some four or five years since I tried using bromide of zinc instead of the ordinary salts, namely, bromide of ammonium or potassium. I only made one batch of plates at the time which possessed several important features I considered an advantage, and I think well worth while following out. I do not think it can be denied that ordinary gelatine plates, if exposed in a weak light, fall very short of the results obtained with wet collodion when compared side by side, gelatine being almost useless under these conditions, and there is a decided gain in the result in this respect if the emulsion be made with zinc bromide.

In using bromide of zinc there is a slight difficulty to overcome, but it *can* be overcome, as I have succeeded in making a perfect emulsion. It will, I have no doubt, be remembered that Mr. L. Warnerke was the first to call attention to this salt in the days of collodion emulsion; and I think he claimed for an emulsion prepared with it that the image would stand more forcing without fogging to gain any amount of intensity. This was said of a collodion emulsion, and I also find that it is the same when used in a gelatine emulsion. I have heard a great many say, when speaking about the intensity of gelatine plates, that they can get any amount of intensity. I grant that in a studio where the operator has full command over the lighting of his subject by means of blinds, but it is not so in the field, especially when the light is dull. I have seen thousands of negatives, and as a rule I have found want of intensity has been the fault, and generally through the light. Now if we can find a remedy for this it will be a step in advance.

What I claim for bromide of zinc is that a rapid plate can be made with it, and any degree of intensity can be readily obtained with a very small proportion of pyrogallic acid in the developer. The cry always is to use plenty of pyrogallic acid and you can get any amount of intensity. I remember, in the early days of gelatine, as much as six grains being recommended, and I have myself, under extraordinary circumstances, used as much as ten grains to the ounce; but I think it is now, to a certain extent, a thing of the past. With the plates to which I refer, I found that I only required to use for a $7\frac{1}{2} \times 5$ plate one grain of pyrogallic acid in about three ounces of developer to get full density without the slightest difficulty. If the ordinary quantity were used far too much density was obtained, and the plate ruined beyond recovery; but with so small a quantity of pyro. the plate was not so much stained as with a larger quantity, and the negative took far less time to develope on account of the intensity being so readily obtained.

In making a gelatine emulsion with zinc it must be *decidedly acid* or it fogs. I prefer nitric acid for the purpose. I also found that some samples of the bromide behaved in a very peculiar way. All went on well until it came to the washing, when the bromide of silver washed out slowly, rendering the washing water slightly milky; this continued until the whole of the bromide of silver was discharged from the gelatine, and the latter rendered perfectly transparent as in the first instance. I remember a gentleman mentioning at one of the meetings of the South London Photographic Society that he was troubled in the same way as I was at that time. I think if a few experiments were made in this direction with the zinc salt and worked out, it would be a great advantage.

WM. BROOKS.

LANTERNS AND SLIDES.

No. VII.

BESIDES such slides as can be purchased, or that the operator can copy for himself by any ordinary photographic method, the want is often felt of diagrams and other similar illustrations which cannot be done by photography unless a special drawing be first made.

There are several simple methods by which such diagrams can be drawn direct upon the glass:—1. By smoking a glass all over and then making the design by scratching away the black with a fine point. This, of course, gives white lines on a black ground.—2. If glass be coated with a thin varnish of gum dammar in benzole, to which a few drops of a solution of india-rubber in benzole are added and thoroughly well dried, the varnish will be found to take the finest lines in Indian ink from an ordinary or a mathematical pen. It is, however, necessary that the benzole shall be quite pure or the varnish will be apt to rag and clog the pen.—3. A particularly-effective way of copying woodcuts is to take a thin film of clear gelatine and trace the design with a sharp point. A little dry lamp-black rubbed in adheres well to the scratches, leaving the field perfectly transparent. The gelatine film should then be mounted between two glasses.

As these gelatine films are not always obtainable I give the method of making them. The gelatine should be diluted to the ordinary consistency for coating plates and thoroughly well filtered, or clarified by boiling with white of egg. The glasses should be

patent plate, well cleaned and rubbed with ox-gall before coating; this will allow the gelatine film to strip easily from the glass when dry. Another method is to coat the glass with ordinary plain collodion before gelatinising, and this is probably the more reliable method of the two. It is, however, essential that the glass should be perfectly clean. Wet-plate workers will appreciate the necessity as well as the difficulty of obtaining a glass surface really clean. The method which I have found the most effective is to take common whiting and mix it with water to a thin cream, allow it to stand for a few minutes so as to enable all the coarser particles and grit which is nearly always present to subside, and then pour the upper and perfectly-fine portion into a jar to settle. The water is then poured off and the finely-levigated whiting well rubbed on to the glasses. When they are thoroughly dry the adhering powder is easily rubbed off with a clean old rag, and the glass will be very nearly *clean*—not quite; for if now a large camel's-hair brush be taken, and the glass brushed over with French chalk (the ordinary boot or glove powder), it will be seen that a thin coating of the French chalk will adhere. By continued gentle rubbing with the camel's-hair brush it will gradually disappear, and the rubbing should, therefore, be prolonged until the glass is perfectly clear all over. This may appear a somewhat troublesome preparation, but it only requires to be done once, and will ensure the compound gelatine and collodion film leaving the glass with the most absolute certainty; and if then they are at once, or within a few hours, again rubbed over the camel's-hair brush and re-coated with collodion—an operation taking only a few seconds—they can always be relied upon, and can be used over and over again with certainty. I have given these full particulars because this is the process for "enamelling." I, therefore, repeat that the secret of success is to clean the glass thoroughly once for all, and that it will keep clean by not leaving it exposed to the air for a longer time than is absolutely necessary; but re-coating with collodion after a preliminary dusting over with French chalk—the object of which is not to form a film between the glass and the collodion, but to ensure the absence of any dirt which might cause the collodion to adhere.—4. Another, and most elegant, method is to draw the design required with a hard, blacklead pencil upon a ground glass. When finished, if a drop of Canada balsam be poured on the ground side and another glass laid carefully upon it, and the two glasses warmed before the fire, the Canada balsam will spread itself quite evenly between the glasses, and entirely obliterate the ground surface, the result being the blacklead drawing hermetically sealed between two pieces of clear glass.

I am indebted to Dr. Williamson, of Newcastle-on-Tyne, for a further improvement of this method. In copying (say a woodcut) by superposition the ground surface of the glass is sufficiently transparent for the general outlines to be seen, but the finer details are obscured. To overcome this difficulty, Dr. Williamson, before commencing his drawing, moistens the ground surface with a mixture of glycerine and water, which renders it almost as transparent as clear glass and allows every detail to be clearly seen. The glycerine causes it to retain its moisture and, therefore, its transparence, but does not prevent the pencil from marking. When the drawing is finished it is put into a dish of cold water (it may even be washed under a tap), the glycerine is washed away, but the blacklead remains adherent to the glass. On drying, therefore, the picture is on a dead ground glass; but on being mounted with Canada balsam the ground surface is quite obliterated, and the result is the blacklead picture between two clear glasses. It is hardly necessary for me to add that the glasses should both be patent plate and as thin as possible, the ground glass being the variety known as "smoothed plate," such as is used for focussing screens. If ordinary glass be used the inequality of the surfaces will probably prevent the Canada balsam from spreading.

I must not conclude these papers without expressing the hope that the Editors or Mr. Wm. Brooks will favour us with some more information about collodio-bromide, which is certainly capable of giving exquisite results as transparencies for the lantern, both as regards texture, tone, and brilliancy. Some of the slides shown by Mr. Brooks at the last lantern meeting of the South London Photographic Society were perfect in all respects, and were produced by collodio-bromide emulsion. Unfortunately, since the gelatine epoch has set in the manufacture of collodion emulsion has been so completely laid aside that it is in danger of becoming a lost art. The reason is, I suppose, that it is by no means a pleasant occupation to make it; and, therefore, to the great regret of many who would like to continue with it, if only as a stand-by in case of need, it has ceased to be a commercial article. Although the extreme rapidity of gelatine plates will always ensure their pre-eminence until some equally rapid process shall be discovered, it is not a reason for good slow processes to be abandoned. However opinions may vary as to the relative advantages of slow or rapid plates for negative work, there is certainly less need for rapidity in producing a lantern slide. All the amateurs I have spoken to on the subject agree that they would raise no objection even to a chloride plate which would take two or three hours' printing if they could ensure the essentials of tone, vigour, and transparence. Collodio-bromide emulsion can certainly be made to equal, or nearly equal, wet collodion in rapidity, and, therefore, must not be overlooked, particularly for the largely-increasing number of amateurs who are anxiously looking for a practical process for producing slides of the highest excellence, and to whom the degree of rapidity is quite a secondary consideration.

To sum up: lantern slides possessing every essential of transparence and delicacy of half-tone can be produced by many processes, but the principal difficulty lies in the control and uniformity of tone. It remains to be seen which process is the most practical and reliable, and among so many really good ones it is hard to decide. It will, I am certain, prove to the advantage of professionals if a choice of processes can be offered to the amateur by which he can readily produce results of the highest excellence. Even if the formulæ are so completely discussed as to become common property he will, in the long run, no more think of preparing his own plates than the professional photographer albumenises his own paper; while, on the other hand, the more successful he is in producing good results from his own negatives the more slides he will buy to complete his series.

The probability appears to be that the best results are likely, for some time, at anyrate, to be procured with gelatino-chloride plates, on account of the far greater number of persons who are now working gelatine. Mr. A. Cowan has shown that they can be produced of sufficient rapidity for copying in the camera, while they would seem to allow of any tone from red to black, with the most perfect transparence.

The public taste is not yet sufficiently settled for a standard tone to be established. It inclines at present towards the warmer tones, but I venture to think it will eventually lean to what I would describe as a warm black. Taking Indian ink as a type of black, it will be found that the finer qualities have a distinctly brown tint—that of burnt cork—and this, with the addition of a very small proportion of red, will, I believe, be the standard tone. In the Woodbury process, where the tone can be controlled with the greatest nicety, I find, after many experiments, that this is considered the best for colouring. George Smith.

TRANSATLANTIC JOTTINGS.

A considerable amount of attention is being given on the other side of the Atlantic to questions of stereoscopic photography, and last month the editor of the *Photographic Times* (New York) devoted a leading article to the subject of the distance apart that stereoscopic lenses should be placed. He very properly advocates a camera so adjusted as to permit some amount of latitude in this respect, and, in view of the same instrument being employed for ordinary larger landscapes likewise, he recommends—wisely, as we think—an extra front for the twin lenses rather than a single front with the larger-focus lens mounted between, the two-lens front being adjustable so that they can be brought nearer together or farther apart according to the exigencies of the case. It scarcely needs our saying that the use of lenses some distance apart necessitates the use of a plate some inches larger than the regulation "stereo. plate;" but for distant views so much more roundness is thus obtained that the plan becomes almost a necessity, though, as we have before pointed out, when the distance is excessive the effect is rather that of a representation of a small model than of the natural objects themselves.

Mr. H. J. Newton has for a long time been an advocate of the carbonate of soda (or, as they call it in America, "sal soda") developer, and there seems to be a decided feeling in its favour in that country. Since it was recently brought forward in this country with some little *éclat* it appears to have gained few votaries—whether from inherent defects or from conservatism as to established methods it is not for us to say; we can merely draw attention to the favour which it meets with at the hands of our transatlantic brethren. Mr. Carbutt is a large dry-plate manufacturer in Philadelphia, and he recommends its use, stating that he has found it "to allow of shorter exposure and to give finer modulation to the negative than any other." This, from the mouth of a manufacturer who is generally

expected to know the best mode of treating his own plates, is no light praise.

The very different effects obtainable in the manufacture of dry plates by variations in the washing water is well known, and the above-named manufacturer experienced the ill effects of the washing water with which he was supplied. To discover the cause was an important step towards finding a remedy, and now all evil consequences are obviated by using distilled water hardened by the addition of known chemicals.

Mr. G. D. Valentine, of Dundee—an able and esteemed follower of our art-science, and an occasional contributor to our columns—who has been visiting the United States, showed some enlarged photographs to a party of photographers, challenging any member of them to pick out the enlarged from the direct photographs, and we read that in most cases the guessers were at fault. This is a very decided argument in favour of those who urge the advantages of securing small photographs and enlarging them afterwards.

Our readers will doubtless remember the simple little instrument recommended in our ALMANAC for readily lifting plates out of the developing tray. It consisted of a thimble with a small projecting spike soldered to it, and the plan being as simple as useful, it has been seized upon by our American friends with the swiftness of a hawk upon its prey. We read that within a very short space of time after our publication of the "dodge" the Scovill Manufacturing Company, recognising the utility of the idea, had special machinery made and were manufacturing these efficient little plate-lifters by thousands—the "Scovill plate-lifter," or "thimble rig," they call it!

"Water highly charged with saline matter is stated to be the cause of non-permanency in prints." So runs a little paragraph in the journal we are quoting from, and we would call especial attention to its import. There cannot be a doubt that there are instances in which the saline matter left in the body of the paper after evaporation of the washing water plays a most important *rôle* in the after-changes which so frequently occur in an albumenised paper print, to its detriment and disfigurement.

At the meeting of the Photographic Section of the American Institute held on March 6th, during a discussion upon pinholes from the bath, Mr. Hallenback is reported to have stated that "a gentleman had a bath that was producing negatives full of pinholes, and he diluted it" [size of bath not given.—EDS.] "with ten ounces of water and four ounces of hypo. After pouring it in he noticed he got a dingy, muddy deposit. He thought the bath was ruined, but afterwards produced most magnificent negatives with it!" He does not state whether he reduced it to the metallic state first, nor even whether the doctored bath did away with the necessity for a fixing bath. Perhaps if he had emptied his toning solution into it it would also produce ready-toned prints.

Mr. Muybridge also spoke at the meeting; he is evidently going to be as industrious as ever, and is clearly enthusiastic. His programme for the coming summer includes illustrations of horses trotting and running at their highest rates of speed, the flights of birds, the successive attitudes of men running, walking, rowing, sparring, &c., persons in health, persons with diseased joints, aquatic birds, and mammals [other than those enumerated above, we presume.—EDS.], pictures illustrating the action of the heart and lungs, &c—a truly varied and interesting programme!

We find half a page of an advertisement with regard to an enlarging and copying camera is occupied with the tables of enlargement and reduction that readers of our ALMANAC are familiar with. It is gratifying to see such a compliment to its usefulness, and, unlike other journals that we could name, the source of the information is acknowledged.

"S." inquires—"What has become of actinism?" we read in "Notes and Queries" column; and, with the usual opposition to natural laws that literary echoes display, we are inclined to say Echo answers—"What?"

TRIPOD AND ROD.

[A communication to the Bristol and West of England Amateur Photographic Association.]

To the busy worker, whose time is passed amidst the hum of city life, and whose associations, during the greater part of the year, confine him to the office, the desk, the manufactory, or to the routine of a profession, what can be more exhilarating than the prospect—when early spring begins to suggest thoughts of rock and river and country scenes—of a month's holiday, to be enjoyed with those accompaniments of rod and line and camera and lens which, one or other, cannot fail to afford sport and pleasure under almost all possible variations of weather, be it wet or dry, fair or foul? For it may be noted that whilst the camera can only be used with good effect when the weather is fine, the reverse is to a great extent true of the piscatorial art. Hence we have a resource for those "off" days when a "southerly wind and a cloudy sky" fail to proclaim a photographic morn; and if it should so happen that unfavourable weather for the camera should drive the tourist to his reserve of rod and line, what more pleasant way of spotting the desirable points of view for a future campaign than when engaged in transferring the spotted beauties from their watery home to the fisherman's basket?

It is usually the case that the scenery of rivers—especially of trout streams—is of a kind which lends itself well to photographic composition. Witness, for instance, the valley of the Lyn above Lynmouth. Here one hesitates at the door-step of the hotel or of the cottage lodgings, and, whilst looking from camera to rod and rod to camera, feels "how happy could I be with either, were t'other dear charmer away!" and one's mind is finally made up by the suitability or otherwise of the weather. We have here, then, an alternative resource which saves us from that fatal temptation ts waste plates in unsuitable weather, which, if yielded to, is so disastrous in its artistic results and aggravating to temper.

In illustration of the happy blending of these two pursuits I recal with infinite pleasure a certain afternoon—May 27th, 1880—when a party, whose names are not unknown in the Bristol and West of England Amateur Photographic Association, were the guests of a worthy and reverend host in the neighbourhood of Frome. With what genial and hearty courtesy did he introduce us to his charming parish, replete with running stream brimful of trout, where lovely views of wood and water enchanted our eyes! Do I not also, and do not some of us now present, recal the invitation to one of the party to "take a throw?" There is an enchantment about that little invitation, and it was not refused. Tripod, camera, focussing-cloth, and all the paraphernalia were at once laid down, and with a turn of the wrist our host's cast of flies were lightly dropped just where a dimpling circle with its gently-expanding rings marked the spot where "Mr. Troutie" was taking his afternoon tea. A little tug, a little rush, and a lively bending of the top joint revealed the painful fact to him that he was no longer a free agent. A short struggle, and the net was deftly slipped under his spotted sides. A moment or two to look at and admire the capture, and then for the next. Whenever the circling rings on the calm surface of the water (for it does not always require a breeze or a ripple to secure sport) bespoke a fish there the same little game was played, and the result laid in plentiful supply of fresh grass; their glistening sides, resplendent with their characteristic pink spots, was something to remember for many a day.

Reverting again to the valley of the Lyn, it may be said that this portion of the adjoining counties of Devon and Somerset is a paradise for both camera and rod. Whichever way we turn there is food for anglers and artists. The various streams of Dartmoor and Exmoor abound in small trout; the valleys and dingles equally abound in charming views, especially of cascades and rocky water-courses.

The sea coast of North and South Devon is of the most romantic description, and sport is by no means confined to that of the angler, for we have here the wild red deer, the fox, and hare. I think I am right in saying that for the red deer it is the only part of England left where they exist in a wild state.

To any intending visitor to the valley of the Lyn it is worthy of mention that anyone who has in possession one of the now nearly disused tents for field work might once again turn it to some use.

The views in the immediate vicinity of Lynmouth are so numerous and so near to each other that by pitching a tent there one could do a good day's work without moving, and if the *impedimenta* of wet collodion were an objection there would be a certain satisfaction in such a district in even developing one's own dry plates on the spot.

I am of opinion that it would be better to develope on the spot at once or else to leave it entirely until the return to one's well-arranged dark room at home, and that it is not desirable, as a rule, to make shifts at hotels or lodgings, and to develope after the day's outdoor work is done.

If this latter (and to me objectionable) course be taken it makes a toil of a pleasure, and the health-giving effects of the outdoor work by day is more than counterbalanced by the late and long hours of work required to complete development of many negatives. Whilst on the subject of developing I may make a passing reference to the various—the wonderfully-various—formulæ for developers. I have taken the trouble to copy out a few of the fearful and wonderful instructions for making them as recommended by the faculty. They are in every shape and form, made up in stock solutions to be mixed in all sorts of proportions in A and B solutions, which will keep to be mixed in wondrous ways when wanted, and to fathom the ultimate proportions of which is a sore trial for the novice. Now I have worked out some of these, and, whilst noting that they vary from (say) one grain of pyrogallic acid to the ounce for gelatine plates, to eight grains of pyrogallic acid for some of the somewhat out-of-date collodion emulsion plates, and also that they vary a good deal in the proportions of bromide and ammonia, still there is a strong family likeness in all of them.

Now, an amateur, especially a beginner, wants simplicity in his instructions; and it has occurred to me that what I have taken upon myself to call a "one-two-three developer" is a close approximation to some of the standard ones, and is almost identical with one recommended by Swan.

I mean by one, two, three—

Pyro	1 grain,
Bromide	2 grains,
Ammonia	3 drops,

as a standard, to be varied according to circumstances, the class of plate, and the accidents of over- or under-exposure, &c.

This formula is so easy to remember and can be so easily varied that a beginner has only to carry the 1, 2, 3 in his mind and can mix and vary as he likes without the abstruse calculations involved in making up stock solutions. One and two; filling up a drachm of No. 1 to 2 ounces in a two-ounce measure, then doing ditto with No. 2, and then, "last scene of all," mixing the two in equal proportions.

My own object in first taking to photography, some few summers ago, was the production of transparencies for the lantern; but, of course, this soon grew into silver printing on paper, and I soon learnt that there is no more charming occupation for leisure hours and in summer holidays than the production of small negatives ($7\frac{1}{2} \times 4\frac{1}{2}$), which are easily reduced in the camera to lantern-size transparencies, and which, if sufficiently perfect to make it worth while, can be enlarged in carbon up to 24 × 18, and form handsome additions to the decorations of vacant wall spaces of the rooms at home. I may say that this latter process I always get done by a leading firm for me, not having the necessary time to spare for that branch of the art.

Transparencies require much care and experience to turn out well. An ordinary transparency is not more difficult than an ordinary silver print on paper, and in printing half-a-dozen or half-a-hundred it is probable that the whole batch would, in the hands of an experienced operator, turn out fairly even and good; but with lantern transparencies it is a little different, for the least clouding in the lights or too great heaviness in the shadows renders them at once unsuitable for throwing upon the screen, so great is the loss of light. This applies more especially to those slides intended for lanterns in which mineral oils are burnt. When the lime or oxyhydrogen light is used there may be naturally a little more margin allowable for waste of light, owing to the greater brilliancy of the illumination.

A good slide, therefore, should possess full detail and yet be perfectly clear. A good negative—perfect, if possible—is therefore the first requirement to begin with; the illumination of it should not be too brilliant, and if the sun be shining and the light highly actinic it is better to place finely-ground glass or some tissue paper over it. Then when a fair exposure has been given—not too full—I usually stop development. As soon as all detail is well out fix, and then fill up to the requisite density with ordinary silver intensification. My transparencies have always been made by the old wet collodion process, and if the above points are attended to very pleasing and satisfactory results may be attained.

Apropos of the vexed subject of intensification for gelatine plates: I have tried, and with a certain amount of success, the mercurial plan; but it seems to me that the weak point in this—quite apart from possible instability, upon which I am not prepared to express an opinion—is the difficulty of arresting the process at a given point of colour or intensity. It seems all or none. Now, I have found that an intensifier composed of the old well-known fifteen-grain iron developer, with fifteen grains of citric acid added, and used with a solution of silver ten grains, and acetic acid ten drops to the ounce, dropped into it, *quant. suff.*, builds up intensity, as it were, in the most gradual, clean, and satisfactory manner.

Note.—You need not be afraid of using the silver solution with moderate freedom. There is a contributor to THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC who sometimes winds up his little hints on various subjects with the brief admonition contained in the two simple monosyllables—"Try it!" I also say try it!

Reverting now for a moment to the secondary subject of this paper, we sometimes hear it said that there is not much fishing in the neighbourhood of Bristol. Now if there is not much I venture to say that there is at least considerable variety. The Avon is well supplied with coarse fish, and in spinning or trolling for pike the angler may occasionally be rewarded by a three-pound trout, or he may idle away a summer's day in filling his creel with roach. Chub are not unknown by any means, and the waters of the Froom and the Midford Brook contain trout and perch, and, I believe, roach and dace.

With regard to the former river, the Froom—which, by-the-bye, is not to be confounded with the Froom which runs through Stapleton and joins the Avon in Bristol, but refers to the other Froom which flows into the Avon at Freshford, near Bath—has been for some years in the hands of an association having its head-quarters in Bristol, and designated "The Avon and Tributaries' Angling Association." This association placed a large quantity of trout fry in the Froom water some years back, and had it in contemplation to stock the water thoroughly and well. Just, however, as the good effects of their efforts were becoming apparent difficulties arose with the owners of some of the riverside properties, and so much of the water was taken from the committee as to render it undesirable to continue the good work.

It is much to be regretted that the proprietors referred to could not be induced to look upon the expenditure of the association as calculated to promote mutual advantage and benefit. There is, perhaps, no happier example of the double suitability to camera and rod than is afforded by that portion of the Froom which lies near Farleigh Castle. At this spot there is ample work for the camera for the best part of a day within a few yards of the Bridge, somewhat away from the course of the stream itself, and more amongst the old ruins; whilst the "rodster" may, by taking train to Freshford, have a day's fishing over the two or more miles of water which lie between that station and Farleigh, and enjoy a most delightful ramble along the banks of this pretty little river.

There are many private waters, too, within easy hail of Bristol, and I could, with bated breath, tell of one where, with an artificial minnow and breezy weather, the favoured angler, provided with the necessary pass, has an exceedingly good chance of capturing many a brace of trout, running from three-quarters of a pound up to two, three, and even five or six pounds' weight. As I have been able to verify these sizes personally I think I may venture to assert that there is, at all events, *some* fishing near Bristol.

Were I to plunge into reminiscences of old fishing days I fear I should become wearisome. It usually happens that such reminiscences are more interesting to the actors in them than to outside listeners. Neither do I wish to try to write a book on angling. That has been well done by Francis Francis, and in the olden days by the great master, old Isaac Walton. Now, if anyone here present has never in the course of his life "happened upon" dear old Isaac, let him hunt up a copy forthwith, and I promise him much pleasure from the perusal thereof. The delicious air of contemplation and genial humour which pervade the book will always render it conspicuous, even quite apart from any value it may have as a special text-book.

Will you allow me to conclude with a few words which I have extracted from this very favourite old author? So much of the work is in the form of conversations between Venator and Piscator and another that the following will explain itself:—

VENATOR.—Let's go merrily to supper, and then have a gentle touch at singing and drinking; but the last with moderation.

CORYDON.—Come, now for your song, for we have fed heartily. Come, hostess, lay a few more sticks on the fire, and now sing when you will.

PISCATOR.—Well, then, here's to you Corydon, and now for my song—

"Oh! the gallant fisher's life,
It is the best of any,
'Tis full of pleasure, void of strife,
And is beloved by many.
Other joys
Are but toys.
Only this,
Lawful is,
For our skill
Breeds no ill,
But content and pleasure," &c., &c.

J. DAVEY.

PRINTING FROM GELATINE NEGATIVES.

How often do we hear the complaint made that, though a gelatine negative contains more beautiful gradation than any wet plate, the print is far from being equal to it! The truth of this assertion can easily be proved by the reader. Let him take any one of his recent negatives and compare it with the print; in nine cases out of ten he will find the beautiful half-tones either altogether missing or merged into a muddy, sombre-looking admixture of light and shade far from beautiful. Again: the prints of the present day lack the brilliancy and crispness of those of a year or two back, and the opponents of the dry process point scornfully to them and cry—"There is the result of your extra rapidity!" My object in writing this article is to endeavour to prove to the thinking photographer, be he principal or printer, that results can be obtained from dry plates equal to any by the wet, and in some cases far better.

The main cause of the "mucky" prints so prevalent nowadays is not to be found in the negatives, but in the false idea of saving and economy that leads a man to compel his printer to use a thirty- or thirty-five-grain silver bath. Some albumenised paper manufacturers recommend this bath in their printed formula. It sells their paper, for at first sight it appears to be a vast saving in silver. I say "at first sight" advisedly; for it is a fact worth knowing that if twenty sheets of paper are sensitised on a thirty-grain solution and twenty on a fifty-grain, and each bath be then tested for the amount of silver used, the difference will not be appreciable. There is no sample of albumenised paper manufactured that will yield a good print from a gelatine negative with a thirty-grain solution. It is true that some samples of German paper can be made to produce a passable print from a wet plate with a bath of that strength; but a gelatine plate, being far more delicate in itself, requires a much stronger bath. I have found in practice that a sixty-grain bath will give the finest results when working dry plates.

I have no doubt that many will say this is going back to the old days with a vengeance; but I do not see the harm of going back if by so doing we can produce a better result. Let the reader try the strong bath and he will be astonished at the difference in the brilliancy and,

the same time, in the gradation of the resulting print. Nor is it the ver bath alone that requires attention. Much of the beauty of a int is lost from the habit of making up a toning bath (say) on the 1st January, and going on from day to day, from month to month, and, many cases, from year to year, using that same bath with simply the dition of a little gold each day. Let the printer test his toning bath om time to time and add acetate of soda or even powdered chalk quently, and he will then be able to retain his half-tones, which, as it too often disappear whilst the print is immersed in what is often, to intents and purposes, merely a mixture of gold and water. I know at in winter time printers have a habit of warming the toning bath. ell, there is no harm, that I can find, in warming it *to a certain degree;* it when the solution is made quite tepid then away goes the beauty of e print.

As it is with the sensitising and the toning so it is with the fixing. any a print that has kept its beauty through the toning loses it the fixing, and from two causes:—"Hypo.," as we still persist in mis-lling this useful salt, is cheap, and therefore but little care is taken measuring it for mixing, and the fixing bath is consequently often o strong. The result is bleaching away of the most delicate parts of e picture, and blending high lights and half-tones into one.

Then, again, it is a very prevalent and widespread notion, though an roneous one, among printers in general and assistant printers in par-cular, that it matters but little how long the prints are left in the xing so long as they are kept moving and not taken out too soon. he absurdity of this idea may be easily proved by putting two prints qually good in the hypo. and watching them carefully, taking one ut directly the high lights are clear, and the print consequently suffi-iently fixed. Now leave the other in for five minutes longer and com-are the two. The one will be a perfect print, and the other—well, astly inferior.

The object of my article so far will appear at once: it is to advocate tronger sensitising baths, more constant renovation of the toning, eakening of the hypo., and more care in taking the prints out of the atter immediately fixation is complete.

In printing from dry plates, too, it is very necessary to keep the rinting-frames in as dry a place as possible. The least damp flies to he gelatine at once, and the result is seen very quickly in the shape of ilver stains of the negative and white blotches for the spotter to ponder ver and obliterate for a time. How often the spotting is wiped off fter pictures have left the photographer's hands can easily be seen by glance through almost any private album. It is almost needless to nention that extra care is required in drying the paper, and that under no circumstances whatever should an unvarnished *cliché* be printed from without a sheet of talc or mica being placed between it and the paper. Mineral paper, which I have seen advocated, is next to useless for this purpose, and the talc is now sold by all the photographic dealers at a very moderate price.

Should the film, by any unforeseen accident, get a stain of silver upon it, it is exceedingly unwise to soak off the varnish with *warm* spirit. Cold spirit "does the trick" equally well, although it takes somewhat longer. I do not suppose that every photographic printer is aware of the fact that the more quickly the paper is dried after sensi-tising the more brilliant in proportion will be the prints obtained upon it. If paper be prepared over night and hung up to dry spontaneously the prints are always wanting in pluck. The best way—in practice at least, as I have found it—is to have a stock of (say) twenty sheets of thick blotting-paper (sometimes called "blotting-boards"), and as each sheet of the sensitised paper is taken off the bath lay it face upward on one of these and press another over it. When three or four sheets are blotted off in this way the underneath one can be taken out and dried at once by a *coal* fire or an *atmospheric* gas stove—not under any circumstances at a *coke* fire or at a stove that burns pure gas (that is, as pure as the gas companies supply). Either of these would cause sulphuration and the ultimate ruin of the prints.

With regard to fuming I have but little to say. For wet plates I have always advocated the use of paper fumed with ammonia, but for dry plates I prefer the paper unfumed. Of course there are instances—especially when landscapes are concerned—where fumed paper causes a very great improvement; but I would recommend that it be not put on the negative direct from the fuming-box, but be allowed to get rid of the free ammonia first. The use of fumed backings I consider very reprehensible, as they not only give unequal results in the print but tend to damage the negative. The same remark applies to backings saturated with carbonate of soda, ostensibly for the purpose of keeping the sensitised paper white. The best way of preserving the paper is to keep it loosely in a drawer lined with blotting-paper which has been soaked in carbonate of soda solution. This will be found to keep it white and pure for several days.

CLIFF.

NOTES ON PHOTOGRAPHY.

LECTURE XVIII.—OPTICS—*(Continued).*

DEPTH OF FOCUS.—This depends upon two factors—1, the diameter of the stop; and, 2, the focal length of the lens. It is inversely proportional to the diameter of the stop; that is, a stop of two inches diameter will only give half the depth of focus given by a one-inch stop, and inversely proportional to the focal length—*i.e.*, a lens of twelve inches focus will only give half the depth of focus given by a lens of six inches focal length.

Compound Lenses.—These consist of two lenses either of the same or different focal lengths, mounted at some distance apart, and with a stop between them. They are employed in two principal cases—first, when absolute freedom from distortion is required, and, second, when rapidity of exposure is necessary. By combining two lenses in this way the distortion and aberrations produced by one lens can be corrected by the other, enabling a much larger stop to be used, and giving an image free from distortion. The extra rapidity is obtained, however, at the expense of the angle of view, and as the rapidity increases so does the angle which can be included in the picture diminish.

Apparent Distortion (Incorrect Perspective).—When a photograph is taken including a very wide angle the resulting picture appears distorted, or the foreground appears exaggerated and the distance dwarfed. This is due to the want of accommodation possessed by the eye. If the eye lens could include a wide angle for viewing wide-angle pictures all difficulties would vanish; but, unfortunately, the angle which it can readily do so is not more than 55° or 60°. Now, in order that pictures should appear in correct perspective, it is necessary they should be viewed at such a distance that the angle they subtend with the eye is equal to the angle they subtended with the lens in the camera, and this distance is obviously about equal to the focal length of the lens; hence the rule —*Every picture should be viewed at a distance equal to the focal length of the lens with which it was taken.* Remembering that the eye only includes an angle of about 55°, a picture subtending a wider angle cannot be viewed at the proper distance, because the eye cannot then include it; and when it is moved farther off so as to subtend a smaller angle apparent distortion is produced. It may and does frequently happen that, of two pictures taken from the same point of view and including the same angle, one taken on a quarter-plate will appear distorted, while another taken on a $7\frac{1}{2} \times 5$ plate appears all right. This is also due to the eye's want of accommodation. Supposing the angle of view to be 55° in each case, the quarter-plate picture will have to be held about four inches and the $7\frac{1}{2} \times 5$ about seven inches from the eye; but the eye has not the power of seeing distinctly objects so close to it as four inches, or, in other words, has only a limited range of focus. In consequence, while the $7\frac{1}{2} \times 5$ picture can be viewed at the right distance for correct perspective, the quarter-plate has to be held further off, and so appears distorted. This explains why *carte* pictures are best taken with a lens of seven or eight inches focal length.

Focal, or Equivalent Focal, Length.—The focal length of a lens is the distance from its optical centre to the point where parallel rays passing through it are brought to a focus. In the case of compound lenses this distance is called its "equivalent focal length," meaning that it is equivalent to a single lens of the same focal length. There are several methods of ascertaining the focal or equivalent focal length of a lens:—1. Focus the sun or other distant object on a screen, and measure the distance from any point on the lens to the screen, turn the lens round, focus, and again measure the distance from the *same* point. The mean of these two distances is the focal length of the lens, and the point along its optical axis; this distance from the focus is its optical centre.—2. Focus with a lens of known focal length an object on a screen, and measure the length of the image. Focus the same object with the lens whose focal length is required, and also measure the image formed; then, whatever proportion the second image bears to the first, so will the focal length of the second lens be to that of the first one.—3. Focus a plane object on the ground glass, so that the image is exactly the same size as the object, and measure the distance between the object and the ground glass. One-fourth of this distance is the focal length of the lens, and the point midway between is its optical centre.—4. To *calculate* the equivalent focal length of a compound lens, multiply the focal length of one lens by that of the other, and divide by the sum of their focal lengths, less the distance they are separated.

Angle of View.—To find the angle of view included in a picture, draw a line equal to the length of the picture and erect a perpendicular on its centre equal to the focal length of the lens employed. Draw lines from the top of this perpendicular to the ends of the base line. The angle they include measured with a sector gives the number of degrees included in the picture. N.B.—This only holds when the picture is much smaller than the object.

E. H. FARMER.

A FEW REMARKS ON THE PHOTOGRAPHING OF CHILDREN.

[A communication to the Glasgow Photographic Association.]

IN bringing this subject before the notice of the Association this evening, I wish to say it is principally intended for the younger members, or for those who, having tried and from some cause or other not succeeded, have become disheartened. And here let me say that I do not for a moment suppose that I shall bring anything new or

startling to bear on the subject, or, in fact, give a formula for catching the particular expression of any particular child; yet I believe that by carefully following the lines I shall lay down you will probably succeed where before you may possibly have failed.

Now, before we proceed to the actual taking of the child, or what I should rather term the "artistic side of the question," let us consider whether the photographing of children is a success financially. I would say undoubtedly a success. Rapid dry plates specially prepared for children, backgrounds for children, baby lenses at anything but baby prices, made for photographers with big pockets, &c.—these things, taken with the fact that through the children you gain the parents, all go to prove that the photographing of children is a paying business. And yet how many photographers there are who would rather toil up a snowy mountain to photograph a favourite view, or conduct certain experiments in a very uncertain light for several hours at a stretch, than face a child of three months' growth for the small space of fifteen minutes! The antipathy shown to children by some photographers is something amusing. Many refuse to photograph them; others declare they are a nuisance; while some say they would rather see the D—— come into the gallery than a child!

All this is caused by the want of a very desirable quality in all photographic operations—that is, patience. If it be really a matter of necessity that you should lose your temper by all means do it in the dark room; but always present a cheerful front to the enemy.

Before we proceed to the studio I would like to mention a little circumstance that took place last year. I happened to call on a photographic friend, and found him busily engaged photographing a little boy. He had spent about an hour with him, and succeeded in wasting nearly a dozen plates. The young lady in the show-room was coming up every five minutes saying that the sitters were getting tired out and could not wait any longer; the frame-maker was waiting for his account—did he think he would be long, &c. These things, taken with the intense heat of the day, show you where patience is required. At last, after spending an hour and a-half, he obtained one position. "Now! now!" exclaimed the father, "we'll have a second position." "No!" roared the now thoroughly-enraged photographer, "I'll be hanged if we do!" The father took the child away without paying for the time and trouble he had incurred, indignant that he could not have as many positions of his child as he chose to pay for. Here was an instance where tact had refused to come to the assistance of patience and long suffering. The mistake here, I fancy, lay in the want of a fixed rule to pay before sitting, or to give not more than a certain amount of time to each child. Photographers, however, soon find out what best suits their own businesses, and the class of customers with which they have to deal.

We will now imagine we have a child in the show-room—a baby, we will suppose. If it be crying let it stop there by all means till it is done. The mother will probably soothe it in a manner that no operator could attempt, and in a much shorter time. While this operation is being performed ascertain the size required, fill your slide, and have it handy. Remove all traces of head-rest, &c.; and, if you have one, use a light background, as rapid exposures against a dark ground seldom have a pleasing effect. A platform about eighteen inches in height and five feet square will be found a very useful accessory for children, as it saves you pointing down the lens, and also brings the children into a better light.

The baby is now here, and as you have made use of your minute or so of spare time you are at liberty to amuse the child to the best of your ability. A very good thing to throw a baby into is an old arm chair with two or three velvet cushions to make it feel soft and comfortable. This in itself is a good step toward success. By the way, allow no one to actually come into the studio with you but the mother or nurse; if you do, one is sure to plant herself one side of the camera and one on the other. Your left-hand neighbour is shaking a pocket handkerchief; the other to your right is violently blowing a penny trumpet. You yourself feel like a fool between the two; the child itself is similarly situated, and the result is disappointment and failure. No! You must insist on only one coming into the studio, and that is another step towards success.

Well, we are now ready to expose. Make some idiotic noise with the mouth. The child has a nice, bright look now. You expose. Ah! it moved just before you got the cap on! Never mind; fill your slide again, and wonder what they used to do in the days of the old wet plates. Everything is ready, and to your surprise he is looking the very way you want him. You expose, giving a good, full exposure. With a sigh of relief you turn to take out your slide and find that you have not drawn the shutter. Suppressing all inward desire for prayer, you set your teeth firmly and prepare for your third attempt, and this time succeed.

Do not try any one kind of amusement too long, as it tires them. The rustling of a piece of paper, striking a match, playing on an old concertina (preferably one where all the notes sound together, as it is more discordant and attracts attention sooner), the mewing of a cat, and imitation of a parrot I have found most efficacious. The mewing of a cat is very useful when photographing dogs.

We now come to a more difficult age—children from two to five; but with our old friend Patience to assist us there is little fear but we shall succeed. Have a good assortment of toys at hand, but do not show them all at once, or you will have nothing to fall back upon. If the child appear nervous or frightened get whoever is with it to do the principal part of the amusing until the child's mistrust of you has worn off, and again I think your patience will be rewarded. But should you get a child that screams at the highest pitch of its voice, dances on the floor, &c., and says that he won't, he wants to throw it down the stairs; for that is surely a spoilt child, and the parents may thank themselves and not you for not being able to photograph it.

One more type and I have done. Little girls under ten are sometimes shy, stiff, and awkward to pose. Have a few examples of newly-posed pictures by you. Show them; tell them how much nicer they would look if they would but allow you to pose them, and I think this method will yield the desired result.

In conclusion: never let a a child be scolded in the studio; never let it be stuffed with sweet cakes there; never give it the penny you promised before sitting; and never lose your temper.

J. H. Halvey.

MR. W. ENGLAND'S PHOTOGRAPHS OF THE ST. GOTHARD DISTRICT.

One of the greatest centres of attraction in Europe during the past year or two has been the St. Gothard route between Switzerland and Italy, the interest of the St. Gothard, as about the most picturesque of the Alpine passes, having been heightened by the success of the gigantic feat of driving a railway through it, thus giving Germany and other northern nations direct communication with Italy, and with Genoa and other shipping ports on the Mediterranean. The St. Gothard tunnel is not the chief feature of interest to the traveller, for it is but a hole nine and a quarter miles long through the mountains, in which nothing can be seen while passing through. The climbing by railway for many a long mile to reach the entrance to the tunnel at either end, in the midst of the grandest conceivable scenery, is the feature of interest, and the passengers crowd to the windows or stand upon the footboards of the carriages to observe the ever-varying scenic effects. The railway carriages, unlike our own, open at the ends, and the first-class carriages have an open balcony on one side, with a guard-rail, on which the passenger can lean, and gaze at the changing scenes before him. A slow train is best for seeing the most of the Pass, when the passenger does not intend to stay at any point on the journey. These trains travel at a jog-trot pace, and there are long stoppages at every station. The line from the northern side winds up the valley of the Reuss, and now and then, when seemingly-impassable barriers block its further progress, it enters a spiral tunnel in the mountain side, and the train comes out close to the place at which it entered, but from 100 to 150 feet higher up, after achieving its corkscrew-like passage in the bowels of the earth.

Rather late last autumn Mr. William England visited this remarkable district, and did not leave till those descents of snow and rain began to take place which subsequently deluged a large portion of Southern Europe. The mountains act as natural condensers. They tilt the warm air from the plains, laden with vapour of water, into the colder regions above; the aqueous vapour is condensed, and falls as rain or snow. I was in the district for some weeks about the same time as Mr. England, but left before the rains began.

The St. Gothard line is tolerably level from its terminus at Lucerne to Fluelen at the other end of the lake, and travellers not unfrequently go to Fluelen by boat—a journey of some hours—and join the train at the latter place. Both the road and the railway pass at places through tunnels in the sides of the precipices near the lake. These tunnels have broad openings at one side, giving views of the expanse of water. Mr. England's photographs of the interiors of some of these galleries, with the scenery revealed through the openings, form striking pictures, with necessarily strong contrasts of light and shade. The scene of William Tell's alleged exploits is near here, and has had due attention from Mr. England; but whether Tell is a true historical character is an open question. Another photograph introduces us to the peaceful little village of Fluelen as seen from the lake, and here the real work of mountain climbing by the railway trains begins.

The ascent is moderate at first until Erstfeld is reached, where strong and heavy locomotives, with small wheels to obtain a good grip of the rails, are put on. Mile after mile the scenery grows wilder until Amsteg and Wasen are reached. In the neighbourhood of these two places Mr. England took most of his views, which are not at all evenly distributed in point of number along the whole length of the mountainous part of the railway.

How shall I describe Wasen? Its little church, which figures in several of the photographs now before me, is seen high above the passenger as the train approaches. A tunnel is entered, a curve is followed, more tunnels are passed through, yet there stands the church. During all these miles of travelling it occasionally bursts upon the view close at hand. In all this twisting and turning and running round curves and spiral tunnels Wasen church keeps fairly well in the centre of the area, and when it is last seen it is far below the traveller, who, on looking down, sees below him the mouths of the various tunnels, also the curved

nes of railway over which he has passed; but he is now at a high evation, and the mountain train resumes its climbing into higher egions still. This interesting locality has been amply photographed y Mr. England, and one of his pictures represents Wasen under snow; r, as already stated, he remained there late enough to see the place ut on its wintry aspect. The accompanying plan of thirteen kilometres

f the railway near Wasen church gives an idea much clearer than vords of the difficulties the railway engineers had to overcome to construct a line through the district. The dotted lines represent tunnels, nd the cross Wasen church.

Curiously enough, in the midst of snow-clad mountains the traveller an see no snow from the St. Gothard railway in the summer time. Could he but climb the sides of the valley, and ascend the hills then evealed above the valley, he would at last come within view of the igher Alps, with their crowns of eternal snow. Tracks of avalanches nark the sides of the valley of the Reuss here and there, and the ailway crosses the valley to avoid these tracks, or tunnels beneath hem; but the reservoirs of snow and ice originating the devastation cannot be seen from the line.

At Göshenen the mouth of the tunnel is at last reached, after half-a-lay's journey from Lucerne, and a glimpse of the beautiful valley of Göshenen, photographed by Mr. England, is obtained before the ailway station at the mouth of the tunnel is entered. The air in the unnel is much better than that on the Metropolitan Railway. Some two miles from the entrance to the tunnel the line passes under the far-famed Devil's Bridge and the adjacent falls of the Reuss, but the passengers are all unconscious of the powerful play of natural forces going on above. The line also passes under the village of Andermatt and some of the higher peaks of the St. Gothard, which are at no point visible from the railway.

The line emerges on the Italian side, close to the village of Airolo, and by a long series of descents, curves, and tunnels, some of them spiral ones, the traveller is at last conveyed to the Italian lowlands—to the plains of Lombardy. The vegetation here, what with the Alps to the north and the Italian sun to the south, becomes sub-tropical; rice fields are seen now and then, vineyards are luxuriant in their growth, and olive, magnolia, and pomegranate trees become features in the landscape. The scenery is as beautiful as on the German-Swiss side, but Mr. England has not taken so many pictures in this region.

Among the most interesting taken by him at Locarno, at the head of Lake Maggiore, is that of the pilgrimage shrine of the convent of Madonna del Sasso, perched upon an eminence, and surrounded by orange and lemon groves—a place of singular beauty. In times past the dwellers in this region were noted for the readiness with which they called in the knife to settle differences of opinion.

In inspecting Mr. England's early prints, before the negatives had been prepared for real practical work, I felt that there was hope for amateurs like myself, to whom skies without good clouds and imperfections in the representation of distances are familiar, and who gaze with awe at the absence of these defects in the views of photographers of note. The impression was like that produced by seeing a lady without her wig and false teeth. Wonderful things can be done with photographs in the printing, as set forth by text-books on the subject. Whether faith can or cannot move mountains, at all events the photographer can do so, one mountain being here brought forward and another there pushed farther away by that which the Act of Parliament calls "subtle crafts and devices" executed upon the back of the negative. Doubtless, long before these lines are published, Mr. England will have arranged mountains and clouds to his satisfaction, and his pictures of the St. Gothard will be keeping up his well-deserved high reputation. He did not, unfortunately, take photographs of the top of the St. Gothard for the enlightenment of those who burrow in darkness through the long tunnel below. The scene at the top is inhospitably bleak, the chief features of the landscape being snow and stone, and near the highest level attained by the old carriage road are an inn, a hospice, and a place of refuge for travellers who may be snowed up thereabouts in the winter time. The chamois and the marmot are sometimes seen in the neighbourhood; two of the former were shot while I was at Andermatt. Bears are not now seen thereabouts, but further east, nearer to the Engandine, they are not uncommon. One thing has struck me in nearly all photographs of scenery like this, namely, how inadequate they are to convey impressions of the grandeur of the reality. One removable cause is, perhaps, the infrequency with which extremely narrow-angle lenses are used. A lens is too often "put on" to include as much subject as possible, whereby mountains are reduced to molehills and a good subject rendered insignificant.

A handy little book in a paper cover, and with some admirable woodcuts, published by Messrs. C. Smith and Son, 63, Charing Cross, London, entitled *The St. Gothard Railway*, is full of information about the line and its surroundings. The descriptions it contains would add to the interest of Mr. England's pictures when the two are examined together. The *Engineer* newspaper, during the past six months, has published enough about the St. Gothard Railway, with engravings, to fill a volume, and one week printed a supplementary page, displaying the fine photolithographic work of Braun, of Dornach. It is to be hoped that before long Mr. England will place his photographs of the St. Gothard district upon public view.

William H. Harrison.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 14	North Staffordshire	Wedgwood Institute, Burslem.
„ 19	London and Provincial	Mason's Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The ordinary monthly meeting of the above Society was held at 5a, Pall Mall East, on Tuesday evening last, the 10th instant,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. R. Murray Lawes was elected a member of the Society.

The Chairman announced that Major Waterhouse, of Calcutta, had forwarded to the Society a programme of the international exhibition to be held there in December next. In Class A photographs would be admitted, and in Class B photographic apparatus, chemicals, &c. Full particulars could be obtained from Mr. W. B. Dilworth, 4, Westminster Chambers, or Major Waterhouse would be happy to furnish anyone with full information himself by letter, and he requested that the matter might be brought to the notice of the Society.

Mr. James Cadett then read a paper entitled *On Photography of the Vocal Organs in the Act of Singing*. Mr. Cadett said that before commencing he must apologise for having left them in the lurch on the occasion of their last meeting. He had had to postpone, at the eleventh hour, the paper he had promised, so they had been left without one. He stated that the paper he was about to read would to many perhaps seem superfluous, after the lecture given by Mr. H. Trueman Wood at the South London Photographic Society's meeting on Thursday last, and but for his promise being given he would not have presumed to bring it before their notice. He proposed to give a description of some experiments carried out at the laboratory of the Society of Arts by Messrs. J. J. Acworth, H. Trueman Wood, Emil Behnke, Lennox Browne, and himself, and would call upon Herr Emil Behnke first of all to explain to the meeting what it was required to photograph. For this purpose he showed on the screen a diagram of the human head in section, which Herr Behnke proceeded to explain, pointing out the soft palate, vocal ligaments, epiglottis, &c., and said that Dr. L. Browne and he had determined to obtain photographs of these for the work they had in course of preparation. He also explained the difficulties in the way of getting at the vocal organs by means of the camera. Mr. Cadett then proceeded to show that the photographing of the soft palate was a comparatively easy matter, provided the interior of the mouth was carefully lighted; but to obtain a photograph of the larynx was not so easy, on account of the difficulty of sending the light down the throat of the person operated upon. The most perfect instrument for effecting this was the ordinary laryngoscope used by surgeons, and Mr. Cadett described the apparatus they had been using in their experiments. It consisted of an electric lamp with a combined condenser, consisting of two plano-convex lenses, to which was attached an apparatus for keeping the condenser cool, consisting of a pail of water fixed on a high tripod stand, the water being made to play upon the condenser by means of india-rubber tubing. The rays of the light were condensed and thrown upon a side mirror made out of a piece of ordinary looking-glass, and from this mirror they were again thrown on to the small mirror or laryngoscope which Herr Behnke fixed in position in his throat, and which served both to bring the vocal ligaments into view and also to illuminate them. In front of the camera lens another small mirror was placed, fixed on a sliding shutter. By means of this mirror Herr Behnke was able to see when the laryngoscope was in the proper position, at which point he gave the signal that he was ready, and the sliding shutter was then, by a pneumatic arrangement, moved from the front of the camera lens. A slide was exhibited on the screen showing the apparatus used by Dr. Stein some years ago, sunlight being used, and the rays thrown into the mouth of the patient by an arrangement of mirrors. In this case the patient tied his tongue down while holding the mirror in position in the throat. The exposures were more rapid than by the electric light—probably because sunlight was used—and were made by means of a drop shutter, to which one end of a piece of string was fastened, the other end being attached to the foot of the person operated upon, who moved his foot and let the shutter fall as soon as he saw the image in proper position. The great disadvantage of this method was that the mirror was placed at one side, instead of being in front of the lens of the camera. A transparency was also shown from a collotype print from the original negative taken by Professor Cormack in 1860, which Herr Behnke explained, pointing out the back of the tongue, epiglottis, cartilages, &c., and the vocal ligaments. Herr Behnke thought that, considering the difficulties that had to be encountered at the time this negative was taken, that Professor Cormack had succeeded very

well. Mr. Cadett then proceeded to show on the screen photographs exhibiting the positions of the soft palate in the production of different sounds, and also the contraction which the uvula undergoes when producing tones in contradistinction to when breathing.

Dr. LENNOX BROWNE wished to say, with regard to Professor Cormack's photograph, that he found it difficult to believe that it was really a photograph; but he wished to remark that the slide they were now looking at, taken in conjunction with those lately produced, proved the correctness of the drawings which they possessed of the vocal organs. He wished to thank Mr. Cadett, the Photographic Club, the South London Photographic Society, and the Photographic Society of Great Britain for the enthusiasm they had shown in aiding Herr Behnke and himself in their work.

The CHAIRMAN thought the subject was one of very great interest to photography, as it tended to prove its great and increasing usefulness.

Mr. FRANCIS COBB drew attention to the great difficulties which had to be met in photographing the vocal organs, from the fact that the vocal chords, while in the operation of forming the sounds, were in a continual state of vibration, and he thought all photographers would be able to appreciate the difficulties that had to be overcome under such circumstances.

Captain ABNEY said he had met with similar difficulties when photographing the interior of the eye.

Dr. LENNOX BROWNE did not think the difficulties were so great in photographing the eye, there being no vibration, though the photographs of the eye had been of much more value to medicine because the conditions of photographing were much easier.

An opportunity was then afforded to the members of seeing Herr Behnke exhibit his vocal organs by means of the laryngoscope, after which

The CHAIRMAN asked the members for a very hearty vote of thanks to Messrs. Cadett and Behnke. He thought they must all acknowledge that it had been a very interesting paper indeed. He also asked for the thanks of the members to the Autotype Company, who had sent them some photographs for the walls, which would otherwise have been bare that evening; also to Mr. Leon Warnerke, for some Russian engravings lent for the same purpose.

Mr. E. Cocking showed on the screen a negative of the vocal organs taken with the lime light.

The meeting was then adjourned to Tuesday, 8th May.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE ordinary monthly meeting of the above Society was held at the House of the Society of Arts, John-street, Adelphi, on Thursday evening, the 5th instant,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. John Downes was elected a member of the Society.

The CHAIRMAN observed that he had perhaps been a little premature in congratulating the members at their last meeting on the success of the new arrangements for the artistic competitions. Though last month there had undoubtedly been an improvement, both in the numbers and merit of the pictures sent in, he was sorry to say that on the present occasion there was a considerable falling-off—at least in the number of competitors; and, in fact, for the figure subject, *Always in Trouble*, not a single picture had been sent in—whether owing to the difficulty of the subject or not he could not say. It had occurred to him, and he had mentioned the matter in committee, that under their new arrangements, by which each member present proposed a subject for competition in landscape and figure respectively, from which one of each was selected, it was a great pity to lose the whole of the unselected subjects; and he would therefore ask each member, in the event of his proposed subject not being the one selected, to bear it in mind for another time.

The subjects for the present month were then balloted for in the usual way, with the following results:—Landscape, *A Shady Nook;* Figure, *Dignity and Impudence.*

Mr. H. TRUEMAN WOOD gave a description of *The Methods by which the Vocal Organs have been Photographed.* He commenced by remarking that he had been surprised to learn that such a topic would prove acceptable to the meeting, as these subjects were not generally of so much interest to the members as those with which they could themselves deal. With a view to attempting to show the applicability of photography to medical research, endeavours had been made, by the aid of the lime light, to obtain photographs of the vocal organs, but without any great amount of success; but when it was suggested to him he had been only too glad to put the electric light apparatus of the Society of Arts at the disposal of Herr Emil Behnke and Dr. Lennox Browne, the gentlemen who had carried out the former experiments, for the purpose of attempting to produce better results. Before giving the meeting the results of these efforts, he (Mr. Wood) wished to demonstrate what it was required to photograph, and showed in the lantern a diagram of the human head in sections, pointing out the different vocal organs which it was necessary to reach with the camera. He said that Herr Behnke's idea had originally been that it would be preferable to use two lights, and accordingly he (Mr. Wood) had obtained, by the kindness of Messrs. Siemens Brothers, the loan of two of their lamps. It was well known that the electric arc gave out great heat, and it was, therefore, necessary to use a screen to prevent the heat going down the throat when the light was thrown on to the organs. In their first efforts they used a globe filled with alum, and with sufficient success to obtain better photographs than had been got previously, which encouraged them to try for results still better. While they were working with these appliances an important ally came into the field in the person of Mr. James Cadett. Mr. Cadett, Herr Behnke, and he himself spent the better part of a day working with these rough apparatus, and they arrived at the conclusion that something better must be devised; also, that the second light was unnecessary, but that a good, strong light right down the throat was essential. It was necessary to so arrange the light as send it straight down the throat in such a manner that Herr Behn should at the same time be enabled to see that the mirror was in t proper position, and that the picture reflected directly into the camera len This could only be done by putting the mirror in front of the camera, whi was rather an obstruction to taking the photograph, but Mr. Cadett h devised a method of getting over that difficulty. In the arrangeme actually adopted, the e ectric light was placed by the side of the camer and a little in front of it. The rays were directed by means of a co denser upon a mirror immediately in front of the camera, and just abo the lens, this mirror being set at an angle of 45°, so as to direct the lig immediately upon the subject. The condenser was furnished on the si next the lamp with a water jacket, through which a current of water wa kept flowing to prevent injury to the lens from the heat of the lamp. Th rays from the mirror were received upon the small laryngoscopic mirro placed, as before described, at the back of the throat. The image of th vocal organs formed in this mirror was reflected upon another sma mirror fixed to the front of a drop shutter. The object of this was th the person whose organs were being photographed could see when th image was properly directed, so that it would be received by the camer lens. As soon as he saw reflected in the little mirror on the shutter th image which it was desired to photograph, he gave the signal to th operator, and the exposure was made. It is hardly necessary to say th the focussing had been effected by means of a previous view of the organ To obviate the necessity of getting the mirror properly arranged twice, i some of the latter experiments arrangements were adopted by which a pa of stereoscopic lenses could be used, one lens serving as a finder and th other producing the picture. For this purpose a temporary back had bee fitted to the camera, one half of which was fitted to receive a small dar slide, while the other half held a focussing-screen, the camera being divide into two by the usual partition. The shutter was worked by a pneumat arrangement, and was mounted on a separate stand from the camera, th same stand serving also to carry the condenser and the larger mirror. Th short tube on which the shutter was mounted was connected with th camera lens by means of a sleeve of black velvet.

Mr. Wood then asked Herr Behnke to place himself in position, an that gentleman proceeded to illustrate the manner in which the photograp was taken. He used a small circular mirror of about an inch and a-ha diameter, with a handle so bent as to enable him to place it in such a pos tion at the back of the mouth that a reflection of the vocal organs wa thrown on to it by the aid of the electric light projected down the throat By means of the second mirror in the camera, Herr Behnke was able t place the smaller mirror in position in his throat so as to throw the refle tion of the vocal organs directly into the camera lens. It was necessary t warm the smaller mirror before inserting it, to prevent its becoming di while in the throat. Having succeeded in obtaining the requisite positio Herr Behnke proceeded to sing a series of notes, and the members wer enabled to notice the various changes of the organs with the differen tones. Mr. Wood then explained that in photographing the organs th exposure was made as soon as Herr Behnke succeeded in securing the righ position, and he showed on the screen some of the negatives which the had taken, and also passed round some prints from the same.

Mr. CHARLES STEVENS asked what length of exposure was given.

Mr. WOOD replied that they had tried various exposures—from a quart of a second up to one second—but Mr. Cadett considered the short exp sure the best.

The CHAIRMAN thanked Mr. Wood for giving their Society the fir opportunity of bringing this most interesting matter before the publi He did not think he should be saying too much if he considered it the fir step in what might prove very important scientific investigations. He fel some diffidence in attempting to speak on such a matter, on which h thought they ought to have the opinions of medical men; and, as he saw D Mann present, he hoped that gentleman would not leave the room withou giving them the benefit of his views. He, however, looked upon th matter in another aspect also, and that was the proof it gave them of th very great value of photography. No doubt the experiments which h been made would lead to investigations which would prove of great valu in throwing more light upon diseases of the throat and voice incident public speakers and singers; and, moreover, he ventured to affirm that ther was a very large amount of interest attaching to the subject scientifically in exhibiting the different appearances of the human throat in health an disease, and believed medical science would derive very much benefit fro it. In proposing a cordial vote of thanks to Mr. Wood, he begged to in clude the names of Messrs. James Cadett, Emil Behnke, and Dr. Lenno Brown, which, having been heartily accorded,

Dr. MANN said it was impossible for him to do otherwise than respond t the President's request that he should say a few words on this interestin topic, and he entirely endorsed what that gentleman had said about th importance of the fact that what had been done so far was a first step, an a first one only. Hitherto they had had no means of getting such representa tions of the vocal organs, and the great value of photography had bee demonstrated by the success of the efforts already made in this direction in so far as, being once possessed of a good impression of a vital part, the had it on record for all time. This he conceived to be the one great poin of importance attaching to the work now being done. He (Dr. Man also illustrated by sketches on the black board the appearances of th vocal organs when producing different tones, and the regions where disease of the throat, &c., occurred.

In reply to Mr. BOLAS,

Mr. WOOD stated that the lens he used was a Ross's 8 × 5 rapid sym metrical, and said that Messrs. Ross and Co. had very kindly undertaken t lend him a pair of smaller lenses mounted stereoscopically, so that one coul be used as a finder. He wished to mention that very energetic help ha been accorded to them by Mr. Acworth, and asked to be allowed to includ the name of that gentleman in the vote of thanks.

The CHAIRMAN asked Herr Behnke what were the extreme ranges of ›ice, maximum and minimum, obtainable, and whether so great a difference as an octave could be got.

Herr BEHNKE replied that it would be quite possible to go over the whole ›mpass of the voice. He could easily sing over an octave and a-half, ›nd then it would be perceived that there were very great differences, articularly with regard to the registers of the voice; but differences of semi- ›nes would be quite indiscernible to the eye. He wished to say a few ›ords respecting the object they had in view. The photographs of ›he soft palate which he had shown were original. As they had seen, the ›oft palate took different positions in the production of different qualities ›f the voice; this influence of the soft palate on the qualities of the voice ›ad never been shown before. Photography, he said, could not lie, and ›hen people saw photographs of these things they would know that they ›nust be correct. He had tried some twelve years ago to obtain photo- ›raphs of the larynx by the aid of lime light, but without much success; ›nd what had been shown at the present meeting were but their first ›ttempts with the electric light. They had, however, been able to show ›he different formations of the vocal ligaments in the production of two ›egisters at least, and he hoped and had no doubt they would yet be more ›uccessful.

Dr. LENNOX BROWNE wished to draw the attention of the Society to the ›act that these experiments showed how difficulties might be overcome when ›hey arose, and the way in which Mr. Cadett had arranged the mirror in ›ront of the shutter, &c., was highly commendable. Personally he was ›eeply indebted both to Mr. Cadett and Mr. Wood, and he congratulated the Society on having brought the matter to such a successful inauguration.

It was announced that the successful competitor in this month's artistic competition was Mr. John Nesbit, and the meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on the 5th instant, Mr. W. Coles occupied the chair.

Some prints sent by a photographer in the provinces were shown round to obtain the opinion of members as to the cause of certain faint reddish-brown spots which were visible on the whiter portions of them.

Mr. J. BARKER suggested the use of a stronger bath.

Mr. W. E. DEBENHAM said that the spots did not appear to arise from imperfect fixing, as they were almost invisible when the print was looked at as a transparency. He had once been troubled with a similar appearance when using a particular ream of paper that had been kept for some years before sensitising. Whether the particular sample of paper gave such marks when new he did not know.

A question from the box was read:—Does the metallic base of the haloid used in gelatino-chloride of silver affect the resulting colour of the image, and in what way?

Mr. E. J. GOLDING said that chloride of zinc gave blacker tones than chloride of sodium.

Mr. DEBENHAM remarked that Mr. Cowan and himself had used chloride of sodium, and found that unless a restrainer were employed black or grey tones only resulted. He (Mr. Debenham), therefore, did not suppose that the use of zinc could give a colder colour than sodium did. He also said he had found that the addition of iodide to a chloride emulsion gave a golden-brown colour to the shadows.

Mr. J. B. B. WELLINGTON showed some transparencies printed upon gelatino-chloride plates, which he considered proved that exposure did not affect the colour of the image, but the amount of restrainer in the developer did. One plate, which on different portions of it had received exposures varying greatly, was of a bright lake brown colour throughout. The developer employed was ferrous citrate, and as much as twenty-four grains of chloride of sodium to the ounce of developer had been used as a restrainer.

Mr. DEBENHAM said that when variation of tone by difference of exposure was affirmed it was understood that the development should be conducted in accordance with the exposure. If Mr. Wellington had divided his plate before development and kept the less-exposed portions of it in the solution until they had come up to match the other parts in apparent exposure, he (Mr. Debenham) was satisfied that a wide difference of colour would have resulted.

Another question was then read:—If engravings are copied as lantern slides, and these slides exhibited and given to friends, would the photographer be liable for infringement of copyright?

The members present had not sufficient technical legal knowledge to answer the question with certainty. The general impression was that there could be no infringement unless the slides were sold, or a charge was made for exhibitions at which they were used. One member, however, strongly expressed his belief that there was infringement of legal rights, although no money consideration existed.

Mr. N. S. TULLY inquired whether very rapid plates were necessarily thin and dirty. He had found them to be so, and the emulsion seemed to have a rough and loose character.

Mr. BARKER replied that there was a tendency to thinness with very rapid plates, but they were not necessarily dirty.

Mr. DEBENHAM said that Mr. Cowan had shown some negatives on quick plates which, with ordinary development, came very thin, but with four times the usual quantity of pyro., as directed by the maker, they developed with sufficient density.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Board of Management held their usual monthly meeting at 181, Aldersgate-street, on Wednesday, the 4th instant.

The minutes of the previous meeting having been read and confirmed, Mr. Robert Higgs was proposed, seconded, and duly elected a member of the Association.

After disposing of the other business the meeting adjourned until May 2nd, at eight p.m.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE ordinary monthly meeting was held at the Studio, Portland Street, on Saturday evening, the 31st ult.,—Mr. T. Davey, Vice-President, in the chair. The minutes having been confirmed,

The CHAIRMAN read his paper, entitled *The Tripod and Rod.* [See page 205.] It was written in a chatty style, and was listened to with much interest.

Mr. H. A. H. DANIEL said there were two things which he would remark upon:—Firstly: He quite agreed with Mr. Davey that developing while away from home (except in the case of test plates) he considered exceedingly unadvisable. Many plates were spoilt through the absence of the conveniences which one had at home, as also through being cramped for room, working by an uncertain light, &c. Also it made one's holiday really hard work, for the evenings were filled up with developing, &c., and the hours for sleep much shortened, thus depriving the holiday of its benefits. Secondly: The speaker considered Isaac Walton's book on angling a remarkably fine cookery book for fish.

Mr. DAVEY said that plates were often hurried in development while away, and it made a labour of a pleasure.

Mr. TRIBE observed that he considered it very desirable for beginners, especially, to develope a few test plates while away, just to ascertain that they were not deceived in the light, and thus to avoid having failures with all their plates.

Mr. DAVEY replied that it was not meant that a test plate here and there should not be developed, but that it should not lead to a general practice of developing all plates while away.

Mr. PHILLIPS quite concurred with Mr. Tribe.

Mr. E. BRIGHTMAN remarked that when at Lynmouth he hired a small room and fitted it up, developing every plate before returning home.

Mr. DAVEY commented upon the various developing formulæ, Mr. BRIGHTMAN saying that each was supposed to be best suited to the plates it was designed for.

Mr. STEPHENS asked if any one present had tried the varnish advertised for intensifying gelatine negatives, but no one was able to give any account of its effect.

After some further discussion of a general nature, a vote of thanks to Mr. Davey for his interesting paper closed the meeting.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE third annual meeting of this Association was held in Lamb's hotel, on Thursday, the 5th instant,—Mr. J. C. Cox, President, in the chair. There was a good attendance of office-bearers and members.

Mr. C. JOHNSON (Secretary) read the minutes of the last meeting, which were approved and confirmed.

The Secretary and Treasurer presented their annual reports, which, having been printed, were taken as ready and duly approved.

The PRESIDENT then gave his annual address, during the delivery of which he was frequently applauded. He said:—It is with pleasure that I can say that this is the third year of the existence of this Association. This being the termination of the same it behoves me to call attention to our reports. Mr. Johnson (our Secretary) is, as usual, full and explicit. He has detailed our doings, and I cannot but think we ought to feel pleased with ourselves —not only with what we have done, but in the way we have done it as a society. When I had this pleasure, this time last year, I urged that good lantern exhibitions should be held. These have turned out a great success otherwise than financially; but why (even with free slides and lectures, through the generosity of certain members) these lantern exhibitions should not at least "square" themselves I am at a loss to know. I was in hopes that we might have had Mr. Muybridge here ere now to have shown Dundee and ourselves his wonderfully-clever pictures of animals in motion. Such an exhibition as Mr. Muybridge's could not but have raised an interest in lantern work and altered the public mind as to what they are apt to associate with the bygone lantern slides—fearful in colour and composition, such as a blue dog "making tracks" for a purple cat, and a yellow-ochre human monster moving his left arm, as I remember once seeing. I think we should not lose sight of Mr. Muybridge if he revisit this country. I have to express a hope that the gentlemen who favoured us by reading papers will again so favour us. I have authority for saying that one and all were thoroughly appreciated. It cannot but be gratifying to us to have our membership increase as it is doing, and if all be true regarding the increased number of local amateurs in photography we look to a still further extension of membership. Our question box is a new and good institution, and ought certainly to be largely used from the information the discussions afford. The holding of another exhibition has been mentioned. It is not for me to negative the idea, but my own feeling is we should not think of it this year at least. In moving the approval and adoption of our Secretary's report I have to ask that a vote of thanks be awarded to Mr. Johnson. As regards our Treasurer's report: his duties would be much lightened if some of our members were not so bashful in handing in their subscriptions. I beg to move the adoption and approval of the report, and a vote of thanks to Mr. Robertson. And, as regards myself, I have to thank you for your forbearance in my many shortcomings and for the assistance I have always received from you; and, at the moment when I should properly retire from the place of honour, you have

thought fit to re-elect me. I cannot but say I appreciate your confidence in me. I will try and prove that such confidence is not misplaced, and work for the benefit of the Society.

A vote of thanks was unanimously passed to the editors of the local and photographic journals for their reports of the Society's proceedings, and for the photographic annuals.

A communication was received from Mr. Muybridge, New York and San Francisco, with regard to his photographs of animals in motion and the publication of a work on the subject.

The next business was the election of office-bearers for the ensuing year, which resulted as follows:—*President:* J. C. Cox.—*Vice-Presidents:* W. D. Valentine and D. Ireland.—*Secretary:* C. Johnson.—*Treasurer:* J. Robertson.—*Council:* G. D. Macdougald, J. Geddes, S. Rollo, G. D. Valentine, H. G. Fraser, and Dr. Tulloch.

Mr. G. F. Roger proposed that a lantern and lime light apparatus be purchased for the use of the Society, and a committee was appointed to report as to cost and to carry out details.

The annual holiday and outdoor meeting was fixed for June 6th, and the place selected was Meiklour, near Perth. A committee was named to carry out arrangements.

Mr. George D. Valentine, who has just returned from a tour round the world, exhibited a collection of beautiful photographic landscapes by Lindt, of Melbourne; Burton, Dunedin; Spencer, Tauranga; Hart and Campbell, Invercargill; large views of the Yosemite Valley, San Francisco, by Watkins; some exquisite portrait work by Morris, Dunedin; beautifully-coloured lantern slides by M'Allister, New York. They were all much admired, and gave ample proof that the brethren at the antipodes and other parts of the globe are not behindhand in the race for perfection.

An interesting meeting was brought to a close by a vote of thanks to Mr. Valentine for his exhibits, and congratulations on his safe return home; also the usual vote to the Chairman.

LEEDS PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 5th inst.,—Mr. W. Teasdale, F.R.M.S., in the chair.

Mr. Frank Kidson read a short paper (which he illustrated by means of a few bold crayon sketches) entitled *Some Remarks on Composition in Landscape Photography.* In opening his subject, he (Mr. Kidson) explained the difficulty he laboured under in having to set down hard and fast rules by which beauty of line and effect could be got. Composition (he said) could not be learned by rule; the beauty, or the reverse, of a pictorial representation must be felt. It was true that rules were laid down in books, but it would be frequently found that many eminent artists departed from these with success. Genius was not to be hampered by any rule, but before disregarding a few of the main ones it would, perhaps, be as well to make sure that we were geniuses. These he would endeavour to give by the aid of a few slight and rough sketches. He (Mr. Kidson) then proceeded to show some examples of bad composition, such as having the horizontal line across the middle of the picture, remarking that it should be either considerably below or above it, the former being generally the more graceful of the two. He then drew a slight sketch of a rock which he requested the audience to imagine to be St. Michael's Mount, Cornwall. By placing this exactly in the centre of the picture he showed the absurd effect produced; but by adding on one side a vessel in the foreground and on the opposite side a small figure, placing it *not* on a line with the vessel and with rock and vessel forming a triangle, the effect, he said, was much improved without detracting from the principal object, but giving great aid to it. Similar examples followed, and the bad effect of long, continuous lines lying parallel to each other was pointed out, as also that of figures or other perpendicular lines continuing others directly above them. In one example he drew a gentleman's house, and remarked that professional photographers were not always at liberty to choose the view which their own good taste would suggest. The gentleman, for instance, might insist on having a front elevation with a laurel bush on each side, and a walk up the middle leading directly to the front door, around which, no doubt, would be a select family group. In this case the photographer was more or less helpless, but (continued Mr. Kidson, drawing a line round his sketch and thereby causing the subject not to be so obtrusively in the centre) the gentleman might not object to have the picture thus. He (Mr. Kidson) then showed a series of photographs more or less illustrating his previous remarks, and concluded by exhibiting examples of what he ventured to think were passable compositions which he had sketched from photographs.

The discussion was continued by the Chairman, and Messrs. Walker, Ramsden, Bedford, &c.

A question was found in the question-box asking for the best method of producing a dead black on brass tubes, &c.

The Chairman suggested that the articles should be made hot and then dipped into nitric acid. By this means he had obtained better results than by the application of bichloride of platinum.

Mr. Branson remarked that for the interior of tubes nothing surpassed the use of smoke from an ordinary candle.

Dr. Walker suggested for tubes black velvet pasted on paper and sprung into the tube.

The meeting was soon afterwards adjourned.

HALIFAX PHOTOGRAPHIC CLUB.

The usual monthly meeting of this Club was held on Tuesday, the 3rd instant, at the *Courier* office,—Mr. J. B. Holroyde, President, in the chair. After the reading of the minutes of last meeting and passing the same,

Mr. J. E. Jones read a paper on *Photographic Experiences.* He said his first attempts at photography was with a sliding square camera and a French lens. He then obtained a 5 × 4 camera by Meagher and a Dallmeyer lens and about twelve dozen plates. He took a tour to North Wales, visiting St. David, Milford Haven, and various other places. He tried a train in motion, a group of sheep, &c., and was just about to take a loving couple near a stream when they observed his intentions and took flight. The above plates when all finished were not very satisfactory. He next took a two days' trip to Filey, with some uranium plates. He then visited Chester, Birkenhead, and Liverpool, where he took the *Great Eastern*, Landing-stage, and other views of passing vessels. He found three things very essential for the best exposure—light, good plates, and a good lens. He used sensitised paper as a guide or test for light previous to exposure, observing the time required to darken the paper. After using many makers' plates, and finding the various points of defects and failures, he wrote to the makers, and the only recompense he could get was that the fault was in the operator's hands, and that the plates were perfect when they left their works.

The Chairman here quoted some correspondence he had had with a friend of his (Captain Turton, of Florence), whose experience with plates sent out to him from England was considerable. He found them very faulty, and when complaints were made he received the answer that the fault was in the operation of developing, fixing, &c., and that the plates were all right when sent out from England.

Several members spoke of the bad quality of various plates—spotty, thin, uneven in thickness of film, &c.—and that the makers or their assistants were aware that some of the plates were bad.

It was suggested that the Club should secure a batch of plates from various makers, try them, and present a report on their qualities, &c.

Mr. W. C. Williams had a batch of plates (about six dozen), and after exposure developed some of them. He found them covered with spots and marks, exposed some, and sent them to the makers for them to develop. After a few days he received the reply that he employed a very dirty assistant and had many complaints, and that was all the compensation he got for the loss of five dozen plates, there being about twelve plates out of the lot that were anything like decent. Another maker's plates he found very bad, the glass being crooked, and when put in the printing-frame they broke. He had several fine negatives spoiled and ruined in that way. This was a very important point to be looked at by makers who intended to gain a good reputation. He (Mr. Williams) recommended that a positive print on glass should be made, and a negative produced from that, in order to secure a good duplicate of a first-class negative. He found of late that many good gelatine plates began to fade at the edges after being laid aside for a year or two, and was afraid if this were continued it would prove a rather serious thing.

Mr. Jones then exhibited several negatives and prints illustrating his paper, showing their faults and defects in different makes of plates.

Mr. Bulmer and Mr. Councillor Smith made some remarks on the making of emulsions and their matt and glazed appearances.

Mr. Williams exhibited a very fine album, containing many choice prints of views in North Wales, Tintern Abbey, Kirkstall, and Fountains Abbeys; also his new camera stand and carriage, which was now complete and a very ingenious contrivance, and well worth patenting.

The Chairman proposed a hearty vote of thanks to Mr. Jones for his interesting communication, and the meeting was adjourned.

Correspondence.

April Meeting of the Photographic Society of France: Instantaneous Views of Flying Birds, by M. Lugardon, of Geneva.—On the Hyposulphite Bath, by M. Laferronnays.—An Ingenious Dark Room for Amateurs, by M. Enjalbert.—Magnificent Proofs, by Carlos Relvas.—Unsuccess of M. Gaillard's Prize.—A Modified Bromide Emulsion.—Honour to M. Léon Vidal.—A New Publication on Gelatino-Bromide, by M. Audra.

The monthly meeting of the Photographic Society of France was held on Friday last, the 6th inst.,—M. Davanne in the chair.

Many instantaneous views were shown. Those of M. Lugardon, of Geneva, were certainly the best ever exhibited, and must have been done in the shortest fraction of a second. The operator had taken a "shot" at sea-gulls, and had seized them when flying in every posture. So sharp are they that their webbed feet can be seen distinctly.

M. Laferronnays sent a communication upon the best means of preserving the hyposulphite of soda bath so that it can be employed for a length of time. This idea is by no means new, being to add alum to the solution and filter thoroughly. He makes his bath as follows:—

Water	1,000 parts.
Hyposulphite of soda	150 ,,
Alum	40 ,,

M. Hermagis presented his new system of fixed diaphragms for lenses, of which I have already given a description in a former communication.

M. Enjalbert presented a very useful piece of furniture, which is likely to secure great success among amateurs. It consists of a large cupboard, nicely ornamented, which takes up very little space in a house, and which, when opened, makes a very comfortable dark room containing every requisite for the development of gelatino-bromide silver plates and other photographic manipulations. When work is done it is closed up again, and no one is the wiser. Many persons, I think, may be induced to try their hands at photography who would not attempt it before the introduction of this very convenient piece

iture, for many could spare space for it in a room, whereas few ateurs could give up a whole room to meet the requirements of their by.

I. Carlos Relvas, the renowned Portugese amateur, sent for inction a great number of proofs made on gelatino-bromide of silver tes, which, for choice of subject and artistic distribution, leave hing to be desired. We shall all be most happy to see this gentleman in fully for rapid productions by the new process, being certain that h the time and money he can devote to that branch we shall soon Nature, in all her freaks, caught by the photographic lens as directed the skill of a master in the photographic art.

The commission appointed in connection with the Gaillard prize de their report, which was to the effect that they had come to the iclusion that no one merited the prize; and as it had now been ered three years for the purpose of finding a suitable film to replace ss in photography, and that without success, the money offered uld be now employed in creating another prize more likely to ceed.

The Society received a communication from a gentleman who says at he has discovered a form of silver bromide by which he can proce objects as seen by the eye. To make this clear, every photoaphic manipulator knows that in reproducing a picture the print tained does not correspond to the picture; for instance, if the incipal colours be a bright red and a dark blue, in the print produced e bright colour (the red) will be found dark, whereas the dark blue ll be found to have given a clear tint. A shawl was laid before the embers, together with a reproduction of the same upon an ordinary latino-bromide of silver plate, and another reproduction upon a odified bromide of silver plate. The two gave completely different sults with regard to the colours, and if it had not been for the whites e might have taken one negative to have been the positive or *contrepe* of the other. It remains to be proved if this "dodge" will nder important service to photographers.

The meeting was adjourned at ten o'clock.

We are pleased that the Ministre de l'Instruction Publique has conrred on M. Léon Vidal the order of "Officier de l'Instruction Pubue" in acknowledgment of the energy employed by that gentleman popularise photographic knowledge among the pupils of the "Ecole ational des Arts Decoratif." If ever a public distinction were merited was in this case. This honour, and even a higher one, was long nce due to M. Vidal, but his modesty has always kept him back. At st his indefatigable perseverance in the cause of science has, we are appy to say, brought him to the front. Not only is this gentleman a *vant*, but he is the most zealous champion of our art-science.

M. Audra, the well-known amateur, has just compiled a very useful ook, bearing for title—*Le Gelatino-Bromure d'Argent: sa Preparaon, son Emploi, son Dêveloppement.* M. Audra has been a very zealous dvocate of this process ever since its appearance, and the different rmulæ and "dodges" which have appeared from time to time in the hotographic journals prove that he is completely *au fait* in all the ecrets connected with the manipulations of this now universal process. his book is not only a summary of his own ideas, but the fruits of his udies on all that has appeared in connection with the gelatino-bromide rocess. I read it with care, and I find it the best work I have yet een on that subject.

La Chambre Syndicale de la Phototographie have terminated the xamination of operators desiring to obtain a diploma. Eight candiates passed successfully and obtained a *brevet de capacité*, namely, IM. Bornstein, Chevalley, Ginestet, Gouffe, Fisch, Jolly, Ruckert, nd Valkman. It would be a very good thing if such a public examiation could be organised in England. A photographer could then dge of the abilities of the operator seeking employment; thus time nd money would be saved to both parties. E. STEBBING.

25, *Rue des Apennins, Paris, April* 9, 1883.

CELESTIAL PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—In your issue of the 6th inst. you have an article y Mr. R. C. Johnson on *Celestial Photography*, in which he commences ith De la Rue.

Now, I think it is too bad to ignore the earlier services of John Iartnup, of the Liverpool Observatory, Dr. Edwards, and myself. We ere at work, with Mr. Hartnup, from February 12th to the end of eptember, 1854, photographing the moon, and our results were exhiited at St. George's Hall magnified to fifty-six feet in diameter, and ectured upon by the late Professor Phillips, of Cambridge, at the eeting of the British Association. It was published in your Journal f that date, and I am in possession of the negatives, or rather enlarged ositives, for the lantern.

As pioneers we had difficulties to encounter that the present men are aved from, such as discovering the difference in position of visual and hemical foci, and also equalising the moon's motion, whilst the colloion negative was being exposed. I am quite sure this omission was made by Mr. Johnson from a want of knowledge of the earliest struggles of celestial photographers.—I am, yours, &c., JAS. ALEX. FORREST.

58, *Lime-street, Liverpool, April* 9, 1883.

THE HYPO. FIXING BATH.

To the EDITORS.

GENTLEMEN,—As an amateur I wish to say a few words upon this important subject in favour of Mr. Charles J. Hall.

In Mr. W. E. Debenham's word of warning in last week's Journal he strongly warns the photographer against using an old hypo. bath, and says:—"He may repent at leisure when he finds some of his cherished negatives going hopelessly to destruction from imperfect fixation."

I can truly say that for the last six months I have been using the same old hypo. bath, and up to the present I have not had the slightest reason to repent.

I will admit that when a negative is taken from an old hypo. bath and held up to the light it looks slightly discoloured, and it also takes a little longer to fix; but by giving it a little extra washing the discolouration is entirely removed, and I am sure it could not be distinguished from a negative that had been fixed in a new bath.

I should be glad if any other user of an old hypo. bath would kindly inform us what injury he has sustained by using it, as I think Mr. Debenham cannot be speaking from experience in his "word of warning."—I am, yours, &c., H. PEMBERTON.

58, *Clarendon-road, Chorlton-on-Medlock, Manchester, April* 10, 1883.

THE SENSITIVENESS OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—I think you would greatly assist the ever-increasing body of amateur photographers, and myself amongst them, if you could afford us some definite information relative to the rapidity of gelatine plates other than that usually given by the makers.

If you ask what exposure a certain make of these plates requires you are told by the dealers, with almost a touch of pity mingled with scorn—"Oh! about ten times that of wet!" Now, many of us have been born since the days of baths and know nothing of wet plates—probably have never seen one—and consequently know as much about the time of exposure as "the man in the moon." But what would really help us would be a statement as to the approximate time *in seconds* that a certain batch of plates would require to be exposed to produce a good result. Of course variations in the light and the time of year, &c., would have to be allowed for; but we should have a definite starting-point to guide us in our exposure which would be clearer to us than "ten times that of wet."—I am, yours, &c.,

April 9, 1883. A BEWILDERED AMATEUR.

[It was for the very purpose indicated by our correspondent that the "Sensitometer Committee" was appointed by the Photographic Society of Great Britain, with the view of establishing a "standard" of sensitiveness. The outcome of their deliberations was that the most reliable standard was Warnerke's sensitometer, the readings of which have a definite meaning to those who use it nowadays.—EDS.]

CLEARING SOLUTIONS.

To the EDITORS.

GENTLEMEN,—Kindly allow us a small space in which to reply to the remarks on our "Brilliant" made by Mr. H. Y. E. Cotesworth on page 188 of your trustworthy and valuable Journal. If he wish to "draw us out" as regards the chemical action of the "Brilliant" he is mistaken, as it would hardly suit our purpose to make an *exposé* of its constituents. As he is quite in the dark on this, he indulges in a lot of theorising which is of no value.

He does not mention one fact about our invention, but details experiments made with a series of clearing solutions with which we have nothing to do, and used a ferrous oxalate developer which we distinctly state is not suited to our "Brilliant." As practical men, we have a strong belief in *experientia docet*, and, having used the solution nearly two years on a very large number of negatives without a single failure or the slightest damage, we are in a position to fearlessly challenge practical opposition. Mr. Cotesworth is surely aware that "an ounce of fact is better than a ton of theory."

It singularly happens that in the same number of the Journal there is favourable mention of the "Brilliant," as demonstrated at a meeting of the Liverpool Amateur Photographic Association (page 197).—We are, yours, &c., ADAMS AND CO.

Liverpool, April 11, 1883.

[Mr. Cotesworth's strictures were directed against the principle of applying *any* clearing solution to a film from which the soluble hyposulphites have not been washed, and theory would certainly appear to justify his view.—EDS.]

RETOUCHING AND THE EYESIGHT.

To the Editors.

Gentlemen,—Noticing your article on *Photography and the Eyesight* in today's Journal, and that you intend dealing further with the subject in your next issue, I beg to offer you my thanks for the benefit I derived from the advice contained in your previous paper on *Retouchers and Eye-Strain*, and if you think my experience is worthy of notice I give it freely to any suffering in a similar way.

In the first place, I am never without a bottle of the "eye lotion" the recipe for which you gave in your former article. It is as follows :—

Acetate of zinc	10 grains.
Wine of opium	½ ounce.
Distilled water	10 ounces.

Filter and use in a glass eyecup twice a day.

I find in practice that it does not require the opium unless the eyes are very weak; it keeps longer, too. In very bright sunshine it is advisable to wear the smoked spectacles, as they keep the eyes nice and cool; and in reading by gas or lamplight an eyeshade is a great comfort and protection.

Respecting the lighting of the dark room: there is nothing to compare with a commercial ruby textile fabric. I have used it for two years, and find it perfectly safe for the most sensitive films. My window is 6×4 feet and plain glass, covered with one thickness of the fabric, giving a good light all over the room.—I am, yours, &c.,

April 6, 1883. Eyesight.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered—

John Ambler, Queen's-chambers, 7, Market-street, Manchester.—*Two Photographs of Mr. Charles Hallé.*

John Marsden Harrison, 40, Church-street, Falmouth.—*Three Photographs of Mr. Barker, the Blue Ribbon Missioner.*

Exchanges.—In our next.

Camera.—We should recommend No. 1 in preference to the others.

W. S.—You are right in your surmise; it should be "*acid.*" It was a misprint.

Tenebræ.—The directions are perfectly intelligible if you read them without your emendations.

Sancho.—You will find more than one article on the subject in our Almanac for the current year.

J. H. S.—The gelatine may be procured from Messrs. A. and M. Zimmermann, 27, Mincing-lane, E.C.

J. R. Ditchfield.—*Silver Printing*, by "Aliquis," price one shilling, published at our office, 2, York-street, Covent-garden, W.C.

Salisbury.—You are employing far to large a proportion of ammonia. Reduce the quantity to one-fourth, and, doubtless, all will go well.

Paper.—The fault lies in the paper itself, not in your operations of toning and fixing. It is probably caused by a too weak bath or too short a floating.

Modern Amateur.—The orthographic, orthoscopic, and caloscopic lenses are similar in construction. The posterior combination in each is a dispersing lens.

J. W. S.—Cabinet size—which in the trimmed prints measures about five and a-half by four inches—may be cut from that sized plate, but you will see that a smaller plate may be used for the size quite as well. The promised articles will appear shortly.

Mr. F. W. Hart writes, in reference to Mr. W. H. Harrison's communication, that a special feature in the cameras he has made for many years past is that the front is so arranged that the lens can be placed at the extreme top, bottom, or sides of the camera front when necessary.

Relievo.—You cannot do better than colour the gelatine slightly with Indian ink. The most convenient form for you to employ is that known as liquid Indian ink, which may be purchased from any artists' colourman. If you attempt to dissolve the ink yourself you will experience considerable difficulty with most commercial samples.

Thos. Arder.—1. About three inches and a-quarter to three inches and a-half apart.—2. It is quite "natural for the second sensitising bath in the collodio-albumen process to discolour after a few plates have been sensitised." The solution may be decolorised by shaking it up with a little kaolin and then filtering, in the same way as the sensitising bath for paper is usually treated when it becomes discoloured.

R. J. Rogers.—The cause of the opalotypes splitting off the glass is probably owing to the glass itself being at fault, or it may not have been perfectly clean when the collodion was applied. We have heard many complaints of faulty opal glass of late. We do not recommend an albumen substratum, unless it be absolutely necessary to secure the collodion film, and it is not if the glass be of good quality and be perfectly cleansed.

S. D. McKellen.—1. Either the front or back lens may be employed as single lenses, but used in this manner they will not give straight lines. The combination in its entirety, however, will give perfectly straight marginal lines.—2. The orthographic lens does not yield straight lines at the margin of the picture; they curve slightly outwards. The front lens may be used alone as a single lens, in which case the convex side should be next the ground glass, with the stops placed in front.

R. W. R.—The spots are due to metallic particles in the paper itself. They show more strongly on the back than on the front. This would not be the case if they were in the albumen only.

Frank Field.—We are very much afraid that you will have a great deal of trouble in convincing photographers that retouching should be abolished. The public, too, will be equally difficult to persuade that it is an evil which ought not to be indulged in. We are quite of the opinion, with you, that bad portraits are often due to bad retouching. Of course there is retouching and retouching, and the skilful use of the pencil will often improve the portrait as a likeness as well as a picture. Retouching, however, is sometimes carried much too far; thus the likeness is destroyed and the picture rendered flat and unlifelike. But this is surely no reason that retouching should be altogether abolished when skilfully performed.

Photographic Club, Ashley's Hotel, Henrietta-street.—At the forthcoming meeting of this Club, on Wednesday next, the 18th inst., the subject for discussion will be—*On Packing and Unpacking Gelatine Plates when on a Tour.*

Note-book of Photography.—Mr. E. Openshaw, of 24, Ward's Buildings, Deansgate, Manchester, has published a very handy little photographer's note-book for use when working out of doors. In addition to the spaces for information regarding subject, lens, stop, light, exposure, &c., &c., a new feature is introduced in the shape of a series of printed numbers, gummed and detachable, to be affixed to the plates after changing from the slides, so as to keep up a trustworthy record of the progressive exposures made during a tour. The book, which may be carried in the waistcoat pocket, suffices for a couple of gross of plates.

Portraits of "Number One."—We have received from Messrs. Marion and Co., the publishers, a couple of portraits of P. J. Tynan, who, according to a New York correspondent, is the veritable "Number One" who has been so particularly "wanted" by the Dublin police in connection with the assassination conspiracy. Tynan is stated to have escaped to Mexico—beyond the range of extradition treaties—from New York, where he was resident at the time the important disclosures were made by James Carey; but he had been previously for many years in this country, where the photographs were taken. In one of the pictures he is represented in the uniform of the Queen's Westminster Rifle Volunteers.

OUR ILLUSTRATION.

The illustration which accompanies the present number is by Mr. J. Thomson, F.R.G.S., whose Chinese studies were so much admired some years ago. As a good example of natural grouping the picture speaks for itself, pointing to a class of subjects which, so far as the mechanical difficulties are concerned, are comparatively easy nowadays though practically impossible with the old wet plate.

LONDON GAZETTE, *Tuesday, April* 10, 1883.

Petition for Liquidation by Arrangement.

William Henry Terry, 65, Oxford-street, Manchester, and 9, Crystal-terrace South-shore, Blackpool, and formerly of Market-place, Denton, and of South-pier Blackpool, photographer.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For two Weeks ending April 11, 1883.
These Observations are Taken at 8.30 a.m

March	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
29	30·16	SW	43	39	—	49	31	Bright & Clear
30	29·46	SW	47	45	—	53	39	Raining.
31	29·93	W	41	39	—	57	33	Hazy.
April								
2	30·15	E	41	39	—	63	33	Hazy.
3	30·20	W	50	46	—	66	36	Foggy.
4	30·24	WNW	54	51	—	64	44	Hazy.
5	30·25	W	51	47	98	69	41	Hazy.
6	30·51	NE	47	44	98	60	40	Cloudy.
7	30·65	E	41	38	90	55	33	Cloudy.
9	30·45	S	41	38	—	57	33	Foggy.
10	30·42	E	45	41	80	53	37	Overcast.
11	30·39	NE	41	38	—	60	34	Overcast.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1198. Vol. XXX.—APRIL 20, 1883.

REDUCING THE DENSITY OF NEGATIVES.

uite as important as a good method of intensification is a good ıethod of reducing intensity; for, working in almost absolute darkess and judging the density of the negative entirely by its ppearance by reflected light, the operator of today is as liable to ıiscalculate on the side of over- as under-intensity. It has been ıid that no negative should ever require intensification, and, *per ontra,* that reduction should be needless; but this is ridiculous, as ; might with equal justice be said that there *should* be no railway ccidents, no people run over in the streets, no colliery explosions. Yet all these casualties happen with a regularity, as shown by the nnual statistics, that almost proves them to be necessities. And so here will continue to be a certain proportion of necessary accidents n developing, in spite of the *dicta* of those gentlemen who never ail—probably, by the way, because they are so easily satisfied. Many plans have been proposed for the purpose of reducing density, all of which answer in so far as the mere reduction is concerned, though few, if any, effect the purpose in a completely satisfactory manner, and none satisfactorily under all conditions. Thus one method may work successfully enough in reducing a negative which is simply over-developed and requires thinning equally all over; but such a plan would not answer for a "hard" negative, the result of under-exposure and forced development, and in which, perhaps, only the high lights are over-dense. Nor, again, would it produce the required result in the case of an over-exposed negative, where, without any very great density in any part, the shadows have become "filled up" and require clearing. In fact, every different form of the defect necessitates its own particular remedy.

With wet plates, or indeed with collodion plates generally, the task was comparatively easy to secure any desired kind of reduction; but with gelatine plates such is not the case. While it is a sufficiently easy matter to attack generally and equally the whole image, it is in the highest degree difficult to secure "selective" action of the reducing agent; that is to say, a proportionately greater action upon the high lights or shadows, as the case may be, in order to produce the desired effect.

This seems to be due to the different physical properties of collodion and gelatine respectively. In consequence of the porous nature of the collodion film the reducing agent penetrates and acts throughout its whole thickness at once, with the result that in the shadows and half-tints, where the particles of metal forming the image are few and loosely packed, the maximum effect is attained long before the denser substance of the high lights is completely acted upon. The tendency, therefore, would be to increase the contrast between lights and shadows. With gelatine, however, the penetration of the reducing solution is more gradual, and the particles of silver are more securely protected and surrounded by the gelatine, so that the action goes on regularly from the surface downwards, reducing simultaneously both lights and shadows. This, while it makes the negative generally thinner, tends to lessen the contrasts. Another influence which may to some extent modify this result should be taken into account. The portions of the gelatine film which represent the shadows and half-tones of a negative contain fewer particles of silver than those which represent the high lights, and are, therefore, more permeable to the solution. On the other hand, there is greater electro-chemical activity in those parts of the film where the particles of silver are in closer contact, and practically, perhaps, the two forces balance one another.

Let us now turn to the methods in actual use for reducing purposes. These consist, first, of substances such as perchloride of iron, ferric oxalate, and dilute hydrochloric acid, which attack the image, converting a portion of its metal into chloride or other salt of silver, which has less power in stopping light, and which may or may not be subsequently removed by means of hypo. Under this heading comes chloride of gold, which has been recommended as a reducing agent; but its most beneficial action lies in its power of altering the colour of the deposit. If employed of sufficient strength it bleaches the image just as a strong solution of perchloride of iron or any similar salt will do, and offers no advantage over the cheaper salts; but when employed in a dilute condition it "tones" the image to a bluer colour, which gives to the negative a power of passing a greater quantity of active light, and at the same time the toned image is permanent, which can scarcely be said of that produced by the action of weak iron, copper, or mercury salts.

For reducing negatives which have received mercurial treatment chloride of gold is specially applicable; but in this case its "bleaching" action is utilised, and a solution of the strength of one grain in four ounces is suitable, its application being followed by re-immersion of the negative in the fixing bath. When perchloride or oxalate of iron are used the subsequent immersion in the hypo. should always be adopted. The disadvantage of this system is that there is no absolute guide as to the exact point at which to stop the application of the "bleach," as the insoluble chloride or oxalate which remains in the film gives a deceptive appearance to the image.

Weak solution of cyanide of potassium, chloralum, ozone bleach, and chloride of lime have also been used for reducing density. The first attacks the metal of the image directly, and the progress of its action may be watched and arrested at any desired point. The remainder act more or less upon the gelatine film, dissolving it and so reducing the density by diminishing the thickness of the layer of gelatine. Prolonged immersion in a fresh and pure solution of sodium hyposulphite has also been stated to produce the desired effect; but this process we should be decidedly inclined to look upon with suspicion in consequence of the probabilities of its introducing subsequent troubles.

All these methods, however, fail in one important point: they give little scope for what we may call "selective" reduction—a term which bears a reverse signification to "local intensification." But by a combination of one or other of these plans with redevelopment, as in Mr. Willis's ferric oxalate method of clearing negatives, almost any desired effect can be obtained with a little practice. The method consists in first "bleaching" the image thoroughly with any one of the salts already mentioned for that purpose—though for efficiency and economy we prefer chloride of copper—and, subsequently, redeveloping with ferrous oxalate.

It is well known that by varying the character and proportional constituents of this developer very different results, as regards

density, can be obtained in the developed image. Thus, if we have a negative which has been simply over-developed and whose excess of density is proportionate throughout, we bleach it with cupric chloride, and, after careful washing, redevelope it with an energetic—that is, a quick-acting—solution of ferrous oxalate. By an opposite mode of treatment—that is, by an old and well-restrained developer—we may add to the density. If, again, we have a negative that is too dense in the high lights while still possessing due gradations in the half-tones, we bleach it as before, allowing the action to pass right through the film until the whole of the image appears white or buff-coloured when looked at from the back. Then proceed to redevelope slowly with a well-restrained developer, and watch carefully by transmitted light and by examining the back of the plate. It will be found that the details in the shadows are reduced first and appear black on the reverse side, then the half-tones, and finally the highest lights alone will still show the white or buff-colour. With practice it will be possible to judge by transmitted light exactly when to stop this operation—when the plate is well-washed and dipped in the hypo. bath until the bleached portions of the high lights are dissolved. In this manner the high lights alone suffer reduction, and so harmony may be given to a previously inharmonious negative.

COPIES OF THE OLD MASTERS.

We frequently hear the statement made that copies of oil paintings made on the continent are, as a rule, much superior in quality to those produced in England, and various reasons are assigned for the superiority.

Sometimes the reason given is that the photograph is not made from the original painting at all, but from a monochrome copy painted by the artist himself, expressly for the purpose of its being photographed. At other times it is said the picture, in the first instance, is painted—or, to speak more correctly, partially painted—in such colours as will enable photography to render a true transcript of what it will be when finished; that is, it is painted more or less in neutral tints, and after a successful negative has been secured the painting is completed with the more pronounced colours. But this will, of course, not apply to copies of paintings by the old masters, many of which are painted in colours in no way suited for copying by the aid of photography, yet excellent reproductions of them are to be found both in the English and the foreign markets.

The latest reason for the superiority of these copies which of late has gained currency is that they are produced by a "secret collodion process," which is capable of rendering colours in their true relation in monochrome. Be that as it may, there is no question that very excellent copies of difficult subjects have been and are being produced on the continent, whatever may be the means employed. One thing is certain, namely, that copying works by the old masters in the different public collections is made more a speciality of, and is carried on more extensively, on the continent than in England.

At the last meeting of the Photographic Society of France [see Professor Stebbing's report in our last issue] a communication was made by a gentleman (whose name is not given) "who says that he has discovered a form of silver bromide by which he can produce objects as seen by the eye," and that if the principal colours of the picture be bright red and dark blue, in the photograph the red will come out light and the blue dark. To illustrate the capabilities of the process a coloured shawl was shown, together with a couple of photographs of it—one by an ordinary gelatino-bromide plate and the other by the modified bromide plate—and the results were totally different. No details were given, so we are, of course, totally in the dark of what the modification may consist. Our correspondent, at the conclusion of the paragraph, says somewhat significantly that "it remains to be proved if this 'dodge' will render important service to photographers."

It is pretty generally known by most of our readers that a collodion which is strongly bromised is far more sensitive to certain coloured rays than one that is simply iodised, and that a collodio-bromide plate (either emulsion or bath) developed with alkaline pyro. will prove superior in this respect to a wet collodion one developed wi iron, however strongly bromised it may be. Also, that a *gelatin* bromide plate will surpass either of the former in regard to th harmony with which it will render violent contrasts of colou This is easily demonstrated by taking a gaudily-coloured pictu and making a couple of negatives of it—one by the ordinary w collodion process developed with iron, and the other by th gelatino-bromide process employing alkaline pyro. as the developer and then compare the two, when it will be found that the colou will be far more harmoniously rendered by the gelatine than l the collodion plate.

Captain Abney has discovered a condition of bromide of silv which is exceedingly sensitive to the red end of the spectrum, an how far this may correspond with the "modified bromide" mentione in the communication made to the meeting referred to we are, course, unable to say. We are, however, fully aware that "secret method" is largely practised by continental photographe who publish copies of paintings by the old masters, namely, that elaborately and most skilfully retouching the negatives, both wit the brush and with the blacklead pencil.

A few weeks since we mentioned, on the authority of the *Archi* that a certain Italian publisher of the reproductions of the work of art in the palace of the Doge and in the Venetian churche (Signor Carlo Naya) had paid as much as a couple of thousan pounds in a single year to an artist, Signor Marcovich, for retouchin the negatives. All this came out in an action brought for piracy o the reproductions, and it was proved that in many of them heads and in some instances whole figures, had been put in by hand which on account of the colours in the original had not shown a all in the negative.

If we closely scrutinise most of the reproductions of oil painting published on the continent we shall find unmistakable evidenc of the amount of work expended upon the negatives—such a amount as would surprise most English photographers; but i almost every instance the *retouch* is executed with considerabl skill and judgment, and it is not the mere mechanical work that frequently passes muster for retouching in this country. On the contrary, it bears evidence that it is the work of skilled artists, who are familiar with the touch and peculiar style of the old masters with whose works they are called upon to deal.

From the price at which these fine copies are sold it will be seen that a considerable amount of time and skill may well be expended upon each negative, and yet prove very remunerative to the publisher. Indeed, if the prints were issued from untouched negatives they would command but little or no sale from the general public (the largest purchasers), and artists would scarcely care to possess them, as the original would be so poorly represented by the photograph.

We have it on good authority that, in some instances, after the negative has been retouched to a considerable extent a transparency is made from it, and this in turn is worked upon; then from that a fresh negative is made, this being further manipulated, if deemed necessary. The object of this is that certain portions—such, for example, as those which come out too strong and which cannot be modified by working upon on the negative itself—may be remedied in the transparency, so as to obtain their proper value in the final negative from which the prints issued to the public are obtained.

STAINS UPON OPAL GLASS.

The increased importance which of late years has attached to opal glass renders any observation upon its permanency matter of general interest to the photographer—the photographer, that is, who, having a pride in his work, takes steps to render it in all respects as permanent as possible. To such a one the thought that, notwithstanding all his care and the adoption of a permanent carbon process, the very surface upon which the opal pictures are formed may be likely to change colour would be the reverse of pleasant; yet under some conditions such changes are likely to occur. We have from time to time noted peculiarities of action presented by

e opal plates, and we are now able to bring some new facts to ar upon the question. That opal glass or, at anyrate, some samples it are readily acted upon by gases or chemical vapours is an un- ›ubted fact to our mind from experiments we have lately carried ıt, and it remains to be seen to what extent this affects the tegrity of photographs taken on such glass.

Some time since we called attention to a remarkable, solid, hite colouration which had taken place in cloudy patches upon, : rather within, the substance of a number of plates that had ad no other treatment but the placing together with plain water or queous solution of caustic soda between them. This whitening was ot alone observable upon the roughened (technically "smoothed") ırface of the glass, but was equally produced upon the polished ıce of the unsmoothed side, and we failed to discover any cause for it.

Recently, however, upon examining a piece of the glass which we ıad placed aside for further experiment, we observed that the vhite patches had become covered with a slight stain of a smoky ast of colour. This showed that not only was the glass alterable ›y the action of liquids, but that contact with the atmosphere was ılso able to bring about a change, unless, indeed, the darkening vere caused by internal change—an utterly improbable contingency.

Upon closely scrutinising the surface of a non-smoothed piece vith the eye the only change we could detect was an alteration of he faintest description, dimly suggestive of a restricted iridescence. We accordingly placed it under the microscope. Using a power of no greater strength than a quarter-inch, we found in a piece nipped from the corner—an average sample—that the surface appeared distinctly porous, whether naturally or by the action of the moisture or the caustic solution in the first instance we could not say. Ordinary flint glass, as is well known, is easily acted upon by caustic solutions, and it seems probable that opal glass may be so in a prominent degree—a fact with which it is very desirable to be acquainted. The dusky stain itself was easily removable with strong nitric acid; it was most probably a lead sulphide.

A short time ago we had brought to us a beautiful vignetted, painted photograph upon porcelain, and here and there were reddish-brown spots, which injured the appearance of the picture to such an extent that if not removed they would render it too great an eyesore to be allowed to remain upon the walls. The picture being painted in colours, great care had to be used to avoid injuring it. A rubbing pad of cloth with a cream of whiting and water quite failed to touch the marks, and chemical means were tried. A drop of strong nitric acid immediately lessened one of the spots, and contact prolonged for a few minutes entirely removed it, the remainder of the spots succumbing to the same treatment.

Another plate brought to us had, instead of spots, a large patch of reddish-brown hue over a considerable portion of its surface, and this also gave way to treatment with nitric acid.

It is highly probable that these spots or stains were the result of the lead on the glass being acted upon by the sulphur of the atmosphere; but we are then brought face to face with the question—"Why do some only and not all glasses become so marked?" We can only reply that sufficient evidence has not been brought before us to enable any conclusion to be arrived at beyond the possibility that different makers' glass vary in composition, though in the present instance we were informed that all the glass came from one maker. It may also be that some accidental treatment during the process of producing the photograph had to do with the evolution of the spots (which were certainly not mildew, such as we have previously had brought before us), but we did not learn any such details. At anyrate, judging from other pictures we have seen, we should be inclined to predict that the proportion of stained pictures to unstained must be very slight; but, at the same time, it is a sufficiently annoying consideration to think that any especially-valued picture may, so far as anything to the contrary is known, be the very one which will show the stains we describe.

We have to conclude by giving details of another most remarkable property which opal glass has shown. During the past twelve months we have had the opportunity of examining three opal pictures which have been executed for nine, seven, and three years respectively, and they were taken out of their frames for examination. The remarkable phenomenon presented itself of a distinct picturing, upon the surface of the opal itself, of the shape of the mount behind which the opal was placed, the part exposed to light being most beautifully white and free from spot or stain, while that portion behind the mount possessed the well-known grey or dusky colour which opal glass sometimes assumes with keeping. The part exposed to light was of so pure and unsullied a tint that we could not restrain the conviction that it was the effect of some special action of light upon the constituents of the glass; for in one of the pictures we speak of a thin film of dust lay evenly over all the surface—equally that uncovered and that covered by the mount—thus showing that it was not through any freer access of the dust to one portion of the plate than to another that caused the increased whiteness.

If a few more *data* in connection with this matter could be brought together much light might be thrown on a singular phenomenon, and possibly preventive measures might be devised (beyond that of varnishing the plate) for the spots and stains we have alluded to in the earlier portion of this article. That, however, can only be done by the co-operation of our readers, and any information sent to us in connection with the subject we shall most willingly publish in our columns.

In the course of a discussion, on Wednesday evening, at the Photographic Club, on the subject of ferrous oxalate development, Dr. E. Liesegang, of Dusseldorf, who was present, was asked his experience in connection with the rival developers for dry plates. Dr. Liesegang replied that on the continent—in Germany, France, and Italy—he found the employment of ferrous oxalate all but universal. "Pyrogallic acid," he said, "is unknown except with English plates." Most English manufacturers issue with their plates instructions for pyro. development, and this may, of course, be a prime cause in bringing about the distinction. At the same time there is, probably, something in the suggestion of a member that "perhaps English plates are the only ones that will stand pyro. development." Dr. Liesegang is of opinion that ferrous oxalate affords a latitude of about three or four times the exposure. The use of hypo. to correct under-exposure is, he states, very general on the continent, the operator dipping his finger in the fixing bath and then transferring it to the developer, in case the image comes up too slowly.

The retouching desk described in another column by Mr. W. Coles is a decided improvement on the one in general use, and it is a matter of surprise to us that it has not secured more general adoption since it was first described by Mr. W. E. Debenham. We have seen the desk as first figured by the latter gentleman in use in his own studio, and were struck with the comparative ease and freedom from constraint of the position of the retouchers as contrasted with what we have seen elsewhere. Now, perhaps, a move may be made in the direction of a much-needed reform, as we understand that Messrs. Marion and Co. have undertaken the construction of Mr. Coles's desk.

A new work illustrated by photography is announced, and from its singular character ought to be very interesting. It is by Mrs. Fred. Burnaby, the wife of the famous Colonel of that name—who now, as all the country regrets to know, lies dangerously ill of a serious malady—and is to contain an account of the remarkable ascents made by the lady, last winter, of Mont Blanc, the Aiguille du Midi, and Col. du Chardonnet. Those who know the district are sufficiently aware of the difficulty of summer ascents of these embarrassing mountains, and many a bold man would shrink from them. But here we have a lady in the middle of winter making the ascents, and, more, taking photographs as she goes along; for the "High Alps in Winter," as her book is to be called, will be illustrated by photographs taken by the author!

An important communication from the Director of the Harvard College Observatory has recently been published, and shows in a striking manner the great advance in the estimation of scientific observers that photography has made. The Director, in view of the present

position in astronomical work already attained, and the expectation of still increased future importance of that branch of science, has formed the nucleus of a collection of astronomical photographs, and appeals to astronomers and others to assist him by the gifts or loan of other typical photographs of the heavenly bodies and their spectra by European and American astronomers. He would prefer negatives, but, failing them, would like glass positives, taken, if possible, by direct printing. Negatives of little value to the engraver, through damage of one kind or other, would to the Director be as important as others more photographically perfect. The existing nucleus consists of four series of daguerreotypes and photographs of celestial objects taken at Harvard in 1850, 1857, 1869, and 1882 respectively, and we do not doubt that if the project be carried out it will result in a most useful addition to the powers of the astronomical photographer.

One point in the matter strikes us as very singular. It is that though photography, from its exact truthfulness, is so important a "witness of truth" in astronomical matters, it is seldom allowed to speak in its own tongue. It is rarely employed in multiplying or publishing results; these must, to suit the makers of pretty books, be translated by the engraver. A photograph is taken of some phenomenon. It may be good or it may be bad, perfectly sharp or entirely wanting in definition, fairly delineated or a mere nebulous haze, yet when committed to paper for the journal, the magazine, or the book, an elaborate and expensive steel or copper engraving is made, very much more finished, clean, and neat than the original photograph, yet a long way inferior to it as scientific evidence. We admit that, when the only resource of the publisher for producing large numbers of true photographic duplicates was the silver print with its known want of permanency, it was most desirable that it should be superseded for book illustration by the graver's transcripts; but now and for years past photographs in permanent pigments, or produced in the press in printers' ink like a lithograph, have been available, and ought by every conscientious author to be employed, to the entire exclusion of those namby-pamby, elaborate prettinesses which adorn the pages of contemporary scientific literature. It is something approaching a real scandal when the veriest wretched, little, badly-executed photograph—a print that its authors could not tell whether it was a cloud or a flour bag—is represented by a magnificent line engraving that must have cost pounds to produce. If photography be worthy of the high place it has gained as an unerring witness, in the name of truth let it speak in its own language!

What would not be given for photographs of the literary giants of the past is the reflection that is forced upon us when we read that the Wordsworth Society has presented its members with photographs of fine likenesses of the poet, but which, says a literary contemporary, do not realise its conception of Wordsworth, who was much finer-looking than any of these portraits would indicate. Another portrait, by an American artist, is said to have been considered a more truthful likeness by Mrs. Wordsworth, and a *negative* of it has been presented to the Society. We presume that, as he was such a great man, his photograph would have been handed down to posterity only through the medium of the etcher or engraver in the shape of a beautifully-executed portrait, more or less like the photograph, according to the idiosyncracies of the engraver.

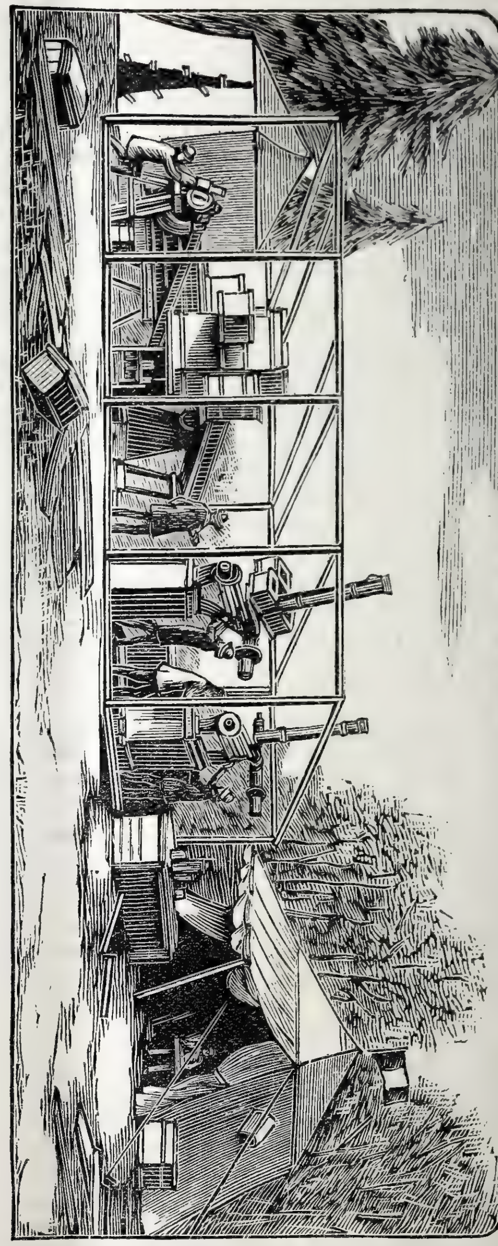
A new danger in astronomical work has recently been brought to light, and as similar effects may be produced by astronomical photographs it may be well to make a note of it here. It is told as an "absolutely true story" by a well-known writer in a contemporary. A gentleman who possessed a large equatorial had recently a number of labourers employed at his house, and, thinking to give them a treat, offered to let them have a peep through his telescope. The first man, having gazed his fill, was asked what he thought of the appearance of the moon through the instrument. "Well, sir," he replied, "it be a gashly sight! Testor, he said so when he see it, and he wur quite right; for you know, sir, he *aint never been to say well since.*" This is superstition with a vengeance, and our astronome photographers will need to be careful where or how they exhib their lunar photographs.

THE SOLAR ECLIPSE OF 6TH MAY.

Our readers have been kept fully acquainted with the various pr parations for the solar eclipse now so near at hand, and in probability a portion of the expeditionary parties, whose exodus have chronicled, have now arrived at their destination—a remo spot in the Marquesas Archipelago, called Sable Island, ne Caroline Island. It was considered to be the only convenient pla where a view of the total eclipse could be had from *terra firma.*

Our Australian brethren will not be able to witness a perfe eclipse; but if they rise before the sun they will see an almo perfect obscuration of that luminary's disc just about sunrise. Sydney the greatest darkening of the orb occurs about a quarter an hour before sunrise; while at Queensland the sun will just be the horizon when the obscuration is greatest.

The French arrangements have been very complete, and, like wise general, M. Janssen held a complete review of all his forc before they started. Previous to leaving Paris every instrume and the tents were set up to see that all was in working ord The accompanying illustration (from *La Nature*) gives an excelle



Apparatus fo French Eclipse Expedition.

idea of the mode in which all will be arranged on Sable Island with the exception of a large awning, which will be placed in the framework shown, to protect the apparatus. The little tent on the left is for photographic work. The various instruments the French party will make use of are as follow:—1. A telescope of short

›cus for spectroscopic work. 2. An equatorial, on which will be rranged a photographic apparatus containing five cameras, which ct together. The plates are about half the old one-ninth size, and rill require an exposure of five minutes. This apparatus is intended or intra-Mercurial planets. 3. A telescope of six inches, with a ens of three inches, with photographic apparatus acting by means f three cameras at once. This apparatus is intended for the solar orona. 4. A fourth telescope, specially reserved for M. Trouvelot, or drawings of the corona and search for intra-Mercurial planets.

PHOTOGRAPHY APPLIED TO METEOROLOGY AT KEW OBSERVATORY.

No. I.

Some twelve or fifteen years have passed away since a brief description of mine was published in these pages about the use of photography at the Meteorological Observatory at Kew, to make continuous automatic records by day and night of the indications given by the instruments. Since then changes have taken place, new instruments have been brought into use, and altogether the work done is so valuable that a detailed description of it may be of interest.

Dr. Balfour Stewart, who is now Professor of Physics at Owen's College, Manchester, had more than anyone else to do with originating the photographic system employed at Kew Observatory, of which he was formerly the superintendent. Canson's thin photographic paper is used in the self-recording instruments; the sheets measure $4\frac{5}{8} \times 12\frac{11}{12}$ inches. These sheets are waxed, and Dr. Stewart tried numerous experiments to ascertain the relative value of different waxes for the purpose. He tried carnauba wax, obtained from the Brazilian palm, *Copernicia cerifera*. This is one of the cheapest of the vegetable waxes, resinous and brittle, and in good specimens is of a light, yellowish-fawn colour. Its market value is from 35s. to 85s. per cwt. He also tried the Chinese white wax, Pe-la, the joint product of an insect, the *Coccus Pe-la*, and a Chinese tree. This wax is not much used in England, and is scarce here. Mr. Leopold Field, of Lambeth, exhibited some specimens lately, and called attention to their properties at a meeting of the Society of Arts. Dr. Stewart also tried myrica wax, obtained chiefly from the berries of the *Myrica cerifera* and, to some extent, from other trees of the same species. He has recorded that their action was found to be purely mechanical. Stearine and most of the oils were too greasy; the fatty acids did not make the paper greasy, but injured the transparency. He also tried paraffine. The result of all Dr. Stewart's experiments was that he found bees'-wax to be the only wax practically available; but this, in the thin, round tablets four inches in diameter, as sold in the market, is commonly adulterated to the extent of fifty per cent. The yellow bees'-wax of the shops is also commonly extensively adulterated. Some American samples have been known to contain no bees'-wax at all, except a little rubbed over the exterior of the cake, the bulk being made of resin and solid paraffine melted together. The best way to obtain pure bees'-wax is to apply for a pure sample to one of the large bleachers.

At the present time the paper used at Kew is purchased ready waxed and pressed; but in former times it was waxed at the Observatory in the following way, as described by Dr. Balfour Stewart:—A pencil mark is made on the smoothest side of the sheet of paper, which is the side selected for sensitising. It is then waxed. The wax is never allowed to reach a higher temperature than 212° Fahr. The apparatus used for the purpose is a tin vessel fifteen inches square and four inches deep, and the tray, one inch deep, which holds the wax, fits into the larger one, which is half filled with water kept at a boiling temperature by means of a gauze gas-burner, giving a heat flame free from smoke and dust. When the wax is perfectly liquid the sheets of paper are taken up singly by one end and lowered on to the fluid; they absorb the wax almost instantly, and are then lifted somewhat quickly by one corner, and the wax allowed to drain off till it congeals on the surface. It then contains more wax than necessary, so two or three unwaxed sheets are then placed on each side of it, and the whole ironed between sheets of white wove blotting-paper, and ironed with an ordinary box-iron. Some of the new sheets, if not all, are thus fully waxed, and the imperfectly-waxed are made the outer sheets of the new set. Each sheet is finally separately ironed between blotting-paper to absorb any glistening patches of wax. It is of the greatest consequence that the heat of the iron should not exceed that of boiling water; so before using the iron it is always dipped into water until the moment the hissing entirely ceases. A properly-waxed sheet of paper should present a perfectly-uniform appearance.

The paper is now ready for iodising. Dr. Balfour Stewart's experiments convinced him that the iodising solution best for a paper to be acted on by solar rays is not the best for a paper to be acted on by lamplight, and it is with the latter we have now to deal. He also tried the effects of adding various kinds of organic matter to the bath, but does not recommend the use of them. They do little or no good, and interfere with the keeping qualities of the prepared paper. The iodising solution in use at Kew consists of—

Iodide of potassium........................	582·5 grains.
Bromide of potassium......................	417·5 „
Distilled water..............................	40 ounces.

The salts are dissolved in the water, and the solution filtered.

A sheet of paper is floated on this bath for ten minutes, care being taken to avoid air-bubbles. It is then turned over, and by a slight agitation of the dish made to sink in the solution, after which the same operation is repeated with a second sheet, and so on with others. The sheets were, in Dr. Stewart's time, allowed to soak in the bath for three hours, with occasional turning about and moving over to let the liquid penetrate between them. At present they are often left in the bath all night. They are then hung up in the air to dry by means of pins bent into the shape of the letter S, by which they are suspended by one corner to a string stretched across the room. In a few minutes a piece of blotting-paper about an inch square is stuck to the bottom corner of each sheet to absorb the drop. If the liquid collect in drops all over the surface while the sheets are drying it is a sign that they have been removed from the iodising bath too soon. The sheets often assume a dirty pink appearance—perhaps owing to the presence of ozone in the air. This pinkiness is not a bad sign, providing its uniformity indicates that the sheet has been evenly prepared. When dry the sheets are stored in a box for future use. They will keep well for ten months, and how much longer is not known at Kew.

At the present time two or three grains of free iodine are added to the iodising bath. In Dr. Balfour Stewart's time the sensitising bath consisted of—

Nitrate of silver..............................	200 grains.
Glacial acetic acid	2 drachms.
Distilled water	20 ounces.

At present it is made up as follows:—

Nitrate of silver..............................	900 grains.
Glacial acetic acid	1 drachm.
Distilled water	30 ounces.

The bath is filtered when the solution of the nitrate of silver is complete. When used it is poured into a glass or porcelain dish, alongside which are two similar dishes containing distilled water. The sheet is then floated from five to ten minutes on the silver solution, till it assumes a uniform straw colour—or, rather, white, for it looks white by yellow light—when it is lifted and allowed to drain for half-a-minute, then floated on the water in the second dish; some ten minutes later it is floated on the water in the third dish. In another ten minutes it is rubbed perfectly dry between folds of the pure blotting-paper (not Swedish) used in quantitative chemical operations. It is then placed aside in a portfolio until required for use.

After the floating of every fourth sheet the dishes of water are emptied and replenished with fresh distilled water. The silver in the waste liquid is used in the subsequent developing operations. The first of the two nitrate of silver baths described will sensitise about fifty of the sheets already specified, or 3,000 square inches of paper.

The sheets must be kept in perfect darkness, away from gases, fumes, and vapours. The developer originally used was made by first dissolving two ounces of crystallised gallic acid in six ounces of good alcohol, 60° overproof. Hot water is applied to the outside of the flask to aid in effecting the solution of the crystals. The developing solution for 180 square inches of paper was made by mixing ten ounces of the washing liquid already mentioned with four drachms of the exhausted sensitising bath solution. The mixture was filtered, and half-a-drachm of the above alcoholic solution of gallic acid added. The exposed sheets of paper are then floated on the developing solution or completely immersed. When the paper has been exposed to moderate light the image begins to appear in five minutes, and is fully developed in a few hours. If the light have been feeble a day's development or more may be necessary. The sheets should not be lifted for examination more frequently than can be helped, because of the risk of stains. A more intense black than required should be produced, because the colour is lowered in the fixing operations.

Under the present system the developer is prepared as follows :—

Solution A.

Gallic acid	1½ ounce.
Absolute alcohol	6 ounces.
Glacial acetic acid	½ drachm.

Solution B.

Nitrate of silver	1½ drachm.
Solution A.	2¼ drachms.
Glacial acetic acid	¾ drachm.
Distilled water	59¾ drachms.

After being developed the sheets are well washed in common water, and fixed by being left for four hours in a solution of one pound of hyposulphite of soda in one quart of water. When dry the sheets have a granular appearance, which is removed by warming them before a fire or placing them between blotting-paper and pressing them with a hot iron. W. H. Harrison.

ON RETOUCHING DESKS.

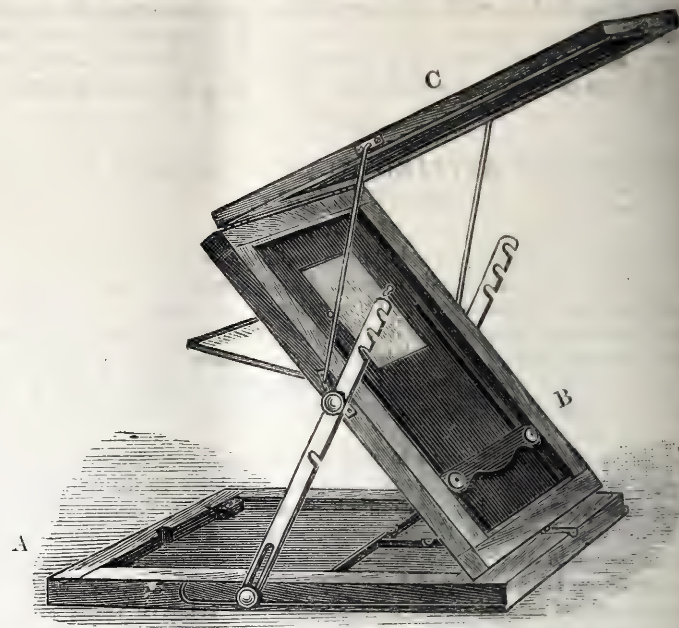
While the subject of the eyesight of photographers is under discussion, it may perhaps be not inopportune to allude to another source of injury to the health of those engaged in photography—the retouching desk. In the Almanac, some four or five years ago, Mr. W. E. Debenham drew attention to the fact that the ordinary desk frequently caused the person using it to become round-shouldered and narrow-chested, while if the individual were enabled to work in a more upright position the deformity disappeared and the work tended to make the figure more upright than usual.

Where retouching is carried on all day long and a sufficient space can be allotted, a large, permanently-fixed desk can, of course, be used. It is different, however, in many establishments where the retoucher has other duties to perform. When an operator has to retouch his negatives during the time he is not occupied with sitters, the studio is often the most convenient place to work in, as there is plenty of light, and he is on the spot when another sitter arrives. In such a case it is necessary that he should be able quickly to put his retouching apparatus on one side, particularly if the studio be small. Besides this, many persons work at home, where a large, fixed desk would be very much in the way when not in use.

A desk to be suitable for all purposes should possess the following characteristics. It should—1. Be light and portable. 2. Fold up when not in use. 3. Not take up too much room when in use. 4. Allow of being fixed at any angle (upright or slanting). 5. When so fixed, be firm and rigid. 6. Be quickly put up or down. 7. Be equally serviceable for day or artificial light. 8. Take any sized plate not larger than the desk itself. 9. Allow any part of the negative to be brought into view on the ground glass at the proper height for retouching, and permit of the plate being moved freely about. 10. Not be too expensive.

Wanting such an article myself some time ago I looked at the various kinds now in the market, but could not find one which fulfilled all the requirements. Some were good in some particulars but bad in others. The ordinary folding ones all slope too much, so as to necessitate stooping over one's work; and, as they are simply propped up by hinged or loose supports, they cannot be set more upright or a slight touch would overbalance them. One pattern has a large piece of ground glass over the whole of the part which supports the negative and a large mirror on the bottom portion in front, some distance below the negative. The glass and mirror if of good quality are expensive to start with, and also to replace if broken; and the mirror being fixed at the bottom reflects very little light to the top of the negative. Another kind has a set of carriers for each sized plate, but no arrangement for holding ground glass, opal, or blue glass, and the head on each negative comes at a different height. Others I have seen look more like childrens' writing cases than anything else. Not being able to find what I wanted I set about making one myself, which I have had in use for some time, and find it so convenient that it may be worth while to bring it before the notice of the readers of the Journal.

The desk is made of three parts—A, baseboard; B, slanting part on which the negative is placed; C, the lid or light screen. A is about eighteen inches long by fifteen inches wide, and round the upper side at the edge strips of wood are fastened so as to form a sort of tray, which is divided for negatives, pencils, colour-box, &c. B, the part which supports the negative, is made an inch shorter than the baseboard, and hinged on the top of the tray, one inch from the front, so as to render it impossible for it to be tilted over. Strips of thinner wood are fastened round the upper side of this at the margins. One of the chief points is that B is clamped in its position, not simply propped up, so that it can be set at any angle, either nearly upright or leaning more forwards, at the wish of the user. In the sketch it is drawn more slanting than I generally use



it for convenience of illustration. Two brass bars are held in place by thumbscrews, and the bars, by means of a slot at the lower end, slide back flush with the desk when not wanted, while a few seconds only are required to fix it up or let it down. In either case it can be lifted about without risk of collapsing.

To hold the negative, a cross bar (as was recommended by Mr. Debenham) slides up and down on B, the bar being kept at the height wanted by two thumbscrews working in slots, the bar having a groove on its upper edge to prevent the negative slipping off. Another feature of the desk is that it will take large plates as well as small ones. The strip of wood which crosses at the top is cut away on its under surface for a portion of its length, so that when a large negative is required to be retouched it can be pushed gradually up under this cross-piece, the top of the plate projecting out at the top of the desk, so as to enable the bottom end to be brought into view on the ground glass. By this means a large negative can be retouched with the same ease and comfort as a small one without using a large desk.

For illumination a hole about five inches square is cut at a suitable height, in which can be supported ground glass or opal, and blue glass when using artificial light. On the under side of B a wooden bracket is hinged so that it can be set at any angle. On this the mirror or opal (or plaster of Paris slab, as used by some) can be placed. The hinges are made sliding and an extra pair is fixed on B, so that the bracket can be adjusted at varying heights according as the desk is used upright or slanting.

The lid or third piece, C, is made as light as possible, as its main use is to keep off the light. When working in the evening I use a duplex lamp with a reflector at the back, working with direct light through ground and blue glass. If there be no other light in the room I find it unnecessary to cover in the sides; but when it is desired to do so a piece of black twill is simply thrown over the lid, C, so as to hang down on each side. A couple of drawing-pins can be employed, if preferred to keep it in its place, or two strips can be attached by glue or tacks to the under side of C so as to be always in position.

In order to make the desk as generally useful as possible, sliding hinges are used for the lid, so that it can be taken off and the desk used as an easel for tinting photographs on or working up small carbon enlargements. The lid, when in position, is kept up by two rods bent at each end, and fitting into sockets in B and C, so that there is no fear of damaging the negative by the lid falling down from a blow or jerk of the table. William Coles.

ON MEN AND THINGS.

All those who have been familiar with alkaline development a few years previous to the general adoption of gelatine plates will recollect the constant experiments which were made and published with

he view of modifying and improving the action of the developer. Then, as now, pyrogallol and an alkali were absolutely essential, and soluble bromide was usually employed; but our experimenters did not, in the language of patent specifications, restrict themselves to these or any other substances. Besides varying the proportions of the chief ingredients and otherwise "ringing the changes" on the methods of their application, use was made of all sorts of substances, organic and inorganic, and for special purposes with good results.

* * *

Since the introduction of gelatine plates, however, very little trouble seems to be taken with the developer outside certain grooves. Each maker of plates has his own pet formula—though it is amusing to notice that some makers quietly "annex" the well-known formulæ of other makers without acknowledgment—which most of the users of his plates follow strictly. Independent experimenters are "few and far between," and these confine themselves to simple variations in the "exciting" and restraining agents and to the addition of substances such as sulphite of soda, citric acid, and alkaline citrates for the purpose either of preserving the solution, keeping clear the shadows of the negative, or checking over-exposure. Absolutely nothing is done in the way of attempting to alter the character of the development or of the developed image. The latter effect is gained by the after application of various clearing solutions, the process frequently involving redevelopment.

* * *

Now, why do not some of our experimentalists of the present day—amateurs especially, for they are the ones to work out such problems—adopt the suggestion of the Editors and follow out some such line of research as that chosen by Mr. William Brooks some years ago? Who knows but that a restrainer as powerful as soluble bromide and without its retarding action might be discovered? or even that an actual accelerator might be unearthed?

* * *

Another "plea for the stereoscope!" How many attempts have been made during the last ten years to revive the departed interest in this charming instrument? And with what avail? Alas! at the present day it seems to be, if possible, in greater contempt—if neglect mean contempt—than it was five or ten years since. It is of no use asking the reason; that matter has been discussed over and over again, the favourite theory being that the decadence of the stereoscope was due to the imperfect instruments and trashy pictures introduced into the market. This may be true to a slight extent, but it does not account for the fact that really high-class instruments and slides are in this country far less saleable than formerly. I saw a few months ago a first-class instrument bearing a well-known name, which had been purchased in a "second-hand" shop for five shillings, though probably its maker's price would have been nearly as many guineas.

* * *

Another argument—that the stereoscope is an expensive luxury if variety of interest is to be kept up in the stock of slides. This is very true, and probably has more to do with the fall of the instrument than anything else. The purchase of an instrument and a dozen slides is not a great matter; but the family circle as well as friends soon get tired "making their eyes ache over those old things." But if variety is to be kept up and all the newest subjects added to the stock, then Paterfamilias will think it better to sell the stereoscope and indulge in a carriage and pair instead.

* * *

Still, however powerfully this argument may bear upon the non-photographic fraternity, it entirely loses its point when applied to the amateur photographer, who is surely in a position to keep up a constant supply of fresh subjects. Not only is the pleasure of taking the picture equally as great as in the case of a single (that is, non-stereoscopic) picture, but the subsequent pleasure must be infinitely enhanced in viewing the greater reality and nearer resemblance to nature which the stereoscopic picture gives. I read or heard somewhere recently of the projected formation of a society for the special purpose of stereoscopic photography. I wish them all success.

* * *

Before leaving the subject of "stereoscopy," there are one or two points which will render the production of stereo. negatives rather more difficult than of yore. All will remember how frequently slides were met with the two halves of which varied very considerably. Those who have practised stereoscopic photography well know the reason, and will comprehend that, now exposures are counted by fractions of a second instead of by minutes, the difficulty of giving exactly the same exposure to each half of the plate must be greatly increased. Then, again, for the same reason, the accurate adjustment of the twin lenses will have to be looked to, and, last but not least, plate-makers must be persuaded to put an equal quantity of emulsion on each half of the plate.

* * *

The subject of old and new hypo. baths for fixing gelatine negatives has received lately a good deal of ventilation. The question which gave rise to the discussion as to whether a bath of hypo. can be used to fix an unlimited number of negatives and does not lose its power when saturated with bromide of silver is too ridiculous to notice, and I am surprised that such a question elicited a reply. It is almost as ridiculous on the part of another writer on the subject to say that because he has used the same bath for six or eight months, &c., &c., an old bath is superior to a new one. The truth appears to be that either an old or a new bath may be used; but if the former, as the Editors point out, it is necessary to be considerably more careful and circumspect. The backer of the old bath, with six or eight months' experience, is perhaps not aware that his experience is not extensive enough to have given him a chance of judging fairly. Perhaps he may yet change his mind.

* * *

By the way, what would be the result of taking a plate out of an eight-months'-old fixing bath—one that had been used and not merely kept bottled up—and immediately dipping it into alum or ferric oxalate or "brilliant," as the makers-up of the last preparation direct? This is not a "conundrum," but merely an instance of *one* of the dangers of an old bath.

* * *

That was an ingenious and a simple filter of Mr. C. Beckett Lloyd's, and he was careful to point out that its beauty lay not in its novelty (except to photographers) but in the absence of any necessity for special apparatus, all the parts being found in any dry-plate maker's laboratory, whether amateur or professional. It was a brilliant effort of criticism on the part of the reporter, at a meeting at which it was exhibited, to describe it as "probably of some use in the absence of an air-pump." As air-pumps are such "common objects" in the dark room, Mr. Lloyd will do well to take note!

ARGUS.

HARDWICH ON THE LIME LIGHT.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

In using a biunial or a pair of lanterns for the production of dissolving views a common defect is that the two pictures are not of equal intensity. Supposing the focal length of the lenses and condensers to be the same, the fault is usually to be found in the jets.

In the case of the oxyhydrogen or mixed gases the *nipples* of the jets should be bored with great care, or there will be a small but appreciable difference in the pictures. The last eighth or tenth of an inch of the bore should be very smooth, and uniform in size throughout. If it be at all conical, tapering and becoming smaller towards the orifice, or, worse still, as I have seen in one instance, tapering away from the orifice, the light will not be so good. The orifice itself, also, should have a sharp edge *inwardly* to direct the stream of gas, and should not be rounded off or trumpet-shaped. When I find this to be the case I rub down the point of the nipple on a dry hone, such as boys use for sharpening knives, until a clean edge is obtained, and then gauge the orifices with a needle to satisfy myself that they are of the same size.

In the blow-through process (the term "blow-through" is not euphonious, but I know of no other so accurate or expressive) an inequality of illumination is often due to a contraction at some part of the hydrogen tube of one of the jets. It should be borne in mind that the pressure of coal gas drawn from the main is comparatively low, and hence the passage should be kept well open. By drawing air through the two jets with the mouth you will perhaps observe that it passes less freely through the one which gives the feeble light; and when the bye-pass hydrogen is turned down low that lantern will go quite out in dissolving.

On trying a new biunial lantern I once noticed that, although the two blow-through jets were to all appearance exactly alike, the one gave a brighter disc than the other. They were "interchangeable" jets, and on examining them carefully I discovered a leak in the one which gave the stronger light. The plug separating the oxygen from the hydrogen was not absolutely tight, but allowed a little of the former gas to pass into the latter. It occurred to me that if I were to rime out a small channel in the plug of the other jet until I found by suction that the two corresponded I should remedy the defect; and such proved to be the case, for the pictures became at once of equal intensity and unusual brightness. I thought at first that I had stumbled upon an improvement; but further experience showed that great care was needed in making this channel of communication between the oxygen and hydrogen of the right size, and that if it were at all too large the flame tended to pass

backward and could not be kept burning at the mouth of the jet. A few candles more or less in illuminating power are of small consequence compared with simplicity and certainty of manufacture, and hence I content myself at present with stating the fact that if a minute quantity of the oxygen should leak into the coal gas at a point lower down than the outlet, it will cause that jet to give a brighter disc than the other.

A great deal of useful information can be gained by looking in at the front glass of each lens whilst the lanterns are burning and comparing the two. You ought to see a cone of rays coming out large enough to cover the whole surface, and if there be only a bright pencil of light in the centre of the lens, you are perhaps working too near to the top edge of the lime; or, in the case of an interchangeable jet, you have not carried the point round far enough to be at right angles, and hence the flame is striking the lime on one side. These are comparatively small matters, but they affect the result; and the beauty of dissolving views is much lessened by any inequality in the illumination.

The blow-through jet is often spoken of disparagingly as giving a poor light compared with the oxyhydrogen; but few are aware how much may be effected by studying the proper conditions. The two gases should be made to mix as perfectly as possible, and the area of ignition should be *large* to compensate for its lower intensity. If these points are attended to you will be able to lecture to an audience of 400 people, and the pictures will be distinctly seen at the end of the room.

The construction of a good blow-through jet requires as much care as that of a jet for the mixed gases. In my own practice I have quite discarded the common form, and have adopted the one first introduced, I believe, by Mr. Young, of Manchester, namely, a circular aperture of one-eighth of an inch for the hydrogen, and a stream of oxygen blowing through it from behind. Mr. Young's aperture for the oxygen was not more than one-thirtieth of an inch in diameter; but his object was to economise that gas, which is not so necessary now that chlorate of potash can be bought at a low rate. The orifice for the oxygen may, therefore, be enlarged with advantage to one-twenty-fifth or one-twentieth of an inch.

Mr. E. G. Wood, of Cheapside, London, has patented a blow-through jet which seems to me to be a good commercial form. It has an aperture of one-eighth of an inch for the hydrogen, and three-sixteenths or one-quarter of an inch behind it, an aperture of one-twentieth of an inch for the oxygen. The effect of this "dome" arrangement is that the oxygen gathers up nearly all the hydrogen, and a small blue flame is seen burning at the outlet very much like the flame of the oxyhydrogen or mixed gases. Mr. Wood includes the "dome" in his specification, but I doubt whether he could establish his claim to priority, and perhaps it would not be necessary for him to attempt to do so; for, if his jets were all as well made as the one he sent to me, the demand for them would probably be as great as he could supply. I notice, inside the dome, an arrangement of three very small screws to keep the oxygen tip in position, so that it may blow exactly through the centre of the hydrogen hole. This is very important, as the jet would certainly give less light if the stream of oxygen were not in the middle. The mixture of the gases is not absolutely perfect either in this or in any other blow-through jet which I have examined. The oxygen is in excess in the inner part of the flame and the hydrogen on the outside, so that when you look at the lime spot you see a dark nucleus. This nucleus disappears on removing the cylinder to a greater distance—say to three-sixteenths or a-quarter of an inch from the nozzle of the jet.

On one point I am at issue with Mr. Wood. He has slanted the lime cylinder in his blow-through jet in order to preserve an angle of 45° for the incidence of the flame. This, I think, is unnecessary, as a much smaller angle than 45° will answer for the blow-through process. One of the most powerful jets in my possession has an angle of 20°, and the only difference you need make is to approximate the lime a little more closely to the nozzle, in consequence of the smallness of the angle. Mr. W. H. Oakley has constructed a variety of jets for me after different models, and I am satisfied by repeated trials that an upright cylinder of lime answers well.

Complaints have been made of a snapping noise like the explosion of a small percussion cap in using blow-through jets in a double lantern. The explanation is that there exists for the moment an explosive mixture in the small chamber behind the hydrogen orifice. I presume the defect might be cured by altering the gas passages of the dissolving tap; but, short of that, a partial remedy will be to dissolve slowly, to keep the bye-pass hydrogen at a maximum, and not to weight the oxygen bag too heavily. A half-hundred weight ought to be sufficient, even for a large bag, and it is not often necessary to increase the pressure as the lecture proceeds, since the pipes become heated, and this compensates in a measure for the comparative emptiness of the bag.

I now proceed to make a few remarks upon the ethoxo lime light of Mr. Broughton, which is likely to come into more general use. No fluid, however volatile, will, I think, entirely supersede coal gas, unless it can be shown to give a better light; but when gas cannot be obtained ether is the best substitute for it which I have tried. Not only is no heat required to volatilise it, but there is an actual depression of temperature, and the condensed moisture of the room can be seen streaming down the sides of the tank as the vapour rises.

The following mode of working the process is not intended to give the maximum light of which it is capable, but will be found simple for rooms holding 200 persons:—Supposing the lenses to have a focal length of six inches, place the dissolving lantern at a distance of eighteen and a-half feet from the screen; this will give a disc of twelve feet diameter with four-inch condensers. Fill an eight-foot bag with oxygen, and load it with one and a-half hundredweight if you use the tube containing pumice, or with one hundredweight if without it. I recommend all who make the oxygen in the lecture room with Chadwick's generator to use the pumice safety tube, since the pressure is sometimes greater than they are aware of. In my own practice, however, with elastic bags and moderate pressure I have discarded the pumice, as I find it impedes the flow of the oxygen and necessitates heavier weights on the bag. Neither do I think that there ought to be any danger of explosion, provided the tank be kept full of ether. I am bound to say, however, that Mr. Broughton himself does not agree with me in this opinion. Taking into account the haste and confusion of a lecture room, and the possibility of the weights slipping off, he advises the constant use of the safety tube. This advice is no doubt prudent; and in any case the oxygen bag should be placed under the charge of a careful attendant, whose duty it should be to see that it does not touch the wall, and that it is not interfered with during the lecture. In addition to this precaution a small back-pressure valve may be placed on the nozzle of the bag, and I have found none better than Chadwick's valve, which interferes very little with the onward flow of the gas, and has only one fault, namely, that the oiled silk is apt occasionally to stick to the brass. A sharp suck or blow through with the breath will, however, usually suffice to release it, and this point should be attended to before the lecture begins.

The true state of the case as regards the danger of using ether vapour appears to be this:—Ether vapour, mixed with air in any proportion, burns quietly when a light is applied. Neither does it form an explosive mixture with oxygen when the oxygen is saturated with the vapour. But if the ether vapour be present in only small quantity—about one volume to ten of oxygen—it explodes violently on contact with flame. Now, the ether tank is so made that the oxygen gas passes backwards and forwards through the liquid much in the same way that coal gas does in the lime purifying chamber; hence with a full tank it can hardly fail to saturate itself by the time it reaches the surface. If, however, the tank were used down nearly dry, it is obvious that a point would by-and-by be reached when the oxygen would take up too little of the ether to give security. And the same thing might happen if a weak ether of sp. gr. ·750 were used instead of ether of ·720, because in that case the tank would eventually contain little else than spirits of wine.

In order to be sure of the amount of ether contained in the tank I fill it by weight and not by measure. The tank now before you weighs two pounds and six ounces, and if ether be poured into it until it weighs three pounds you have ten ounces by weight and about thirteen by measure. After the lecture is over you weigh it again, and find, perhaps, that it has lost about four and a-half ounces by weight, or six ounces nearly by measure. You leave what remains of the ether in the tank with the taps closed, and fill up again to three pounds by weight before the next lecture.

The vapour of ether has a slightly-solvent action on india-rubber, so that the tubing used to convey it must be new and strong. I have had fracture of the india-rubber on two occasions from using old and brittle tubing. A short tube is to be preferred to a longer one, and as the tanks lately made by Mr. Broughton have a safety chamber holding fourteen fluid ounces on the side nearest to the bag, the tank may be placed on the table close to the lantern without any fear of suction backwards.

The jets for the ethexo light may be either of the blow-through or the mixed-gases kind; but the latter are more economical, and perhaps, all things considered, safer in this process. The size of the orifice of the nipple should be about one-thirtieth or one-twenty-fifth of an inch, the ordinary size of one-twentieth being rather too large for dissolving when the vapour of ether is used instead of gas, and at a lower pressure. Turn on the ether tap gradually, and work the oxygen up to it until the former is full on, and the latter partially so. The flame should be slightly tinged with red, and a dark cone of about one-eighth of an inch long should be seen in the centre. The hottest part is immediately beyond this dark cone, and if you bring the lime within it there will be a black nucleus in the centre of the spot and a loss of light. When once the proportions of the two gases have been properly adjusted the flame will need very little further attention during the lecture; but towards the close the amount of ether vapour will decrease somewhat, and the oxygen tap of the jet will require altering accordingly.

I conclude my paper with a word on the subject of chlorate of potash as used for the manufacture of oxygen gas. Some two or three years since Mr. F. York sent to me a sample of the crude crystals which are sold at a low price for the preparation of oxygen, and I found them to answer sufficiently well for lantern purposes. Further experience, however, has shown me that this first crystallisation is not of reliable quality, and that it often yields oxygen so highly contaminated with chlorine as hardly to admit of purification. It requires also a stronger heat and more oxide of manganese to decompose it.

I do not observe any appreciable difference in the light when oxygen from the crude crystals is used; but, taking into account the destruction of the retorts and the corrosion of the taps, to say nothing of the injury caused to the bag, I am not sure that there is much economy in employing it, although the recrystallised is exactly double the price.

T. F. Hardwich.

WOODBURY RELIEFS.

That the subject of making Woodbury reliefs is of interest to at least a portion of your readers the leading article in the issue for the 6th inst. is sufficient evidence, and, as far as I am aware, the process has never yet been published in its entirety. The following method of working (which in my hands is very successful) may be acceptable to those anxious to succeed in this branch of photography. The tissue compound is made of—

Gelatine	2 ounces.
Sugar	½ ounce.
Water	5 ounces.

When the gelatine is dissolved add thirty grains of bichromate of potash and about half-an-inch of indigo squeezed out of a Rowney's water-colour tube. The mixture is then churned with a Kent's egg-beater, and filtered through three or four thicknesses of fine muslin.

While the tissue compound as above is being made three or four 12 × 10 patent plates are cleaned, then polished with French chalk, coated with plain collodion, and allowed to dry. The tissue compound being filtered and the patent plates collodionised and dry, one of the plates is slightly warmed and placed upon a levelling-stand, and sufficient of the tissue compound poured upon it to cover it thoroughly and to the thickness of (say) one-sixteenth of an inch. Allow to remain upon the levelling-stand until the film has set, when it must be removed to the drying-chamber. For experimental purposes this drying-chamber may be extemporised from an old packing case not too deep, at the bottom of which is placed a zinc tray, two inches deep, half full of dry chloride of calcium. The plate upon which the tissue compound is spread is supported face down over the chloride of calcium by wires stretched across the top of the zinc tray, the wires being so placed as to touch only the smallest possible portion of the film.

When the film is quite dry it is stripped from the glass and placed (collodionised side in contact) upon the negative (duly provided with a safe-edge) in a printing-frame and exposed in the sun. Of course the exposure is a matter of great moment, and can only be determined by experiment, the time being measured by means of the actinometer. For a developing support a grained zinc plate is coated with thin india-rubber solution and allowed to dry.

When the piece of tissue has been exposed sufficiently long it is removed from the frame, placed in cold water, and squeegeed (collodionised side in contact) down upon the india-rubber film upon the grained zinc plate, the tissue and plate being protected with a piece of india-rubber cloth or a piece of single transfer paper, over which the squeegee is applied. After this operation has been performed a short interval is allowed, after which the zinc plate is placed in warm water in a grooved tank, where it must remain for from three to twelve hours to allow of all the soluble tissue compound being dissolved away, the water in the meantime being kept at an equable temperature and free from dirt. When sufficiently developed the plate is rinsed in cold water and placed away to dry, when the relief may be easily detached from the zinc plate.

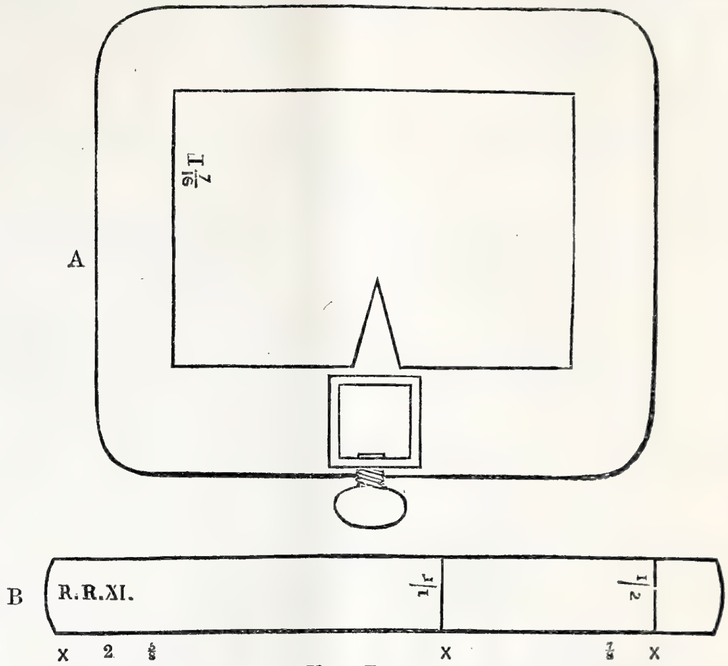
All the operations are extremely simple, but require great care, the principal cause of failure being *dust and dirt*. W. T. Wilkinson.

VIEW-METER AND CAMERA DIRECTOR.

[A communication to the Edinburgh Photographic Society.]

I have great reluctance in coming before such a meeting as this with anything of my own. The small things which I shall have the pleasure of showing you tonight were made to supply a want I very much felt in taking instantaneous views at sea, and also to save the trouble of setting up the camera until the proper position for it was decided upon. Your indefatigable Secretary, however, begged me to bring them before you, and as one cannot well refuse any request he may make I must only ask your indulgence in the matter.

As an amateur, I find the greatest drawback to the practice of photography is the crowd that collects the moment a camera appears, and to avoid this as much as possible I use the view-meter, which you see is marked for the different sizes of plates and lenses I use. The size of the meter is one of taste or fancy. Mine was regulated by the material I had at hand, and I wished it small that it might go into my waistcoat pocket. You all, I have no doubt, know how to regulate the size, or should any one not know, perhaps I may say the simplest way is to draw a line, say A B, equal in length to the size of plate. Take the centre of this, and draw another perpendicular to it, and equal in length to the focus of the lens to a point, say C join C A C B. Now you can select any size on this for your meter; the length of focus bar will also be measured from the same point. For the height of meter measure off from centre of A B the half width of plate, and join these points with C as before. I have had no experience with doublet or wide-angle lenses, but for rapid rectilinear or triplets now get pretty correct results. By adjusting the opening to the mark corresponding to the size of the plate and lens intended to be used, and holding the meter so that the end of the bar just touches the cheek, you see at once the exact amount of subject that will come on the plate. There are,

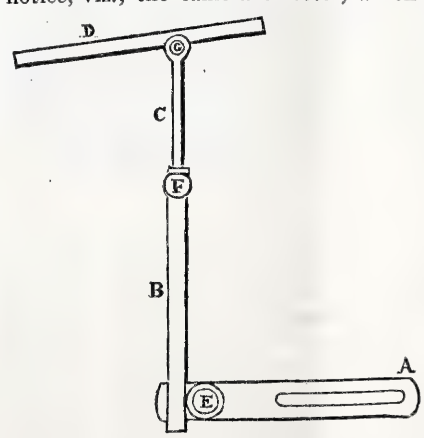


View Finder.

A piece of sheet brass with a socket and screw to hold B, a bar of wood or ivory, on the four sides of which are marked the foci of the various lenses. The screw is not necessary if the bar slide with slight friction.

as you know, very many forms of these meters, from the well-got-up articles with eyepieces, to be had from photographic dealers, down to the simple piece of string with knots in it which I saw mentioned the other day; still I venture to think this little thing is as simple as any and most accurate.

In the centre of it, on the lower edge, you will notice a triangular piece. This is to assist me in determining the centre of the picture, and to be a guide in using the next instrument which I will bring to your notice, viz., the camera director, which consists of four parts—1st, a brass plate to attach it to the camera; 2nd, a piece of brass tube to carry the rising rod; 3rd, the rising rod; and, 4th, the director, which, I may say, had better be made of some white metal, being more easily seen than simple brass. The parts fold so as to be easily carried in the pocket. Now I am fully aware there are many appliances for ascertaining the position of the object on the plate, yet they all more or less entail much extra weight and bulk, while this little thing only weighs one ounce and is not bulky. One of its advantages is that it allows you to cover up your camera if there be a bright sun, and at the same time you get a true guide to the object you wish to take. For some time I only used a hinged arm on the focussing-frame. This was no use when the camera was covered, as it ought to be; and the result was I often got the subject too high or two low, which spoiled the picture. To use the director, I attach it to the camera by the screw of the rising front. If you use a drop shutter as I do, raise the rising rod till it clears the top of the shutter when set, and, turning the camera to any object, observe what is in the position on the glass you would wish your subject to be in. Point the director to this and screw up firmly, and it is ready. If you are using a large camera on a stand set it up with two



Camera Director.

A piece of sheet brass with slot through which passes the screw of rising front of camera. B brass tube with shoulder for screw E to work as hinge on A for convenience of folding up. C brass rod to slide and revolve within B, retained in any position by screw F. D the "director" of stout sheet brass or some white metal, working on screw G, the upper edge being true, as it is along its surface that the eye is directed to the object photographed. B C can be conveniently arranged so as to be over centre of lens, and allow D to overlook the drop shutter.

legs in front of you, the third leg directly towards you, and as the ship or moving object comes on, by moving the leg next you a trifle to or from you the director can be got exactly in position, and, at the same time, the level, as far as horizon goes, not altered.

The small views I now show were taken without a stand, the top of my walking-stick (a common one, you see) doing duty for one. I never looked through the camera after once setting the director, the meter being my guide in all cases. I shall not further trespass on your time, but trust these little things may be of some use to those who, like myself, are fond of taking views of things in motion.

Thos. H. W. Knolles.

A TOUR IN ITALY WITH THE CAMERA.
No. VI.

The best general views of the Forum, with the Colisseum and temples, are obtained at about halfway up the hilly Via del Campidoglio, leading over the Capitoline Hill. From about the same spot up the Via del Campidoglio I obtained the annexed view of the Temple of Saturn.

This temple is situated at the foot of the Capitoline, and was originally consecrated some 500 years B.C. Eight graceful Ionic columns hewn out of granite, surmounted with an entablature, and resting on a basement some ten to fifteen feet above the ground, comprise all that remains of that once beautiful edifice. On the left of the picture is a part of the Triumphal Arch of Septimus Severus, some seventy-five feet in height, and erected in 203 to commemorate his victories over the Parthians. Close by this triumphal arch is the Rostra. This is probably the site where the Gracchi harangued the turbulent populace, and where Cicero denounced Cataline, and announced himself as "I am the Saviour of Rome; I am the Father of my Country!" Right in front in the lower portion of the picture is a part of the Roman Forum.

From the Triumphal Arch of Septimus Severus and close to the Mamertine Prison—where one is shown the spot where SS. Peter and Paul were incarcerated, miraculous well, and many other wonderful things—another hilly Via leads to the Piazza del Campidoglio at the top of the Capitoline. About halfway up this Via another very effective picture of the Temple of Saturn may be taken, together with the three remaining fluted Corinthian columns which once formed a part of the Temple of Vespasian.

We now come to that grandest of all ruins—perhaps the most imposing structure the world has ever seen—the Colisseum. The building originally seated nearly 90,000 spectators, and has passed through many vicissitudes of fortune. In the middle ages it was used as a *quarry*, and palaces have been erected from the materials so obtained without visibly affecting the mass of the pile. In those troublous times it also used to be the rendezvous for the worst characters. The external diameter measures nearly a third of a mile. Only about a third of that stupendous edifice remains, the rest having been used for building purposes, yet the first sight of it is a very impressive one:—

"A ruin—yet what ruin! From its mass
Walls, palaces, half cities, have been rear'd;
Yet oft the enormous skeleton ye pass,
And marvel where the spoil could have appear'd.
Hath it indeed been plunder'd, or but clear'd?
Alas! developed, opens the decay,
When the colossal fabric's form is near'd:
It will not bear the brightness of the day,
Which streams too much on all years, man, have reft away."

It has been estimated that the Colisseum as it now stands is worth, from a builder's point of view, about half-a-million pounds sterling, simply for building purposes. The Colisseum is very impressive by moonlight; at anyrate I believe it is thought so by the many young ladies and gentlemen who frequent it on such occasions—

"When the rising moon begins to climb
Its topmost arch, and gently pauses there;
When the stars twinkle through the loops of time,
And the low night breeze waves along the air."

Very good views of the Colisseum, both interior and exterior, may be obtained without difficulty. With regard to the exterior, I was literally astonished at the distance I had to go from the building before I could get it within my ground glass, and had the angle of my 5 × 4 lens been a few degrees less it would have been impossible. The view of the interior is best from the first storey. The custodian below who admits to the staircase is not allowed to receive any *pour boire*, but sells photographs to repay himself for his trouble. It is always as well not to let him or others in a similar position know what is the object of the photographic tourist. In such cases I always carry my apparatus packed up, when I am looked upon as a *signore* addicted to piscatorial pursuits (my camera-stand being packed in a neat black case), and as such have often been pounced upon by dozens of Italian sailors as their legitimate prey. Leaving the Colisseum staircase with my camera rigged up astonished the custodian not a little.

With regard to the Colisseum, I once heard a Yankee story. A party of our transatlantic cousins had managed in their "grand tour" to get inside this building, when one of them was asked what he thought of the Colisseum. His answer was a characteristic one:—"Well, I guess it's a very fine buildin'; lots of materials; but I calculate it's very much out of repair." The same gentleman always did think the public buildings of Rome required a deal of renovating.

Close by is the Arch of Constantine, erected after his triumph over Maxentius. This Arch is certainly worthy of a plate or two.

Not very far from the Roman Forum is the Forum of Trajan. This also makes a capital picture, and is best taken before noon from the southern side. This Forum used to be considered the finest in Rome, and with its rows of granite columns is still very imposing, and deeply suggestive of Rome's departed splendour. On the north side is Trajan's Column, nearly ninety feet high. Beneath the monument the Emperor is interred, but the good Popes thought it a very wrong thing that such an unholy man as Trajan (one of the best of the emperors, and a very good man) should have a monument on the top for all men to admire, quietly had him taken down, and put St. Peter—who reigns almost supreme in this respect in Rome—in his place.

About six or eight minutes' walk from Trajan's Forum we get to the Pantheon—one of the most perfectly-preserved of all the buildings of ancient Rome. It is a huge circular structure, with a fine colonnaded portico. The walls are some twenty feet in thickness; no wonder they have stood the ravages of time. The interior is lighted by a single opening at the top of the dome, the diameter of the aperture and the height of the dome being both 140 feet. The Pantheon seems to occupy a somewhat similar position to our Westminster Abbey, the former being the last resting-place of great Italians. Raphael's tomb is here, as is also the burial vault of Victor Emmanuel and others. The front view of the portico makes a very effective picture.

J. J. Acworth, F.I.C., F.C.S.

PORTRAITURE BY ARTIFICIAL LIGHT.

Portraiture by artificial light should be a subject of much interest to both amateur and professional photographers, and consequently it is surprising that so few really successful attempts have been made to overcome what ought to be only trifling difficulties connected with it. The amateur, whose occupation keeps him at work all the day, would hail with delight an easy and economical method of brilliantly and suitably illuminating his drawing or dining rooms, so as to be able to pose his friends in any desired position and with all due distribution of light and shade—to be able, in fact, in his leisure hours and at his own fireside, to exercise his artistic skill in turning out work quite equal, or even superior, to much that is done by his more favoured professional brethren during the brightest days and in the best appointed studios. Equally welcome should be the advent of such a method of artificial illumination to the professional photographer; for

lthough, if he be a sensible man, he will know and act upon the nowledge that both he and his assistants, if they work hard during aylight hours, need rest and leisure during the evenings, there re, nevertheless, cases and circumstances in which portraiture could e practised by artificial light with both pleasure and profit. But in he hands of a professional photographer a suitable method of artificial llumination need not and would not be confined to night work, as it would be found an invaluable auxiliary in the studio during the too frequently occurring days of semi-darkness, in which, when good work is aimed at, the expectant sitter has to be requested to call again.

A case in point occurs to me while I write. On a recent visit to Glasgow I called at one of the best-lighted studios in the city. It was one of those days, well known in Glasgow and other large cities, on which the sun, though shining brightly, appeared as a dark ruby disc, and when the light in the studio was powerless to give anything like a satisfactory negative on even the most sensitive gelatine plate. Two ladies came, anxious to be photographed together, as one of them was to leave Glasgow on the following day. The photographer, who rather prides himself on the brilliance and sparkle of his work, looked round the studio and respectfully declined to attempt a feat which he knew he could not perform. Now, bad as the light was, there was enough to have given transparency to the shadows, and if there had been at hand a ready means of producing for a few seconds sufficient artificial light to make the necessary high lights, he could have pleased his visitors and pocketed the fees.

So far as I am aware, up to the present time only four sources of artificial light have been experimented with to any considerable extent, namely, the burning of so-called chemical compounds, ordinary illuminating gas, magnesium, and electricity. With each of these some good work has from time to time been produced; but generally under difficulties and inconveniences, or at such a cost as to dissuade both amateur and professional from their use save under most exceptional circumstances.

If my memory serve me rightly, Moule's "photogen" was first in the field, and for a time great efforts were made to bring it into use. For a short time it was heard of here and there, and those who invested in the apparatus got a few sitters, but, I believe, it never passed the curiosity stage. Subsequently the Council of the Edinburgh Photographic Society demonstrated the fact that passable portraits could be produced by the light from ordinary gas jets, if only a sufficient number were employed; and, later still, Mr. Laws, of Newcastle-on-Tyne, did equally-good work with specially-constructed burners. Mr. Vander Weyde turned his attention to the electric light, and patented a method of applying it in a way that certainly succeeded better than any of his predecessors; but the cost of the plant and the necessity for sufficient power were items fatal to anything like its general adoption. If electricity is, as some of our scientists expect, to be the light of the future, and we can turn on an arc or an incandescent as easily as we now turn on the ordinary gas, or if the storage battery is to be so improved that we can send it to be re-charged as easily as we send our syphons to be filled with ærated water and at little more than the same cost, electricity will render the photographer independent of daylight. But these improvements are not to be made just yet, and we need not fear that it will be a waste of time to look for something that will serve our purpose till they come.

The burning of magnesium in the form of ribbon or wire or in powder, either with or without nitrate ef potass, has occasionally been successfully employed, probably one of the best examples of the results thereby produced being the well-known, exquisitely-beautiful interiors of the Great Pyramid, by Professor Piazzi Smythe. The most serious objection to the use of magnesium, as employed by the Professor, was the filling of the apartment with the magnesium oxide in such a fine state of division that after one or two exposures operations had to be suspended till next day to allow the powder to subside.

More recently—on this side of the Tweed, at least—the question of the employment of the magnesium light has been revived, but with this improvement—that it is being burnt in oxygen; and I have, within the past few days, seen really excellent portraits, both *carte* and cabinet sizes, produced with exposures of from one to three seconds in that way. All that is required for simple experiment is a globe such as is used for burning phosphorus in oxygen on the lecture table, about six or eight inches in diameter, and which may be bought for a trifling sum from any dealer in such wares—to fill it with oxygen in the ordinary way, and twisting from six to twelve inches of magnesium ribbon into a spiral, light it with a candle, and insert in the globe. For the purpose of diffusing the light and lessening the glare the globe should be covered on one side at least with tissue paper or *papier mineral.*

Mr. M'Lellan, of Glasgow, has devised a most efficient and luxurious, and at the same time an extremely simple, arrangement for this burning magnesium in oxygen. It consists of a cylindrical gas holder of zinc or tin of twelve gallons' capacity, and having supported on the top a ground glass globe of about six or seven inches diameter. The gas-holder having been filled with oxygen in the usual way, and the globe filled with water, all that is required to fill it with gas instead is the turning of the two taps in the tubes which support it. From six to twelve inches of magnesium ribbon burned in this is capable of giving an excellent cabinet negative in a single second. From three to four exposures may be got with one globe full of oxygen; and, as the gas-holder may be filled at the cost of sixpence, and contains sufficient for about a hundred experiments, the cost of each exposure is but a small fraction of a farthing.

The advantages of such an apparatus are that the gas-holder—which can be as easily filled as a gas bag—with its globe full of water can be placed anywhere and be always ready for use, and during a dull day, or when the shades of evening begin to fall, assist in giving that sparkle so beautiful in a picture, but so difficult to get in a dull light.

In the experiments to which I have alluded there was only one magnesium light employed, the operators trusting to screens and reflectors to light up the shadows; but I think much better results may be obtained by the use of a secondary light of much less intensity, or by a second "eclipse"—which is the name given by Mr. M'Lellan to his arrangement—removed to a much greater distance from the sitter.

John Nicol, Ph.D.

NOTES ON PHOTOGRAPHY.

Lecture XIX.—Optics—*(Concluded).*

Rapidity of Lenses.—The rapidity of a lens—or, in other words, the exposure required with it—depends first upon the amount of light it transmits, and, second, on the size or area of the image formed. Since the area of circles increase as the square of their diameters, it follows that *the rapidity of a lens increases as the square of the diameter of its working aperture.* Again: the size of the image (its diameter) increases in the same proportion as its distance from the lens increases, or, what is almost the same thing, the focal length of the lens; and, as the area of the image is proportional to the square of its diameter, it follows that *the rapidity of lenses diminish as the squares of their focal length.*

From the opposite effects thus produced by increasing the aperture and focal length of lenses, as long as their apertures and focal length bear a constant proportion to each other they remain of the same rapidity; while, when the proportions vary, the relative exposures required are obtained by squaring the members representing the proportions, the rule being as follows:—*To find the relative exposures for different lenses: divide their focal lengths by their apertures and square the quotients. The numbers thus obtained represent the relative exposures. Example:* I have two lenses—one of twelve inches focus and another of eight inches focus—and I have to make a copy of a map of exactly equal size. I find that with the first lens I have to use a diaphragm having an aperture of one-quarter of an inch diameter to get good definition, and with the other a diaphragm having an aperture three-tenths of an inch diameter. Give the relative exposures necessary:—

$12 \div \frac{1}{4} = 12 \times \frac{1}{4} = 48;$

or— $12 \div \frac{1}{4} = 12 \div {\cdot}25 = 1200 \div 25 = 48;$

and— $8 \div \frac{3}{10} = 8 \times \frac{10}{3} = 80 \div 3 = 26{\cdot}6;$

or— $8 \div \frac{3}{10} = 8 \div {\cdot}3 = 80 \div 3 = 26{\cdot}6.$

48 squared $= 48 \times 48 = 2304;$

26·6 „ $= 26{\cdot}6 \times 26{\cdot}6 = 707.$

Answer: 2304 and 707 represent the relative exposures.

Working Aperture.—In the case of lenses with a stop in front the working aperture is represented by the diameter of the stop, but in compound lenses with a stop between: this is not so. To find the working aperture in the latter case focus a distant object on the ground glass; then replace the ground glass with a piece of cardboard having a small hole in the centre, and place a candle close outside this hole. The diameter of the illuminated circle seen on the front of the lens is its working aperture.

The rapidity of lenses is also influenced by the transparency and colour of the glass, a very appreciable quantity of actinic light being absorbed by the best of them, and by the number of glasses forming the lens, more or less reflection occurring at each surface.

Enlarging and Reducing.—To find the required distances for any proportionate size of object and image, and for any focus of lens—*Rule: Add the required proportions together, multiply by the focal length of the lens and divide the product by the required proportions separately. The quotients give the relative distances of object and image. Example:* What are the distances from the optical centre of a lens of the object and image respectively for a *carte* picture to be enlarged four times, the focal length of lens being six inches?

The proportions are 1 to 4:—$1 + 4 = 5$, $5 \times 6 = 30$.

$30 \div 1 = 30$, and $30 \div 4 = 7{\cdot}5$.

Answer: object 7·5 inches, and image thirty inches.

E. H. Farmer.

HOW TO SECURE A DEAD BLACK SURFACE ON OPTICAL BRASS WORK.

[A communication to the Edinburgh Photographic Society.]

When your Secretary asked me to repeat here tonight what I had said in another place I had difficulty in acceding to his request, because the matter is really not one in which photographers may be supposed to take a deep interest. As it sometimes happens, however, that a difficulty arises in getting matter sufficient to occupy the evenings on which

the Society meets, my excuse must be that one of these occasions has rendered it necessary for me to take up your time now.

I wish, to begin with, to call your attention to the mode of finishing brass work by plain lacquering. If it be an article which has been lacquered before that lacquer must in the first place be removed, and the article afterwards carefully cleaned and polished. When the brass has not been lacquered before, it must receive before lacquering the highest possible finish and polish if it be desired to make a fine job. This is done by taking out the marks of the file with finer and finer sorts of emery paper or cloth, then polishing with rotten stone and oil, and giving the article after this has been cleaned off a final touch with a buff-stick and crocus powder. The article must be carefully wiped clean, and care taken that it is not touched with the fingers after this has been done, as these would leave a greasy mark. Care must be taken at every step to invariably lay the successive strokes of the emery cloth or paper and polishers in the same direction. When the desired degree of polish has been attained, a quantity of lacquer is poured into (say) an egg-cup, which is a very convenient receptacle for the purpose. A fine flat, camel's-hair brush is taken, and, the article being gently warmed and held on the left hand, a small quantity of the lacquer is taken up on the brush, and then the brush is drawn over the brass with straight strokes, always if possible in the same direction. The article may generally be held by screwing a piece of wire into some hole in it, and holding the wire with a small hand-vice. As many coats of the lacquer may be given as desired by keeping the brass hot. The degree of heat is an important element in the success of the operation. Holtzappel says it must not be warmer than boiling water; but, so far as my experience goes, I should say the heat of boiling water would be too great. Considerable skill is required in lacquering well, and that skill can only be attained after a good deal of experience. The great secret of lacquering—for beginners, at all events—is to take as little as possible of the lacquer at a time on the brush, have the article *perfectly* clean, a good brush with no loose hairs in it and clean, and not make the article too hot.

Now, as to lacquers: there are a great variety of them. As a rule, English brass work is covered with a very pale lacquer containing almost no colour, while, on the contrary, continental lacquers contain too much colour. I show you two microscope object-glass boxes, one of which is finely polished and lacquered by Mr. Wray, and the other is by Dr. Carl Zeiss, of Jena. Mr. Wray's is a very fine specimen of lacquering. It has, however, in it a fugitive colouring material, and when a certain time elapses the brightness leaves it. Zeiss', again, has a great amount of colour in it. Wray's looks well when new, but it very soon fades and the colour becomes bad. I show you another box of his which I have had for some years, in which the colour has changed very much. The simplest and best pale lacquer, Holtzappel says, is made of shellac and spirits of wine only, in the proportion of about half-a-pound of the best pale shellac to one gallon of spirit. It is, he says, required to be as clear and bright as possible, and it is always made without heat by continuous agitation for five or six hours. If not clear it may be filtered, and should be kept away from the influence of light. It may be coloured for yellow tints with turmeric, cape-aloes, saffron, or gamboge, and for red tints with annatto or dragon's blood.

What I have described is the process adopted for lacquering the outside of photographic lens mounts, or all those portions of the brass work where the light does not pass. The inside of the mounts, however, are treated in a totally different way. We must have where light passes a surface as nearly dead black as can be got. This is obtained in the inside of the tubes by mixing finely-triturated lampblack with the lacquer used for the outside, and applying the black lacquer in one or more coats with heat to the inside of the tube. The result is a finely-grained black surface, which reflects no light. As soon as the surface has received one or two coats no more must be given, as the repeated application of the lacquer would make the surface glossy—the very thing which it is wished to avoid. This method of blackening the brass does excellently for all portions which are not to come into contact with the fingers; but wherever the brass requires to be handled we must have recourse to something different from lampblack. One of the modes adopted for that purpose is to bronze the articles. There are various ways of doing this. Everyone must be familiar with the ordinary greenish colour of gas-fittings which are bronzed. The article is first thoroughly cleaned from all grease, and then dipped in vinegar or a strong solution of sal-ammoniac, or sal-ammoniac and vinegar mixed in the proportion of one to three ounces of the sal-ammoniac to one pint of vinegar. Holtzappel says a quick bronze is made with one ounce of corrosive sublimate dissolved in one pint of vinegar. The best and most rapid, however, of all the bronzing liquids is the nitro-muriate of platinum, called "chemical-bronze." It is known in the shops as the "terchloride of platinum." This produces the colour very rapidly. All these methods, however, merely, so far as I am aware, give a bronze tint, and not the black surface we should like to get.

I show you here a few lens stops of Mr. Grubb's which have seen some use, and you will see that the bronze has nearly all disappeared. If I take a piece of clean brass and touch it with the platinum solution the bronze effect is almost instantly produced, but it does not in my hands produce black. The bronzing process is invariably used with all articles put together with soft solder. The method I am about to describe requiring a considerable amount of heat, the articles must be without any soldered joints.

When I first began to "work in brass," a great many years ago, at the lathe I experienced much difficulty, sometimes not being able to give some parts of the articles I produced a sufficiently dead black surface, such as the settings of lenses, lens stops, and suchlike. Merely bronzing in such a case will not do, and lacquer and lamp-black is worse. I became acquainted with an Edinburgh optician who had been taught his knowledge of brasswork finishing for philosophical instruments in the workshop of the late Mr. John Adie; he knew no method except bronzing. At that time he had a large business in the sale of the student's Nachet and Hartnack microscopes, the brass stages of which are perhaps the most beautiful specimens of blackened brass which can be produced. We wrote to Nachet and asked him how it was done, and I think he replied that it was done by nitrate of silver. We tried that and failed. There was nothing for it but to fall back upon the bronze again. Some time after, when the Rev. J. B. Reade described his microscope kettle-drum condenser in the *Proceedings* of the Royal Microscopical Society, he incidentally mentioned that those portions of the mount which it was necessary to blacken were blackened by nitrate of copper. My friend and I tried it almost as soon as I read it, and we succeeded at once to our great delight in producing a black surface which was everything we wished. I prepare the solution by dissolving copper wire in nitric acid, weakened by adding (say) three or four parts of water to one of acid. The article to be blackened is heated pretty hot and then dipped into the solution. It is then taken out and heated over a Bunsen burner or spirit lamp. When the article is heated to the proper temperature, the green colour of the copper first appears, and as the heat is increased the article becomes of a fine dead black. It is not necessary to lacquer it. It seems better, to my thinking, to let it alone, just giving it a good brushing to remove the dust, and it may be considered finished. If, however, it get a single coat of lacquer the colour becomes blacker, but there should not be sufficient put on to make the surface glisten, as too much lacquer invariably produces an objectionable polished surface. I shall let you see one of the stops of the Grubb's lens I referred to treated in this way.

I have, perhaps, detained the meeting too long about such a technical matter; but from this time forward if I see any member of the Edinburgh Photographic Society with badly-blackened stops to his lenses the blame will not rest with me. WILLIAM FORGAN.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATIONS FOR PATENTS.

No. 1650.—"Photographic Shutters for Instantaneous Photography." R. REYNOLDS and F. W. BRANSON.—*April* 2, 1883.

No. 1654.—"A New or Improved Clasp for Albums and Other Books." L. A. GROTH.—*April* 2, 1883.

No. 1787.—"Receptacles or Albums for Rendering them Capable of Containing Crystoleum Paintings." LUCY WISE.—*April* 9, 1883.

ABRIDGEMENT OF BRITISH PATENT.

No. 3889.—"Photographic Cameras." A communication from PAUL ROUAIX, Paris.—*Dated August* 15, 1883. (Not proceeded with.)

This invention relates to photographic cameras in which the operations of sensitising and developing the glass plate upon which a picture is to be obtained are carried on in the camera itself without the necessity for a separate dark room. The camera consists of a front part and lens of ordinary construction and a back part provided with a hinged door, and with a flat horizontal slide fitting below the top of the camera, and having a handle by which it may be drawn in or out as desired. Below this slide and near its front edge is a groove provided with a spring to allow a separate focussing-glass to be readily inserted and held in position. The picture having been focussed, the ground glass is removed and replaced by a glass plate coated with iodised collodion, which, when pushed into position, hangs over a suitable vessel, containing silver solution, which is fitted into an opening in the bottom of the camera. This vessel is raised by suitable mechanism until the plate is completely immersed; when sensitised the vessel containing the silver is withdrawn and the exposure made by uncovering the lens. The development is effected by withdrawing the horizontal slide, together with the plate, until the latter is in position over a second vessel containing the developing solution, which is then raised in the same manner as the first. When the picture is developed the hinged door is opened, the plate taken out, and fixed and washed in the ordinary manner.

Meetings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on the 12th instant, the chair was occupied by Mr. C. H. Cooke.

Mr. A. HADDON showed some negatives of river scenery taken on plates he had prepared by Mr. W. K. Burton's method of precipitation and subsequent re-emulsification. He said it had been stated that a better quality resulted from emulsions in which the original emulsifying gelatine or its

lecomposition products were retained than in those from which it had been removed, and he wished to know whether this lack of quality was observable in the negatives shown. He had boiled for one hour and precipitated by dilution and the addition of ammonia, as originally directed by Mr. Burton.

The plates shown were remarkably clear, clean, and vigorous.

Mr. A. Cowan and Mr. W. E. Debenham thought that the experiment would be more conclusive if the emulsion after boiling had been divided into two quantities, one of which had been finished in the usual manner without precipitation and the other as stated, and the resulting plates compared under similar conditions of exposure and development.

In answer to inquiries,

Mr. Haddon said that the development had been conducted with three grains of pyro., four of bromide, and six minims of ammonia to two ounces of water. The exposure had been four seconds with an aperture No. 72 on the universal system. This was considered to indicate a plate somewhat less rapid than some of commercial make.

In the course of a discussion which took place on lenses for portraiture, the following questions were considered:—1. Which form of lens is better adapted for portraiture—the single or the doublet of rectilinear type?—2. What is the difference of brilliancy in pictures produced by one or other of these lenses?—3. What is the largest available aperture for portraiture with a single lens?—4. Does not a lens with round field possess certain advantages for some kinds of picture?—5. What is the general construction of the lens called "universal," or group lens?

Mr. Cowan could not find any difference in the brilliancy or speed of single and doublet lenses when both were stopped down to the same ratio. He said that the front lens of a portrait combination might be used with an aperture of $\frac{f}{12}$. This would represent No. 9 on the universal system, and would, therefore, necessitate an exposure nine times as long as would be required by an ordinary rapid portrait lens when used without any diaphragm.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The sixth ordinary meeting of this Society for the current session was held in 5, St. Andrew-square, on the evening of Wednesday, the 4th instant,—Mr. A. Craig-Christie, F.L.S., Vice-President, in the chair.

The minutes of the previous meeting having been approved, Mr. Alfred C. Hooker and Mr. Thomas Swanston were unanimously elected ordinary members of the Society.

Mr. William Forgan then described very fully, with illustrative experiments, the best way of securing a dead black surface on optical brasswork. [See page 225.] Mr. Forgan was heartily thanked for his lucid explanation of a most useful series of operations.

Mr. Thomas H. W. Knolles exhibited and described two appliances he had invented for securing moving objects in the camera without the necessity of resorting to an inspection of the focussing-screen, and for finding the position in which to place the camera without resorting to the usual experimental inspection of the image on the ground glass. [See page 223.]

Mr. A. Mathison considered the "director" quite as valuable as a "detector camera." He had had an opportunity of using the arrangement exhibited by Mr. Knolles, and found it possessed all the merits claimed for it, and, being not more than one ounce in weight and easily carried in the waistcoat pocket, possessed advantages over the detector camera, which with him the simple apparatus described had entirely supplanted.

Mr. S. Tamkin thought the director might be of use in the studio.

Mr. J. M. Turnbull believed that a lens-finder would be of greater value in the studio, where weight and bulk were immaterial, but for outdoor work the invention of Mr. Knolles was unquestionably superior. To indicate the usefulness of the "view-finder" he mentioned that a gentleman had called to know if a certain lens was capable of taking a certain building within a limited space. He (Mr. Turnbull) simply gave him a view-finder adjusted to the lens in question, and asked the gentleman to go to a building of similar dimensions at the limit of distance necessary and inspect how much of the building was visible. By this simple means the gentleman had arrived at a demonstration to his inquiry.

A hearty vote of thanks was accorded to Mr. Knolles for his ingenious, simple, and very useful appliances.

The following question had been found in the box:—"Do gelatine dry plates deteriorate in sensitiveness by age?"

Mr. W. T. Bashford said that in his experience some makes of plates certainly became less sensitive by keeping. Some which originally were so sensitive that it was impossible to develope them into bright, crisp negatives were, after being kept some time, all that could be desired, while others, that were very fine when first received, became exceedingly slow and liable to produce hard images, yet the plates were kept under the most favourable conditions for stability.

Mr. Crooke had noticed an iridescent colouring round the edges of some plates after having been on hand some time, and wherever this occurred the image was very unsatisfactory.

Mr. Tamkin had found plates positively improved when kept a long time.

Mr. Turnbull was quite familiar with the defect alluded to by Mr. Crooke, and stated it was due to impure air having access to the plates; probably sulphuretted hydrogen was the chief cause. The defect was chiefly noticed in those plates packed with folded cardboard at the edges to keep them apart, the space thus formed allowing a film of air to intervene, which, if impure, was sure to affect the plates disadvantageously. He had noticed this peculiarity develope throughout the entire surface of plates within twenty-four hours. He did not think that plates did deteriorate to the extent mentioned by Mr. Bashford, though he was aware that some plates did not keep so well as others. He had noticed that some certainly improved, especially in regard to frilling.

Mr. Mathison considered that the deterioration in plates was certainly established in regard to some makes. He thought the defect arose chiefly through improper packing, or from being packed before thorough desiccation.

The Chairman fancied the discussion had not thrown all the possible light on what was evidently a dark subject, but considered that much must depend on the store-rooms, the presence of gases from combustion or sewage, and it was very important that these deleterious influences should be absolutely prevented from affecting the plates by excluding them from apartments in which plates were stored.

Another question was concerning the simplest means for producing photomicrographs. This elicited a discussion, which eventually terminated in Messrs. Forgan and Mathison undertaking to bring the matter forward at the next ordinary meeting, by which time they hoped to prepare specimens and demonstrate their mode of work.

Mr. Crooke exhibited some interesting lantern transparencies, which were much admired.

A vote of thanks to the Chairman terminated the proceedings.

The first outdoor meeting for the season was held on Friday, the 6th instant, the place selected being Falkland, a small town twenty-five miles north of Edinburgh. The party met at Waverley Station, and proceeded by the half-past nine train for Falkland-road, which is about two and three-quarter miles from the town. The weather being exceptionally fine the walk was much enjoyed, and some good pictures might have been got on the road had not the majority resolved that the cameras were not to be unpacked till the destination was reached—an arrangement considered necessary in consequence of the exhilarating walk and the fine sea breeze crossing the Forth creating a very keen appetite. Accordingly luncheon was hastily partaken of at the hotel, where a fine view of the old palace could be obtained, and the light just being about right no time was lost in bringing a battery of cameras, such as the old place had never seen before, to bear on this the principal subject for the day; and a very fine subject it is, both as a picture and likewise for its many associations with events recorded in Scottish history. The old structure was begun by James III. or IV., and was completed by James V. in 1537. It is a mixture of Gothic, Baronial, and Palladian architecture, which makes it of much interest to the antiquary as well as to the photographer, and it is remarked by architects how admirably the various styles are made to harmonise. James V. retired here after his defeat at Solway Moss, and while lying here on his death-bed, on being told of the birth of Mary at Linlithgow, he made the well-known remark concerning the crown of Scotland—"It came with a lass and it will go with a lass," these being his last words. After his death his widowed queen often resided here while she governed the kingdom for her infant daughter; and the unfortunate Mary, after her return from France, in the sports of the field in this district often sought relief from the many troubles of her short and unhappy reign. A goodly number of plates having been exposed from different positions, the party resolved to visit Falkland House, it being a fine modern structure. Only a few plates were exposed, but a number of beautiful peacocks tempted one of the youngest members to try a couple of plates on them. A fine dell and waterfall were next visited; but the light being dead against the subject the members with two exceptions reserved their plates for some of the quaint old thatched houses which still survive in this district. About four o'clock the members met at the hotel, where a towsy tea was quickly despatched, to allow a plate to be exposed on the interior of the palace before the conveyance started to catch the half-past five train for Edinburgh. It is needless to say that every one was greatly pleased with the day's outing.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The usual monthly meeting of this Society was held in the Royal College of Science, Stephen's Green, Dublin, on Friday last, the 13th inst.,—Mr. George Mansfield in the chair. The minutes of the previous meeting having been read and confirmed,

The Chairman called upon Mr. Conan to demonstrate the platinotype method of printing.

Mr. Conan, in the course of his remarks, drew attention to the advantages to be derived from the absolute permanency of the finished prints. He also exhibited a collection of prints on fabrics kindly sent over by the Platinotype Company, as well as several specimens on paper, some of which he developed before the audience.

Following the demonstration there was a well-sustained discussion.

Mr. J. V. Robinson exhibited several specimens of photo-filigrane and a new single dark slide. The Society's new albums were also laid on the tables for inspection.

The next meeting will be held on Friday, the 11th May.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held in the Patents' Room of the Literary and Philosophical Society's Institute, on Tuesday, the 10th instant,—Colonel Sheppee, President, in the chair.

The minutes of the last ordinary meeting having been confirmed, Mr. James Edwards, South Shields, was nominated for membership, and Mr. Gibson, of Newcastle-on-Tyne, was elected a member of the Association.

The Secretary stated, in reply to a question by Mr. Galloway, that the presentation prints were expected daily.

Some excellent photographs were presented to the Association by Mr. Galloway, and the Chairman proposed a vote of thanks to that gentleman, which was carried.

The meeting then adjourned to the adjoining lecture theatre of the Institute, when the Rev. T. F. Hardwich, (briefly introduced by the Chairman), read a communication *On the Lime Light* [see page 221], before

a numerous audience. The paper was received with many marks of interest and approval. At its conclusion,

The Chairman moved a hearty vote of thanks to the lecturer, which was accorded with acclamation. He (the Chairman) invited discussion, and no remarks being made by the audience,

The Rev. T. F. HARDWICH said he had received two or three notes from friends at a distance, which it might interest the meeting to hear:—

From Mr. E. G. Wood.

"I beg to re-enclose your draft, and to thank you for your kindness in permitting me to read it. Newcastle is some few miles from London, but had I not a previous engagement for April 10th I might be tempted to perpetrate a holiday and put in an appearance.

"It would ill become me to take exception to your observations about the precise angle of incidence that will give the best results. I am quite sure that, so far as present knowledge goes, there is room for a fairly-large difference in the details of such arrangements; and until we have found out the precise values of the shape and size of the chambers holding the gas to be employed and the amount of velocity of the gas when in use, as well as the absolute effects of the shape and dimension of the aperture of the jet, I hardly prefer anything that approaches to an axiom.

"There is an aspect of the case that perhaps has not had sufficient attention—that is, the part that the velocity of the gas at the point of ignition plays in the production of the light.

"Then there is the question as to the bearing of a larger or smaller area of ignition *on the definition of the picture*, all other things being equal.

"It was the late Professor Daniell, of King's College, London, who first proposed to use concentric tubes for the jet. He was led to this, I believe, from the absolute perilousness of Dr. Clarke's copper box containing the two gases compressed into it, and the unhandy and imperfect attempt to improve upon it by the water chamber and the asbestos and wire gauze. Edw. Marmaduke Clarke, of the Strand, and afterwards of Leicester-square notoriety, adopted as his oxyhydrogen jet Professer Daniell's jet, and fixed over the ends of the tubes a small chamber prolonged into the usual jet. In this way he provided the mixing chamber, and the gases emerged as mixed gases from the point of the jet. This is only another instance of what is frequently seen—that an old plan is re-invented. So far as I am concerned, I have always been forward to give to Professor Daniell the honour that belongs to him."

From Messrs. W. H. Oakley and Co.

"The snapping you speak of is very objectionable to an audience, and I think it could be remedied by filing away a little of the slot in the plug of the dissolving tap so as to turn the oxygen completely off, leaving the hydrogen slightly on.

"In doing this you may find it necessary to cut away a trifle of the 'stop' or of the 'shell' at the point where it touches the stop, to make the plug turn a little further round and shut off both gases."

From Mr. W. Broughton.

"I can add but little to your very explicit directions for the working of my ethoxo light.

"You say the light is suitable for audiences of 200 persons; but I have shown it to an audience of over 2,000, using a twelve-feet screen. It was admitted to be the best light they had seen, and was mistaken by some for the electric light in consequence of its extreme whiteness.

"I have made some capital transparency plates from a formula which recently appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY of gelatino-bromo-iodide. They give bare glass in the shadows and are very slow, averaging about ninety seconds at a distance of twelve inches from a gas flame.

"The pumice chamber is by far the safest arrangement with the ethoxo gas. Accidents have occurred without it and will occur again. As you have before pointed out in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, the ether volatilises better at high temperatures; hence the necessity, if it be under 50° Fahr., of placing the tank in a bucket of warm water, thus making it much easier and safer to work.

"I have no doubt that the pumice as I use it, namely, in the mixing chamber of the mixed jet, performs another useful function—the thorough combination of the two gases.

"I would suggest, if a back pressure valve be used, that instead of oiled silk as in Chadwick's valve, the diaphragm should be made of silk coated with a mixture of glycerine, gelatine, and chrome alum, or potash bichromate; the glycerine to make it pliable, and the salts to render the film insoluble.

"The ether ought always to be tested before exhibiting. My method is as follows:—Into a glass tube graduated with C centimetres, I place first 100 centimetres of water and then 100 of ether. The tube is now well corked and agitated, taking care to keep the finger tight on the cork. With ether of sp. gr. ·720 the water absorbs about ten per cent. of ether, and ditto of ·730 about twenty per cent. The ether will be found floating on the top of the water. I use methylated ether. My reason for mentioning this is that quite recently I had supplied to me in mistake spirit of ether, and which was only detected by testing it; there was no separation of ether when mixed with water.

"I should also advise the emptying of the tank altogether when it has been used (say) half-a-dozen times, as the action of oxygen on the ether has a tendency to turn it acid.

"The enclosed sample of thick tubing I find the best for the ether tubes. There is no danger of stoppage through twisting of the tube or rusting of the wire.

"The best light is got by high pressure and small aperture; but size of aperture makes no difference in dissolving, provided sufficient hydrogen be left on. The poppings out and small explosions in other burners are, as a rule, due to this cause, namely, insufficient hydrogen to drive out the oxygen before the gases become explosive.

"I always use the mixed jet, finding it brighter, more economical, and safer."

Mr. HARDWICH: I am afraid it will hardly be *safe* to recommend dipping the ether tank in warm water, because some persons may not be aware that ether boils at a little over 90° Fahr.; but if warm water be used a *thermometer* should certainly be dipped in it to ascertain its exact temperature. My own experience of the ethoxo light has been at comparatively low pressure, because when I lecture in a very large room I usually find gas laid on. High pressure may give more light, but it requires greater care on the part of the operator to prevent accident. With reference to Messrs. Oakley and Co's letter: I have altered my dissolver as they suggest, filing away the hydrogen slot until I found by suction that a little of the hydrogen passed after the oxygen had ceased. I have not since had an opportunity of trying the dissolver; but, if I have carried the correction too far for the oxyhydrogen process, I can easily cut away a little of the oxygen slot until I have hit the right point. The dissolving tap which I use has large and free passages for the two gases, and I find it is both more air-tight and more free to move when I put in the plug just as it is, and do not rub it with oil, hog's lard, or burnt india-rubber. Mr. Wood speaks of a large area of ignition being likely to give a less sharply-defined picture. Such in theory is no doubt the case, but practically we do not find any complaint made of a want of sharpness in pictures shown by the blow-through jet. I have seen the original jet of the late Professor Daniell, of King's College. It is not of the exact form which we now consider to give the best light, but Mr. Wood is right in saying that the honour of the invention of the blow-through jet belongs to him, and that all those which have since appeared are but modifications. In my own opinion the most simple and economical "interchangeable jet" is an old form which has been in the market for many years, slightly altered. It consists of a circular plate of brass about an inch in diameter, with three loose caps of two inches high screwing down upon it with a leather washer, the oxygen brass pipe entering the circular plate in the middle and the hydrogen on one side. In using the jet for the blow-through you screw on a small oxygen tip, with an aperture of one-twentieth of an inch, and a quarter of an inch shorter in length than the outside hydrogen cap, which has an aperture of one-eighth of an inch. Be careful to ascertain by means of a needle that the stream of oxygen blows exactly *through the centre* of the hydrogen hole. For the mixed gases you take off the inside oxygen tip and use only cap No. 2, with an aperture of one-twentieth of an inch; and for the ethoxo light you employ cap No. 3, having an aperture of one-twenty-fifth or one-thirtieth of an inch. The inside of the caps should be sufficiently hollowed out to hold one and a-half fluid drachms, otherwise you will be annoyed by a roaring noise in the oxyhydrogen burner when the gases are not quite pure. The lime should be upright, turning from the back of the lantern, and sliding along the horizontal brass tubes as they lie side by side. An angle of 30° to 35° will be sufficient in the general way to prevent a shadow being thrown on the upper part of the screen.

An exhibition of lantern slides then took place. Slides were lent for this occasion by Messrs. Hardwich, I'Anson, Stuart, Mounsey, Blyth, Kimmish, Mawson, Swan, and Morgan, and Templeton. Mr. Allison, of Monkwearmouth, kindly lent his lantern and screen, and gave his valuable assistance.

The CHAIRMAN proposed a vote of thanks to these gentlemen, which was carried unanimously, and the meeting terminated. About six hundred persons were present.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE seventh ordinary meeting of this Society for the present year was held on Tuesday evening, the 2nd instant,—Mr. J. D. Leader, F.S.A., and subsequently Dr. Morton, the President, occupying the chair.

The minutes of the preceding meeting were read and confirmed. Mr. W. Bark was elected a member.

It was arranged that the first excursion should be to Hardwick Hall, on Wednesday next, the 25th instant.

Mr. Foxon exhibited several effective views printed from gelatine negatives, produced by contact with a positive, secured in a similar manner from the original, which was very thin but full of detail.

Dr. MORTON observed that it was satisfactory to know that a secondary gelatine negative could, by careful development, be made denser and better than the first one by adopting a process not unknown to collodion workers, and would, no doubt, prove a superior plan to the ordinary intensification of a thin plate.

On the motion of Mr. HATFIELD, it was decided to purchase apparatus for class demonstrations, and to test the value of different developers, &c.

Mr. Leaman showed some good examples of instantaneous work. Other contributions were handed round and discussion followed, after which the meeting was adjourned.

Correspondence.

THE SENSITIVENESS OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—"A Bewildered Amateur" asks for bread and you give him a stone. Does any reasonable being expect an amateur, whose whole outfit, perhaps, has not cost two guineas, to buy a Warnerke's sensitometer at that price merely to test the rapidity of the plate he buys, which rapidity ought to be supplied by the maker? At the risk of repetition, I ask again—Why do not the makers state the time of exposure of their plates with a certain ratio—say $\frac{f}{20}$—under, of course,

ie most favourable conditions, and then let each user make his own ılculations for his own lenses?

Amateurs do not want to be supplied with brains, but they ought to ave some data to go upon, and "ten or twenty times as quick as wet" ieans nothing, as wet plates vary as much as dry.—I am, yours, &c.,

Liverpool, April 13, 1883. J. H. T. Ellerbeck.

[With due deference to our friend Mr. Ellerbeck, we think that iis "amateur whose outfit has perhaps not cost two guineas" would carcely trouble himself at all about the sensitiveness of his plates, till less buy a Warnerke sensitometer—which, by the way, is not so expensive an instrument as Mr. Ellerbeck implies. If, however, hat be too expensive, "luminous paint" in small bottles is cheap nough; and any amateur, without being "supplied with brains" from outside sources, can easily construct a graduated screen which, if not a standard, will answer his own testing purposes perfectly well. We venture to think that the system proposed by Mr. Ellerbeck, though it was the one adopted by the early plate-makers, would prove of very little more use than the "ten times" or "fifteen times wet" so much complained of. To be of any value it involves a tolerably-accurate estimate of the power of the light when the trial is made. Those who wish to be accurate in their exposures must test their plates themselves, and not trust to any arbitrary valuation that the manufacturer or his assistants may choose to affix to them.—Eds.]

To the Editors.

Gentlemen,—We have read the letter of "A Bewildered Amateur" in your last issue, as to the rapidity of gelatine plates, and his difficulty in the matter; also your note to the effect that Warnerke's sensitometer, for meeting this difficulty, had been approved by the Sensitometer Committee as the most reliable standard.

A step in the direction of simplifying this matter has been taken by Professor Stebbing, of Paris, for the sale of whose "Parisian plates" we are the agents. These plates have all been carefully tried with Warnerke's actinometer, and each packet of them bears a distinct register of their rapidity in the shape of a number, ranging from 10 to 24, thus:—Actinometer 10 represents the rapidity of wet collodion.

Actinometer	12 is	$1\frac{3}{4}$	more rapid than 10.
,,	14 is	3	,, ,,
,,	16 is	5	,, ,,
,,	18 is	9	,, ,,
,,	20 is	21	,, ,,
,,	22 is	27	,, ,,
,,	24 is	48	,, ,,

Any further information that may be required we shall be happy to supply.—We are, yours, &c., Dring and Fage.

145, *Strand, W.C., April* 18, 1883.

CELESTIAL PHOTOGRAPHY.

To the Editors.

Gentlemen,—Permit me a word of explanation in reply to Mr. J. A. Forrest's letter in your issue of the 13th instant.

The paper was merely *notes* on celestial photography, and my object in referring to the moon was to exhibit to the meeting, by photographs which were in my possession, taken by the astronomers whose names were mentioned, how inadequately any of them represented the minuter details of the lunar surface. I am well aware of the valuable work accomplished at the Liverpool Observatory in 1854; but as I had not one of these photographs to show, and as I have several times, when treating of the history of the subject, referred to Messrs. Forrest and Hartnup's results, I thought it unnecessary to do so again.

Celestial photography has for some years been in a dormant state, but the advent of gelatine has revived it. I will only add the wish that the Liverpool Amateur Photographic Association, whose name is so honourably associated with the past, will gather fresh laurels during its future career.—I am, yours, &c., R. C. Johnson.

Liverpool, April 18, 1883.

"THE DARK ROOM AND THE EYES."

To the Editors.

Gentlemen,—I have read with interest your remarks on the *Dark Room and the Eyes*—with more interest, probably, than I should have done had I not severely punished myself by want of care on first taking to photography.

There is no doubt that photographers may protect their eyesight in their work a great deal more than is generally done. In the dark room much can be done by arranging the illumination so that the light should only reach where it is required, while the eyes at the same time are protected from the direct light. If the eyes are protected—say in a manner similar to that described in your article—the operator is thereby enabled to work in greater comfort and certainty with less light admitted into the room.

A very good plan, also, is to have sliding sashes to work in front of a second window, so that the illumination for development can be modified according to the intensity of the daylight.

Then in the studio the operator's eyes can be protected from direct light in many ways. It is not necessary to wear a shade, although that is a good way of doing it if one disregard personal appearance. The tunnel arrangement—which has before been described in the Journal for the shading of camera and lens from receiving the direct rays, and thus helping to brilliancy in results—is useful also in protecting the operator's eyes, and enables him to *see* his model more brilliantly. Blinds and curtains can likewise be so arranged as to conduce to the relief of the eyes from excessive glare.

As you say, the subject is important. The eyesight once broken down requires very long time, attention, and patience to effect restoration, and too often the breakdown is so complete that the eyesight becomes permanently impaired.—I am, yours, &c., W. S.

Reading, April 17, 1883.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

To the Editors.

Gentlemen,—The winner of the last monthly competition was *Mr. W. Brooks*—not Mr. J. Nesbit, as stated in your last impression.—I am, yours, &c., F. A. Bridge,

London, E., April 16, 1883. *Hon. Sec. and Treasurer.*

THE FOCUSSING-CLOTH.

To the Editors.

Gentlemen,—Some remarks having been lately made on the subject of focussing-cloths, I may mention that the usual square of black velvet lined with the thinnest *white* waterproof is about the best thing I have found for the purpose, as the waterproof protects the camera from wet in case of a shower, and the white colour prevents it from being overheated in the hottest sun.—I am, yours, &c.,

Cannes, April 13, 1883. W. Cotesworth.

RE ADAMS'S "BRILLIANT."

To the Editors.

Gentlemen,—Seeing the letter in this week's Journal with respect to the above I was induced, through curiosity, to analyse the "brilliant," and was surprised to find it simply an acid solution of ferric oxalate, and, of course, I was not then surprised at its having no effect on plates developed by "ferrous oxalate."

To quote Messrs. Adams's words, "a pound of fact being worth a ton of theory," I thought that perhaps the readers of the Journal would like to know for what they pay 3/6 per pint.—I am, yours, &c.,

Hanley, Staffordshire, April 17, 1883. Herbert J. Gover.

An Old, Old Story.—The London papers, from *The Times* to *Reynolds'*, have recently been "had" by "a correspondent" who has apparently supplied them individually with the following version of a very, very old story—in all probability a "story" in more ways than one from the first:—A correspondent informs us of a romantic incident which has recently occurred in a prosperous London suburb. A devoted young High Church curate of interesting appearance and great popularity in his district was waited upon by a young lady of considerable attractions, but with an air of deep melancholy, and clad in a somewhat ascetic garb. After some confusion and the shedding of a tear, she revealed to him that she had ventured to visit him on a matter deeply affecting her happiness—she feared her life. The curate naturally asked what it might be; but after several attempts to speak, choked by sobs, she informed him that the matter was one of such deep importance that she could not impart it except at her own abode, where she adjured him as her spiritual friend, by all he held sacred, to visit her. After some little conversation the reverend gentleman promised to do so, and the next day he called at the address given him. Then the young lady, with a look of still deeper dejection, and a voice indicative of remorse and shame, revealed to him the fatal secret. She had conceived a deep, a passionate love for the curate himself. She knew, she said, that her passion was hopeless; he in his devotion to the church, for which she loved him all the more, had vowed himself to a life of celibacy, and she would resignedly carry her attachment to the grave, which she felt was not far off. But there was one kindness which it was in his power to grant her, the remembrance of which would bring consolation to her dark and weary path. Would he, before they parted for ever, give her one kiss? After some timidity and agitation, the young curate, touched with pity, complied. The lady shed another tear, bade him adieu in a hollow voice, and he departed. A few days afterwards he received a neat little parcel gracefully tied with a piece of blue ribbon, and on opening it found an instantaneous photograph (cabinet size) of himself kissing the young lady. Accompanying this was a communication from the fair creature herself that there were eleven more copies, and that he might have the whole dozen at £20 a-piece. Should he not be in want of them, it was her intention to dispose of them in another quarter. Negotiations on the subject were said to be proceeding.

EXCHANGE COLUMN.

What offers in exchange for forty stereo. negatives?—Address, PHOTOGRAPHER, St. Merryn, Padstow.

I will exchange a 5 × 4 pocket and a quarter-plate camera, three double backs each, for a tricycle.—Address, 3, Egerton-road, New Ferry.

Wanted, a quarter-plate view lens, in exchange for a quarter-plate portrait lens by Flemming, London.—Address, G. SMITH, 10, Lark Hill-terrace, Preston.

I will exchange a Victoria camera, four lenses, by Darlot, and gem camera, six lenses. What offers?—Address, PHOTOGRAPHER, 20, Fore-street, Brixham, Devon.

I will exchange Weston's cabinet burnisher for a folding pocket camera with double backs; difference adjusted. — Address, GEORGE FEAR, Market-place, Trowbridge.

Wanted, a whole-plate camera and lens by a good maker, in exchange for a beautiful pug dog, a great favourite with children. Photograph sent.—Address, T. VIPOND, Grantham.

Wanted, for cash or exchange, a half-plate landscape camera with three or four double backs and tripod, with or without landscape lens.—Address, S. WATTS, Queen-street, Bridgewater.

Wanted, outdoor backgrounds and accessories, in exchange for other backgrounds, Seavey's boat, and cabinet portrait lens.—Address, R. J. ARNOLD, photographer, Market Drayton.

I will exchange my violin (splendid tone), bow, and solid leather case (violin alone worth £6), for a good $7\frac{1}{2} \times 5$ tourist camera complete. At home after seven p.m.—Address, E. WILSON, 36, Roman-road, Barnsbury, N.

We will exchange a Bowman rolling-press, *carte* size, also a 20 × 16 silver bath, in water-tight mahogany case, for a carved cabinet or any other useful accessories.—Address, GOODALL AND STEVEN, Jamaica-street, Glasgow.

I will exchange Dallmeyer's patent lens and Rouch's half-plate bellows-body camera, for a quarter-plate tourist and bellows-body camera, with several dark slides, and landscape lens.—Address, H. R., 18, Fransfield-grove, Sydenham, S.E.

I will exchange a very old clock, in oak case, brass dial, suitable for a hall, in perfect working order and good condition, value £3, for a strong head- and body-rest, focussing-glass, backgrounds, or other useful photographic apparatus.—Address, J. B. SMITHSON, Leyburn, Yorkshire.

I will exchange a prismatic lantern, with three and a-quarter inch condensers, lime light arrangement, and 100 slides of various subjects, also a luxograph lamp and gem camera, with twelve lenses, and upwards of fifty gross of quarter-plate negatives, for anything useful in photography.—Address, HINCHCLIFFE, 273, Scotland-road, Liverpool.

I will exchange a triangle iron tank with large brass tap, on stand, capacity about thirty gallons, suitable for print washing (coated with pitch), also 12 × 10 glass bath in stand and half-plate porcelain ditto for fixing negatives. Wanted, half-plate portrait lens or single view lens for 10 × 8. Difference in cash adjusted.—Address, C. VERNON, 4, Longton-grove-terrace, Sydenham.

I will exchange a Victoria camera and nine lenses, gem camera and twelve lenses, Dancer's patent stereo. camera and lenses, with changing-box to hold twelve slides for plates $6\frac{1}{4} \times 3\frac{1}{2}$, Meagher's dark tent, whole plate, with tripod, solar camera, nine inch condenser, all equal to new. Wanted, a good quarter-plate camera, with or without lens, and offers.—Address, C. P. GEE, 80, Thomas-street, Weymouth.

I will exchange an interior background, by Marion, a good posing-chair, whole-plate portrait lens, by Slater, good for cabinets, quarter-plate portrait lens, by Shepard, and splendid half-plate landscape lens. Wanted, a 15 × 12 rolling-press, *carte* repeating-back camera, No. 1 wide-angle rectilinear lens, by Ross or Dallmeyer, or anything useful in photography.—Address, J. WHITE, 32, High-street, Littlehampton.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Z. Y.—You are quite in error. Put your theory to the test of practice and you will soon be convinced of the fact.

A. VICK.—You have far too much castor oil in the collodion; one-eighth of what you have employed would be quite sufficient.

W. CAHILL.—The glass referred to may be procured at most glass warehouses, under the name of "smoothed patent plate."

ALMA.—Not having tested either of the lenses in question we are, of course, unable to pronounce an opinion on their respective merits.

J. A. MOTTRAM.—We can give no more definite instructions than those contained on page 17 of our present volume. We cannot conceive what more is required.

W. GRIFFITHS.—Any colouring matter will answer if care be taken not to use too much. Mr. Woodbury employs Indian ink, but Prussian blue has also been used.

R. BOYD.—If you can procure methylated spirit sufficiently strong it will answer quite as well as the alcohol; but it must be strong. What is sold as 66 o.p. will do, if you can obtain it of that strength in your neighbourhood.

REV. S.—Nothing makes a better foundation for a background than unbleached sheeting. This you can procure at any linen-draper's establishment, from two to three yards wide. Strain it on a light deal frame, and then colour it in distemper in the manner you propose.

JAMES ANDREWS.—The spots appear to be due to minute particles of air adhering to the surface of the prints while they are in the hypo. bath. With some samples of paper, and under certain conditions of the fixing solution, minute air-bells will adhere very tenaciously to the surface of the prints. They can only be got rid of by employing great care and attention when the prints are *first* immersed in the solution.

A YORKSHIRE AMATEUR.—No wonder the lens fails to give satisfactory pictures, as you have put it together wrongly, as shown by your diagram. The convex side of the front lens should be outwards and not the plane as you have it. You have rightly arranged the back combination.

P. P. P.—You will be far more successful in photographing objects of the class alluded to by using the one-inch power than the quarter. Indeed if you possess a two-inch object-glass we should advise you to employ that, as it will yield better definition over the whole of the picture.

S. B. J.—The tin dishes will answer perfectly for development and do not require any coating if they be carefully dried when not in use. To the wooden dishes apply several thin coats of black varnish or good Brunswick black, allowing each coat to dry thoroughly before putting on the next.

J. S. W.—Sutton's panoramic camera and Johnson's pantascopic camera are totally different in construction. In the former the picture is taken on a curved plate; in the latter the camera rotates while the picture is being exposed on a flat plate. Neither instrument is much used now-a-days—Sutton's rarely, if ever.

HERTFORD.—The fault of the panel picture is that the lens employed for taking it will not cover that size of plate; hence the "dark, indistinct corners." The largest size of picture you can get with it, judging by the examples forwarded, is about ten inches by seven. If you employ a lens of at least six inches, or, better, eight inches, longer focus you will not only get more perfect definition at the margin of the plate, but you will also have better perspective in the picture.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—The subject for discussion at the next meeting of this Club, on Wednesday next, the 25th inst., will be—*On the Preparation of Lantern Slides*. This being the last Wednesday in the month the evening will be devoted to the lantern. After this the regular lantern nights will be discontinued for the summer months. Visitors are invited to attend, and bring slides or objects of interest to be shown in the lantern.

A NEW STYLE OF PORTRAIT.—We have before us a specimen of a new style of picture which Messrs. Mawson and Swan are introducing to the profession in the shape of panel size portraits in carbon, enlarged from ordinary cabinet-sized negatives. The style is most effective and imposing, and the closest scrutiny of the example we have, and of others we have carefully examined, fails to show the least evidence of the pictures being anything but direct ones. We anticipate for the new picture a considerable amount of popular favour.

THE LATE MR. JOSEPH WAKE.—We regret to announce the death of a gentleman well known in photographic and art circles, Mr. Joseph Wake, better known, perhaps, to many of our readers as the author of a valuable series of articles on photographic colouring which appeared in our columns a few years ago, and were subsequently published in book form. Mr. Wake had been for ten years head of the artistic staff of the Autotype Company, and was a member of the Manchester Academy of Fine Art and of the Hogarth Club. The deceased gentleman had been long subject to periodical attacks of hæmorrhage from the nose, and it was to one of these he finally succumbed at the comparatively early age of forty-seven.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 25	Bristol	Studio, Portland-st., Kingsdown.
„ 26	London and Provincial	Mason's Hall, Basinghall-street.
„ 26	Liverpool Amateur	Free Library, William Brown-st.
„ 26	Oldham	Hare and Hounds, Yorkshire-st.

LONDON GAZETTE, *Tuesday, April* 10, 1883.

PARTNERSHIP DISSOLVED.

WILLIAM HARDING WARNER AND JOHN JACKSON, trading as W. Harding Warner and Co., at The Hollies, Clyde-park, Redland, Bristol, photographers; J. Jackson retires.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending April 18, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M

April	Bar.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Sh'de Tem.	Min. Tem.	Remarks.
12	30·02	NE	48	45	91	58	37	Cloudy.
13	29·91	SW	44	41	—	50	38	Overcast.
14	29·87	SW	46	43	93	56	40	Cloudy.
16	30·03	NW	47	42	98	59	40	Hazy.
17	30·07	W	48	43	95	57	37	Fine.
18	29·58	SW	55	50	102	61	42	Cloudy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1199. Vol. XXX.—APRIL 27, 1883.

VARIATIONS IN DEVELOPMENT.

A few weeks back—in our issue of the 9th ultimo—in treating on the above subject, we suggested the advisability of testing the capabilities of various additions to the developing solution for gelatine plates, with a view, if possible, of modifying the tone of the resulting image, in the same manner as with collodio-bromide films. Since that time we have made a few experiments with some of the substances which proved useful in the case of collodion; and, though we do not find them on the whole so effective with gelatine, we think it possible that at least some benefit may accrue from following up the quest.

It is worth while to make one remark before commencing to describe the results obtained, namely, that most of the trials have been made upon commercial films of the exact constitution of which we were ignorant; while in a few cases in which plates that were known to be of different preparation, and to contain different haloids, distinctly characteristic results were obtained from the same treatment. Thus, in a general way, films containing simple bromide showed the greatest variety of tones under different treatment, the presence of iodide tending, as a rule, to the production of a more uniformly-neutral black colour, while chloride produced more of a grey tint whatever material was used.

The first series of experiments consisted in changing the alkaline element in the developer, retaining the same proportions of pyrogallol and of restraining bromide throughout. It was difficult to estimate the relative developing values of the different alkalies, and, probably from variations in this respect alone, a considerable diversity of colour would arise. In addition to liquid ammonia we employed ammonium carbonate, sodium carbonate, potassium carbonate, as well as potassium hydrate, and finally M. Davanne's "saccharate of lime." These were added gradually to the pyro. and bromide as the progress of the development seemed to require. The results obtained exhibited, no doubt, considerable variety, but it is doubtful whether any improvement was gained upon the *liquor ammoniæ;* and much of the distinctive colour appeared to be rather due to "developing stain" than to anything else, as it was at least partly removed in most instances by the application of a clearing solution of alum and hydrochloric acid. Ammonium carbonate gave a softer and less vigorous development than the caustic solution, but otherwise not varying materially in colour. The carbonate of soda (common washing) gave a decidedly-yellowish or even greenish-brown image, but a good deal of that tint disappeared under the action of the alum. Pure sodium carbonate gave less of the yellow or green tone, but the prevailing brown also partly disappeared in the alum. Carbonate of potassium, in the crude form known as salts of tartar, gave a warm black with a trace of veil, the hydrate also rendering a black image, but with a very distinct deposit in the shadows. The best result was attained with M. A. Davanne's saccharate of lime, which was described by him in our Almanac for 1877, and which is prepared by shaking up slacked lime with a ten-per-cent. syrup of white sugar and allowing the mixture to stand until clear. This gave—especially with pure bromide plates—a rich, warm black image, which changed comparatively little in the alum bath.

The next series of substances tried included, amongst other organic matters, the following, the quantities of pyro., ammonia, and bromide remaining the same throughout:—Cane sugar, grape sugar, honey, albumen, decomposed gelatine, and mucilage of gum arabic. These results were, however, all negative in so far as any permanent improvement in colour was obtained; but it is quite possible that the restraining action exercised by some of them may indirectly, by permitting the variation of the exposure, prove useful in modifying the tone.

We next tested the influence of such substances as tannic, gallic, and salicylic acids, and these were found to give far more encouraging results. The hardening effect of the tannin upon the gelatine surface considerably limits its applicability, while the very low degree of solubility, at the ordinary temperature of the salicylic acid, has a similar effect, unless it be dissolved first in alcohol. Gallic acid produced the greatest variation in the character of the development, but tannin gave the better colour. Gallic acid, it may be noted, may be substituted entirely for pyro., though it does not form so energetic a developer.

Finally, we turned our attention to such substances as the acetates, tungstates, sulphates, phosphates, oxalates of the alkalies, and similar salts. Many of these apparently inert combinations prove to be really powerful restrainers of the same class as the alkaline citrates; and, though they undoubtedly bring about a great change in the character of the developed image, the prolonged development they entail renders necessary the subsequent application of the alum and hydrochloric acid mixture, and this to a great extent replaces all the results on the same level.

In conclusion: while the general character of the results obtained can scarcely be said to show any great amount of success in the direction aimed at, we are not without hope that by some combinations of the different materials already employed, or of others not yet tried, more satisfactory modifications may be secured. The physical nature of the gelatine film and its strong tendency to become stained by a prolongation of the development place it altogether in a different position to collodion with regard to the effect of these substances—at anyrate for positive or transparency work, where the absolute integrity of the lights must be preserved. For merely improving the colour and printing quality of the negative deposit probably some of the materials already enumerated may be found to answer, but our special object is in connection with transparencies.

DIFFUSION *VERSUS* DIALYSIS.

The process of dialysis has, since the use of gelatine became so general, assumed an importance in the eyes of photographers which it never before possessed, though the operations of diffusion, known under the term "dialysis," had really played an important *rôle* long before gelatine was ever thought of in connection with plate-making. As many erroneous notions prevail on the subject, a few plain explanations may serve to familiarise the principles of the process and destroy some of the misconceptions that exist.

There seems to be be a belief that in subjecting any substance to processes of dialysis some occult action is performed by the mem-

brane or other separating material between the two liquids to be mutually acted upon; but, except in the most minute degree, the conception is quite false. Professor Graham—who brought the process to perfection, and formulated the principles governing its action—made in the first instance a large number of experiments upon the diffusion of substances into water without the intervention of any separating medium at all. He carefully placed a number of bottles, exactly similar in size and filled with various solutions, in jars of water, and noted the amount of the salt that left the bottles and diffused into the surrounding water after the lapse of a certain length of time. Substances such as starch, gum, albumen, dextrine, gelatine, &c., he found diffused most slowly, while such bodies as diffused rapidly were crystalline compounds and other analogous substances. To the former the term "colloïds" (from a Greek word signifying glue) has been given, and to the latter "crystalloïds."

This property of unequal diffusive power—as examples of which we may cite hydrochloric acid and caramel, the latter diffusing ninety-eight times more slowly than the former—was able to be utilised for the separating from one another, when in solution, of bodies belonging to these two classes; but the facilities were greatly increased by interposing between the two liquids some material of a colloïdal nature, such as animal membrane. Again: the jelly of starch and of animal mucus, of pectine, and other solid colloïdal substances, are themselves permeable in mass just as water is; but, to use the words of a standard authority, "they greatly resist the passage of less diffusive substances, and cut off entirely other colloïd substances like themselves that may be in solution. In this respect they resemble animal membrane."

Thus, it is shown that when a certain salt in solution, mixed with anything of a gummy nature, is placed so as to be separated from a body of water simply by a substratum of animal or other membrane, the gummy matter will remain behind, while the salt will pass through the septum into the surrounding water.

If the experiment be performed with a fairly-stiff jelly—as, for example, a layer of jelly containing a salt dissolved in it, and then a second layer of jelly placed upon the top, the plane of contact being rendered invisible by heating the upper layer and allowing it to cool—it will be found that a portion of the salt will leave the first and penetrate into the whole substance of the second layer after the lapse of a certain period. When this experiment was performed the two layers were in contact for eight days; the upper jelly was removed slice by slice, and its contents analysed, the result being that the salt diffused in eight days from the lower to the upper jelly to a greater extent than it did into water in seven days.

We thus see that the membrane, or the separating body, such as gelatine, plays little further part than to enable the two liquids—into which and from which respectively the crystallised matter diffuses—to be brought into contact without mixing. There is the difference that the accompanying colloïdal matter is kept more completely to its own quarters than if no membrane were present.

There is, however, at the same time that the diffusion is taking place, another remarkable and less-familiar phenomenon occurring. Not only does the crystalloïdal body pass from one side of the septum to the other, but its place is taken in greater or less degree by water from the side the salt passes to. It is found that, independently of the state of concentration, a given quantity of each particular salt is replaced by a definite quantity of water, which has been termed its "osmotic equivalent." The quantity of water so passing is often much greater than would occur in simple diffusion, sometimes amounting to several hundred times the quantity of the salt displaced; and the displacement takes place with a definite force, which can by a simple arrangement be measured. It has further been discovered that the osmotic action of one salt may be interfered with to a most considerable extent by the presence, even in slight quantity, of another salt. Thus, sulphate of potash has a moderate osmotic force; but, by the addition of so small a quantity as the one-thousandth part of its weight of carbonate of ammonia, the quantity of water that passes to displace it—its osmotic force—is increased tenfold.

The possible bearing of this action on some photographic processes is obvious. If a salt has to be dissolved from the texture of albumenised paper or from the film upon a gelatine plate its place will be taken by water. Experiments are needed to enable us to ascertain the exact osmotic equivalent of the particular substances involved; but it is a most probable supposition that the water exceeds in amount the salt dissolved and displaced. If this be the case, it is evident that, in the case of a gelatine plate, the film would expand quite independently of the expansion through the water absorbed when the plate was put into the fixing bath; and if the gelatine were such that it could not resist the osmotic force, frilling or blisters would be the inevitable result; and, as a matter of fact, it is during and after the fixing operation that blisters are most frequently seen.

It will be perceived that precisely the same principles must apply during the elimination of the "hypo." after fixing, and it is at that stage that blisters most frequently occur in albumenised paper.

It is a singular fact in this connection that in some salts the osmotic equivalent is a *minus* quantity—that is, the water which displaces the salt is less in quantity than the salt that diffuses—and, further, the addition of some substances causes salts having a positive action to behave as though their action were *minus*. If now the action of the various photographic salts were measured, and a cheap salt or other crystalloïd could be discovered that would reverse the action, many cases of frilling in gelatine plates and blisters in albumenised paper might be prevented. Methylated alcohol, among other things, we know is in most instances a perfect cure for the latter, and possibly less expensive additions to a fixing bath might be found.

The subject is of great interest and importance, and we propose to return in our next to its further consideration.

HEAT AS AFFECTING THE PERMANENCE OF PRINTS.

Until we obtain a process which will supersede silver printing for the production of photographs in everyday practice, too much attention cannot be devoted to rendering our pictures as permanent as is permitted by the present state of knowledge; for, be the cause what it may—whether impurities in the mounts, weakly-sensitised paper, negligence in the manipulations, or thinner negatives—it is a fact that there are more complaints of the instability of prints now than formerly.

Just at the present time the public taste appears to be in favour of photographs of larger dimensions, as witness the increasing demand for the panel size picture, particularly for portraiture. Now this happens very opportunely for the photographer, as, by reason of the exalted sensitiveness of gelatine plates, he is enabled to produce them with very inexpensive lenses compared with what was at one time necessary for portraits of large size; hence the production of this class of picture at once becomes more remunerative to the professional artist than the smaller sizes, and ought, therefore, to be encouraged. It would be a pity if the demand for these larger sizes should receive a check by reason of the evanescent character of the pictures compared with what were formerly produced; for, of course, the public cannot much longer be expected to pay high prices for pictures unless they have a certain degree of confidence in their stability. For this reason "no stone should be left unturned" by photographers in order to secure the maximum of permanency possible in their productions, and full advantage should be taken of every little point that will conduce to that end.

The object of the present article is to raise the question—Is the application of heat to the finished print of any advantage in conferring greater stability on the photograph? We know that in the older forms of "marking ink," which consisted essentially of a solution of oxide of silver in ammonia (ammonio-nitrate of silver), it was necessary, after the fabric had been written upon, to press it with an iron as hot as could well be employed without danger of injuring the fibre. When this was done the writing was rendered indelible, and would remain of a fine black until the fabric itself

had worn out, notwithstanding the treatment that it continually received at the laundry; but if the ironing were omitted then the writing invariably disappeared after a few washings, and frequently the ink was condemned as being at fault.

At one time, in the very earliest days of photography, it was the constant practice with most operators to press the prints with a hot laundry iron before they were mounted. This was done with a twofold purpose—first, with a view to darken the tone or render the picture blacker; and, secondly, as it was surmised, to still further fix the image. But the practice has been discontinued for many years, so far as the treatment of the print previous to mounting is concerned. Rolling on a heated plate—"hot pressing," as it is sometimes termed—and burnishing by a hot bar is now somewhat largely practised, though not with the idea of enhancing the stability; yet it will be instructive to know if prints so treated have proved more or less permanent than those which have simply been rolled with cold pressure in the ordinary manner. Burnishing and hot rolling, as generally practised, can scarcely be considered as equivalent to the old-fashioned plan of ironing, as in the former the print, after it is mounted, is only for a very brief period in close contact with the heated surface; whilst in the latter the heat was applied for a much longer time, the plan being to place the picture on several thicknesses of paper and then to pass the hot iron over it several times with considerable pressure, in the same manner as in ironing linen. By this means the print became thoroughly heated, and was kept so for a much longer time than in the case either of hot pressing or burnishing.

The effect of heat on photographs appears to vary considerably. If a photograph be plunged into boiling or very hot water the colour is generally lightened, becoming of a redder or browner tone; But if a dry heat be applied the print usually (but not always) takes a darker or blacker tone. The action of heat does not always appear to be uniform, probably on account of some trifling difference in treatment the prints may have received in their production In some experiments, recently made, we have met with, at first sight, somewhat curious results. We took a print (a mounted *carte*) that had been made some five or six years, which did not show any signs whatever of fading; but on passing a hot laundry iron over it several times it changed very considerably and showed unmistakable signs of decay. The whites became yellow, and the half-tones suffered considerably in the details.

Seeing this, we took another print which had faded to a considerable extent—the lights being quite yellow. Upon ironing this it became at once very much worse. Remembering that the prints had been kept for several years in a place by no means free from damp we took some more out of the same batch, and made them thoroughly dry before applying the iron, with the result that no really appreciable change was produced by the treatment. In one or two instances we imagined the tone was rendered slightly darker, but it was very trifling indeed. Prints which had decidedly begun to fade did not appear to be made worse, as was the case previously when they were ironed before they were made perfectly dry.

We have commenced a series of experiments with a view to determine whether greater permanence is produced by subjecting the prints to a strong heat before mounting them, and if any satisfactory conclusions can be arrived at we shall give our readers the benefit of the result. These experiments must necessarily extend over a considerable period; but, in the meantime, we shall be happy to receive details of the experience of others who may have been experimenting in the same direction.

In another column will be found the first instalment of Mr. H. A. Lawrance's account of the doings of the English party despatched to observe the total eclipse of May 6th. The communication reaches us from on board the s.s. "Bolivia," at Guayaquil, and was written after the junction of the American and English parties, but before they had decided upon their observing point. Although, of course, no details can yet be expected for some time as to the actual success of the expedition, there is every reason, judging from the care exercised, that it will be assured, and the details of the preparations will be read with interest.

The analogy between the eye and a photographic camera has been exemplified in a fresh manner by a series of observations by Mr. H. F. Newall. The effect of "flare"—so long a source of mystification and annoyance to workers with the camera—was shown to be owing to reflections from the inner surfaces of the lenses, and the above gentleman has observed the effects of an internal reflection within his eyes, which appears in the form of a somewhat dim, inverted image of any bright image placed in front of the eye. He used a lighted candle, and, in a paper read before the Royal Society, he describes a large number of experiments made to find the exact *locale* of the reflection. He finally arrives at the conclusion that it comes from the front surface of the crystalline lens, and is a reflection of the image thrown on the retina, just as though the lens of the camera produced a reflection of the image on the sensitive plate.

A few weeks ago we described an accident that had occurred in a private house through the rays of the sun having been concentrated by the lens of a graphoscope and set fire to a lady's dress. Since then, as we expected, numerous other instances have been brought to light of the ignition of inflammable substances by the accidental concentration of the sun's rays. One gentleman describes how, in India, his carriage lamps were set alight by the concentration taking place by reflection from a mirror. Last week the photographer's studio that was set on fire by a "bull's-eye" in the roof was paralleled still more closely by an account of the repp curtains in the saloon of a despatch boat having been ignited by a plano-convex lens, forming the scuttle glass, focussing the sun's rays upon them. These instances should form timely warnings to photographers and others as to how and where they place large lenses with regard to the sunlight.

A pawnbroker's shop in the capital of China is about the last place in the world where one would expect to find photographic goods, and yet we read that Mr. Yang (a well-known pawnbroker of the Chinese metropolis) owned a store of photographic apparatus, not to speak of such sundries as gas-works, steam engines, a whole pharmacopœia of drugs, &c. After this it is not surprising to learn that Mr. Yang has studied chemistry, mechanical science, mineralogy, medicine, &c.!

Some time ago we made reference to the visit of the British Association to Canada, and the schism that the project seemed likely to create in the ranks of the members. An official letter of inquiry has been sent to the members asking whether they intend to go to Montreal or not. So far we learn the affirmation replies number 340, including a good many who may be termed representative men of science.

Referring to our remarks last week upon the translation into engravings of photographic results, we may say that there are, of course, instances where scientific accuracy is not the chief end of the photographing, in which engraving may add to the artistic value of the results. A case in point has recently occurred, where the French periodical, *La Nature*, has made an engraving of a well-known photograph of one of the lions at the "Zoo." This is an actual engraving, though photography has been used to transfer the image on to wood. The picture is copied into the English serial, *Nature*, and is accompanied by remarks, which we print *in extenso*. Our readers will perceive that the editor of that journal (unwittingly, no doubt) gives a completely-false impression to a non-professional of the means by which the picture is produced; for nineteen persons out of every twenty would, after reading the account, believe the block was the unaided product of photography and not the result of the labour of the graver's tool. After speaking of the block being from a photograph, the description in *Nature* runs as follows:—"The original was rephotographed in Paris directly on the wood by means of a special collodion at present much used. This has assured a

perfectly-faithful reproduction of the original, exhibiting all the characteristic details of the lion at rest. The illustration tells its own story."

As an example of the commercial value of photography in the printing press we may call attention to an advertisement in the *English Mechanic* of April 13, the greater part of one of its large advertising pages being filled with illustrations and letterpress (the latter on a very small scale), all produced by photography.

The improved bichromate battery of M. Trouvé seems to be gaining ground, and is well spoken of by many, one writer in a contemporary, however, stating that more water requires to be added than is recommended in the inventor's description. Seeing that a lamp and battery (of one kind) is advertised to be had complete for 25s., it is evident that with an improved manner of working the battery at no increase of expense such miniature lights would be capable of fulfilling many useful functions in the studio or laboratory of the photographer. M. Trouvé's mode is as follows:—He adds three ounces of bichromate of potash to a pint of water, and drop by drop nine ounces (by weight) of sulphuric acid. The mixing of the acid with the water causes in the well-known manner a rise in the temperature of the mixture, and the bichromate dissolves. Upon cooling no crystals are formed, nor are any found in the cell. It is stated that ten ten-candle lamps can be kept working for five hours with less than double the above quantity of materials. The zincs, as may well be supposed, are rapidly consumed with the production of so much electricity.

WITH THE ECLIPSE EXPEDITION.

On the 17th of February last an expedition, consisting of Mr. C. R. Woods and myself, was sent by the Royal Society and the Science and Art Department to observe the total eclipse of the sun, visible only in the Pacific Ocean, which takes place on May 6th, at 9.45, Greenwich time. We left Waterloo Station by the special boat train, and embarked upon the Royal Mail Company's steamship "Medway" at Southampton, where we found that Mr. Linstead, the company's agent, had taken every precaution for the safety of our instruments.

About three o'clock the vessel got under weigh, and by seven o'clock was in the Channel. The voyage was uneventful and very calm—a great contrast to the voyage to Egypt last year. The monotony of the passage was only relieved by a concert and a "nigger" performance given by the officers. Barbadoes was reached at daybreak on the morning of the 2nd of March, and here most of our fellow-travellers left us. Bridgetown, the capital, is a clean, little town, with many nice villa residences in its suburbs, surrounded by charming gardens containing many beautiful flowering shrubs and trees. The town is full of activity, and has many good stores. A drive into the country was taken, and several plates exposed on objects of interest with good success. The country is rolling, but somewhat uninteresting, as there are very few trees, though it is very well cultivated.

Barbadoes was left early next morning, and at six o'clock we were passing between the islands of St. Lucia and St. Vincent. Both were wooded as high as we could see, for clouds covered the summits of their mountains. St. Vincent's was the nearer, and with our field glasses we could make out some deep gorges. St. Lucia appeared much more volcanic than St. Vincent, and at the western end two very perfect cones, known as the Pitous, were seen.

Jacquemel was the next port we called at, but the vessel did not stay long enough for us to land. The town stands at the head of a bay, surrounded by lofty and picturesque mountains. We left this port about eight o'clock, and the rest of the day we travelled westward parallel to the coast of Hayti, so that we were able to admire the scenery; unfortunately, however, the lofty range of Les Hattes was hidden by mist.

Jamaica was reached early next morning, and by seven o'clock we were alongside the wharf at Kingston. The track of the fire was shown by the roofless houses and blackened palm trees. A walk through the town showed that very little had been done towards restoration. In a few cases small wooden stores had been erected within the ruins, and in more cases labourers were at work repairing; but it seems as if the owners were too much disheartened to do anything. We were told that the distress had been much exaggerated, and that the accounts sent home were very sensational. A short distance from the town is the racecourse, on which were about a dozen tents inhabited by the most destitute of the refugees.

Kingston sadly wants a Board of Health. Its streets are very uneven, and down all that lead to the sea run more or less putrid brooks. No wonder it is unhealthy. The streets of Cairo and even of Sohag are cleaner than those of this place. The adjacent country, however, is charming. Pretty little villas in beautiful gardens adorn all the roads leading out of the town, and the lanes are full of flowers of very varied hue and shape, and of forms of insect and animal life that were quite new to us. At one place we watched with great interest a pretty little humming-bird hovering over and thrusting his long beak into some wild flowers. The Blue Mountains, which rise close behind the town, afforded a background that was ever changing its hue under the effects of light and shade. The two sunrises that we saw here were very beautiful. The second day of our stay we made a photographic trip, exposing eight plates; time, however, prevented our doing all we intended, as we were bound to be on board by one o'clock. We were consoled when evening came by finding that all the plates gave good pictures.

Jamaica was left about two o'clock on the 7th March, and Colon was reached at noon on the 9th—just too late for the mail to Panama. The same afternoon the instruments were got out, packed into a van, and, after a little trouble, we were promised that they should be sent to Panama by the first train. The thanks of the expedition are due to Captain Bruce, Mr. J. Brown, and the other officers of the "Medway," who did everything they could for our comfort, and also to Mr. Way, the Company's agent, Mr. Burt, of the Panama Railroad, and to Mr. Crompton, the Vice-Consul, for their help in getting away from Colon.

The next day, at daybreak, we learnt that the American mail was in sight, and on her arrival we found the party of American observers, whom we were to join, on board. The American observers consisted of Professor Holden, Dr. Hastings, Mr. Rockwell, Mr. Preston, Lieut. Brown, U.S.N., and Mr. Upton. Their baggage was quickly landed, and at one o'clock we started on our journey across the isthmus. The tropical scenery is very fine along this line, the vegetation most rank and luxurious, with gorgeous butterflies flitting amongst the beautiful orchids and flowering shrubs. Here and there we came upon clearings that had been made for the Panama Canal. We passed by several large settlements of labourers, and saw in a great many places evidences of a large amount of work having been done.

At Panama we found we should have to pass the night, as the "Bolivia"—the steamer on which we were to go to Callao—would not start till the following evening. The next day all the instruments were got on board, and now we are travelling down the coast to join either the "Hartford" or the "Pensacola," in which we proceed to the Caroline Islands, where we shall erect our observatories, provided the French party, consisting of M. Janssen, Sig. Tacchini, and assistant, Mr. Ranyard, F.R.A.S., and two Austrians, have not taken possession. If they have we shall probably travel further westward to Flint Island, so as to increase the chance of fine weather being obtained.

The Caroline group consists of a number of small islands covered with cocoa-nut trees enclosed by a coral reef seven and a-half miles long by one and a-half wide. In 1880 these islands were reported uninhabited; they are from fifteen to twenty feet above the sea level. Flint Island is lower, and covered by brushwood and trees. It is three and a-half miles long by one and a-half wide in its broadest part. The landing is very difficult. Thus much for the fortunes of the observers; now let us see what the various members of the expedition hope to do.

Professor Holden, the successor to the late Professor Watson, of the Wisconsin Observatory, will search for the planet Vulcan—which Watson thought he saw in 1878 with a six-inch telescope made by Clark—but does not expect to find it.

Dr. C. H. Hastings, of the John Hopkins' University, Baltimore, will make a spectroscopic examination of the outer corona. By an ingenious arrangement the light from the corona, on opposite sides of the moon's diameter, can be examined at once, so that if there be any difference in the spectrum or in the intensity of the lines it can be easily detected. Dr. Hastings will be assisted by Mr. C. H. Rockwell, of New Jersey, who, with a four-inch telescope and grating spectroscope of high power, will observe the reversal of the lines just before and after totality, just as Mr. Lockyer did last year in Egypt—we will trust with as good results.

Lieutenant Brown, of the United States Navy, will observe the spectrum of the corona during totality with an integrating spectroscope provided with a slit; while Mr. W. Upton, of the United States Signal Service, will also observe the corona with a prism placed before the object-glass of a telescope.

Mr. Preston, of the United States Coast Survey, will observe the second and third contacts with a three and a-half inch Clark's telescope, Professor Holding observing the first and fourth. As soon as the second contact has been observed Mr. Preston will go to a four-inch comet-seeker armed with a polariscope, which will be directed to different parts of the corona by an officer of the ship, while another officer will observe the details of the corona, especially round the poles, with the three and a-half inch Clark.

The photographic work has thus been left entirely to the English party, which will, with the assistance of two officers from the ship, work three instruments. Mr. C. R. Woods will have a siderostat, with a thirteen-inch mirror, throwing a beam of light into a Rowland grating, a prismatic camera, an analysing spectroscope, and an integrating spectroscope. The Rowland grating is provided with a camera on each side. The prismatic camera is the one used last year in Egypt, with another prism added to it. It will give images of the sun (rings) for every bright line in the corona spectrum from red to blue. The analysing spectroscope is the same as that used in Egypt last year, and will probably give very good results. The integrating spectroscope is provided with a long plate which will be driven by clockwork during the whole totality. In this way it is hoped that the phenomena will be differentiated. The Rowland grating, cameras, and the cameras for the spectroscopes under my own charge, are likewise provided with long plates, but they are moved by hand instead of clockwork.

An officer of the ship will work the two photoheliographs—the one to give a large magnified image of the sun four inches in diameter, whereby it is hoped that it may be possible to photograph the inner detail of the corona; the other gives a small image of the sun, and is the instrument which took such perfect pictures of the outer corona at the last total eclipse.

Another officer will give out to all observers the time that remains for work every ten seconds.

My own attention will be given to a spectroscope of high dispersion for catching what is technically known as the "flash" before and after totality, and for obtaining the bright lines in the order in which they occur; and also a spectroscope of lower power for the same thing in case the dispersion of the other is too great. I shall also probably observe the first and fourth contacts.

At the moment of totality an immense number of bright lines suddenly appear, which last for only a short time. This is the "flash."

Thus, between the American and the English parties, a quantity of good work ought to be done that will make the eclipse of May 6, 1883, memorable amongst eclipses. H. A. LAWRANCE, F.C.S.

NOTES ON LENSES FOR PORTRAITURE.

It is curious how small a share of attention is given by photographers to what certainly is the chief implement or tool of their art, namely, the lens. It is the one thing of all others a thorough knowledge of the powers of which would naturally be supposed to be the desire of the user to gain; yet we find that the extent to which most photographers investigate the subject amounts to the perusal of the pages of a lens-maker's catalogue, the statements in which they swallow without question of any kind.

The general state of knowledge on the subject is aptly illustrated by a discussion which took place at a recent photographic meeting, where it appeared to be considered a question whether or not there existed in the portrait lens some obscure quality quite beyond those which usually come under the notice of the optician; that besides the quality of giving definition, flatness of field, and of permitting the use of a large aperture where such is desired, there is some magical property in a portrait lens whereby it gives a more "brilliant" image than will another lens working at the same aperture.

Now, it cannot be too distinctly comprehended—I have no doubt that it would have been earlier understood had it not been evidently to the advantage of opticians to keep the matter as much in obscurity as possible—that, except where it is necessary to use a larger aperture than can be obtained in any other lens, the portrait lens is *inferior in every respect* to all others. It was the outcome of a set of conditions totally different from those which now exist, namely, those of the collodion process. Every qualification had to be strained to compensate for the comparative slowness of the process and avoid intolerably long exposures, the consequence being that the portrait lens was produced. It is true that we have in it one of the most wonderful of optical instruments, a triumph of art and skill, but, nevertheless, a makeshift—an instrument in which all qualities except one are to a certain extent sacrificed to that one, which, I need scarcely say, is rapidity. Definition, as we all know, if exquisite through a certain angle, is confined to a very small one indeed. Flatness of field, as compared with that of any landscape lens, is exceedingly small, and, above all, equality of illumination is wanting.

We do not appreciate these defects sufficiently unless we consider how very much longer for a given plate the focus of a portrait lens is than that of any of the landscape lenses in common use. The lenses generally sold as "cabinet" lenses have an equivalent focal length of at least ten inches. With such a lens it will certainly be found that a half-plate is not covered to the corners with even a moderate portrait lens aperture—say $\frac{f}{4}$. To cover with this aperture will require an equivalent focal length of at least fourteen inches. Here, be it understood, I mean by "covering" giving as good definition at the extreme corners as in the centre. A landscape lens of the same focal length would cover, according to its construction, anything from a plate $8\frac{1}{2} \times 6\frac{1}{2}$ inches to one 20×15 inches; or, to cover the half-plate, there would be required a landscape lens of focal length only from ten inches to four inches.

In the matter of brilliancy, again, the portrait lens is the most defective of any, because, from its many reflecting surfaces, it tends to diffuse a certain amount of the light reflected from the most brilliant parts of the subject on to the portions of the plate which as representing shadow ought to receive none or little. I, therefore, repeat that, except for the case where it is necessary to use a lens giving greater aperture than even the more rapid landscape lenses can be worked with, the portrait combination is in every way the *worst*, whatever be the subject.

In the present day—except for *cartes* and occasionally cabinets—I imagine that an aperture is seldom used which could not be got with a rapid rectilinear lens, or, at anyrate, with a D or group lens; and yet photographers appear to adhere to the use of a portrait lens whenever a portrait is required as strictly as they did in wet-plate days. The true place of the portrait lens at present is that which the extra-rapid or baby lens held some years ago. It is an instrument to make use of in the case of emergencies—either when the weather is unusually dull or when a particularly difficult subject is presented.

That photographers who have on hand a fine set of portrait lenses should be unwilling to disuse them is natural; but that those wishing new instruments should buy large-sized portrait lenses appears a mistake. I believe that the reason for so doing is to be found in the general impression before noted, that there is some magic in the portrait combination distinguishing it from all others; also, quite likely it arises in part from another cause: this is ignorance of how to use a landscape lens for portraiture. A landscape lens (we will say) of ten inches focal length is sold as a whole-plate lens, and it is found that it will cover with admirable definition the plate named—certainly with far more perfect marginal definition than is necessary for a portrait. It is, therefore, argued that it may be used as a whole-plate portrait lens, and the resulting portrait is certainly sharp enough at the edges; but there is still seen to be something wrong. If the portraitist be anything of an artist he will see at once that the perspective is wrong; but even now he may not thoroughly understand the matter, but may simply lay his landscape lens on one side under the impression that it is "unsuitable for portraiture."

Now, had he used his lens for a picture on a 5×4 plate only he would have found everything satisfactory. The fact is that, before, he was including far too great an angle, and he got a false perspective. It must be distinctly borne in mind that *if a landscape lens is to be used for portraiture it must not be used with the largest plate which it will cover, but only with such a plate as a portrait lens of the same equivalent focal length will cover.* It is a good rule to use a lens of equivalent focal length *at least* double the longer dimension of the portrait to be produced. Thus, for a *carte* the focal length will be at least seven inches, for a cabinet twelve inches, for an 8×6 picture sixteen inches, and soforth.

It is quite possible that opticians might design a new lens more exactly suited to the present requirements of portrait photography than any in the market; but it appears doubtful whether anything which would not very nearly approach the group lens or the rapid rectilinear could be produced. One thing which they might do is to alter the wording of their advertisements so as not to lead the

photographic public—which depends for the major part of its information on this species of literature—to the impression that a portrait lens is, under all circumstances, the most suitable for portraiture. It is a notable fact that the wording in which our principal opticians described the uses of their lenses has been in no way altered since the change from wet-plate work to dry-plate work became general. This may merely be accidental, but certainly the impression conveyed is that the opticians are desirous of not removing the ignorance which exists on many points in connection with photographic lenses.

There can be no doubt that, except for the smallest size of portraits, where as before indicated the portrait lens may still be the most useful, the best form is either the group or rapid rectilinear. Nevertheless, it has frequently been pointed out and several times demonstrated, by Mr. A. Cowan and others, that portraits may be taken with single lenses. Certain forms of the single landscape lens may be worked to $\frac{f}{12}$ or even to "8" of the uniform standard numbers, which is a shade larger. This necessitates in a well-lighted studio an exposure of only four or five seconds, which is by no means excessive. I have used a single lens for portraits in an ordinary room, but in such a case the exposure is somewhat prolonged. Ten seconds are necessary, even under very favourable circumstances. Generally twenty or thirty are required.

I am here speaking of the ordinary forms of single lenses, but it must be borne in mind that, as it is necessary in the case of a portrait to use a much less angle than is given with a single lens, even with the larger aperture mentioned some marginal definition might be spared; in fact, a somewhat rounder field might be permitted. Would it not be possible, if a little were given in this direction, to take a little in another? That is to say, might not a special lens be so ground that, whilst it had a somewhat rounder field than the ordinary single lens, it permitted the use of a somewhat larger aperture?

It appears to me by no means unlikely that the portrait lens of the future may be a *single* lens. I notice that a certain optician is making a new departure in the form of a single lens specially ground which works at $\frac{f}{15}$, and which is intended for instantaneous work. I have not yet tried such a lens, but intend to do so. If it give fairly-good definition, through even a moderate angle, it will be a useful instrument. W. K. Burton.

THE NEW PATENT BILL.

It will probably be some time yet before the new Patent Bill, introduced by Mr. J. Chamberlain on the 16th inst., can get through the grand committee to which it has been referred, if we may judge by the progress made by the Bankruptcy Bill. However, patent law is a matter not understood by a very large number of members of the House, and very likely when the Bill is once taken in hand it will not be long before it is ready to be read a third time.

Considering the number of photographic patents which are taken out, or at least applied for, every year, the subject of patent law cannot be without interest to many of our readers. The great reduction of the charges for the earlier stages of a patent (£4 in all for four years), will doubtless have its effect upon photographic as upon other inventions, and probably it will have even more effect upon inventions of a class which it does not require any very great length of time to perfect and get into the market than upon inventions dealing with large manufactures, which may require several years to complete, and as many more before they can be got fairly to work. Improvements in steamships, blast furnaces, steam engines, and the like, often only become profitable during the last few years of a patent's life; but the majority of photographic patents can be fully tested in a much shorter space of time.

On the other hand, the heavy fees which still have to be paid in the fourth and eighth year of a patent (£50 and £100 respectively) will press very hardly upon those inventions which have been successfully started in their career during the first four years, but have not yet sufficiently paid their inventors. Probably, however, before the bill passes into law modifications in this respect will be effected, despite Mr. Chamberlain's statement that he was not prepared to make any further reduction in the fees.

As regards the method of application for a patent, it is probable that some of the defects which have been pointed out in the recent discussions at the Society of Arts and elsewhere will be removed before the bill passes, while the advantages of simplification and facility for making application will remain. The fact that the necessary forms can be obtained at postoffices and be transmitted through the post to the Patent Office in London will be a great boon to all who are sufficiently intelligent to fill up the forms themselves without the assistance of a professional patent agent.

The proposed arrangements for amendment, extension, and revocation of patents do not greatly concern us, any more than the curious provisions under which the Secretary of State for War is authorised to take charge of warlike inventions and carefully bottle them up so as to prevent their being used to the damage of any of Her Majesty's lieges.

On the whole the bill is decidedly friendly to the class of patents under which photographic inventions would come, though, as has been pointed out in several quarters, it is, generally speaking, inferior to the careful measure which was prepared by the Society of Arts, and introduced on behalf of that Society by Sir John Lubbock.

THE PRACTICAL WORKING OF RAPID COLLODION EMULSIONS.

The influence exercised by the various bromides in ordinary use upon the resulting emulsion is a point of considerable importance at any time, but is more especially so when a minimum quantity of pyroxyline is employed. It will be found that the greater the difficulty there is in dissolving the bromide the quicker the emulsifying itself is completed, and, as a consequence, the coarser and heavier the resulting molecules of silver bromide. The result of this is that, in the case of the more insoluble bromide, more pyroxyline is required to suspend the sensitive silver haloid than would be the case with those that are freely soluble.

As an example, take potassium bromide, which is only very sparingly soluble in alcohol. Any addition of this to a collodion emulsion increases the tendency to precipitation during the emulsifying operation; and even if this stage be got over safely it will be found that a considerable sediment will gradually fall to the bottom of the bottle, consisting of a coarser and more granular form of silver bromide, resulting from the use of this salt. The bromide of ammonium is more soluble and is very suitable for emulsion work containing the full quantity of pyroxyline, but in this case is not available on account of its comparative insolubility. As I stated in a former article on this subject, only the most soluble haloids should be employed, such as cadmium or zinc. With these an emulsion is easily made, the molecules of which are in the finest possible state of division, and, if a suitable pyroxyline be employed, it is surprising what a quantity can be held in suspension by one or one and a-half grain to the ounce of solvents without any tendency to precipitation appearing.

But there is still another important point to be considered in connection with this, and that is the influence exerted by the nitrates of the bases used, and which are formed in the emulsion as a by-product. An emulsion formed by means of potassium or ammonium bromide, or of a mixture of the two, "ripens" in the presence of the corresponding nitrates much more rapidly than one formed of zinc or cadmium; and, not only so, but if free silver nitrate be present soon passes the most sensitive condition, and in spite of restraining acids becomes hopelessly fogged. Such a collodion possesses but little keeping property, and has to be carefully tested and precipitated or washed before this fogging stage is reached. With the metallic nitrates, however, the case is different. Colonel Wortley first pointed out, many years ago, the influence of nitrate of uranium in keeping a collodion free from fog with a large excess of silver present, and afterwards Mr. M. Carey Lea claimed the same property for nitrate of copper when added to the collodion.

It will be found that the nitrates of zinc and of cadmium have similar properties, and an emulsion formed with these salts as a by-product will bear a considerable excess of free silver and remain in good working order for a very long time without any tendency to fog. There is, however, nothing gained by a large excess of silver. The safest plan is to so calculate the quantity of bromide and silver as to have the least possible excess of silver present after allowing time for full combination to take place. To test the emulsion for this all that is necessary is to flow a little over a glass plate, and, when set, pour on it a few drops of a solution of bichromate of potassium, when there should be only a mere trace of the characteristic red formed by the bichromate of silver. When thus made it will go on increasing in sensitiveness and brilliancy for a long time, and may be kept unwashed an indefinite period. Some I have stored away for experimental purposes, made eighteen months ago, is still in perfect condition.

There is also a considerable difference in the nature of the silver bromide formed when using cadmium or zinc. The alkaline salts give a blue, transparent film, cadmium one much more opaque,

whilst zinc yields a film remarkably rich and creamy, resembling one formed by the bath process. The ease in which density is obtained is in the same order, the alkaline being the most difficult to intensify, whilst cadmium or zinc gives full density at once. Zinc bromide, then, has the advantage in easy solubility, keeping property of emulsion, richness in resulting film, and brilliancy of image formed. It is a salt not easily obtained in commerce, and is of a very unstable nature when it is obtained, rapidly passing to the sub-bromide state. Cadmium bromide is, however, readily obtained in a comparatively pure state, and from this it is easy to form zinc bromide as required, owing to the greater affinity which bromine has for zinc than cadmium. All that is necessary is to weigh out the required equivalent of cadmium bromide, dissolve it in alcohol, and immerse in the solution one or two strips of well-cleaned zinc. The cadmium will be precipitated in a few hours, and exactly the same equivalent of zinc bromide remains in solution, which may be filtered into the collodion for use.

Each ounce of alcohol should have twenty grains of cadmium bromide dissolved in it, and after the requisite treatment with the zinc it ought to be filtered into the collodion, and *aqua regia* then be added at the rate of one drop to two ounces of alcohol. This quantity will require about twenty-six grains of silver to the ounce of alcohol for the silvered collodion. The resulting emulsion will thus contain thirteen and a-half grains of silver bromide, with a trace of chloride and free silver nitrate. With a suitable pyroxyline no difficulty will be experienced in emulsifying this quantity with only one grain to the ounce of solvents.

In practice the rapidity of such an emulsion will compare favourably with gelatine, whilst the ease of preparation of the plate is far greater, especially when large surfaces have to be covered. It is much easier to get an even film on a large plate with collodion than with gelatine, on account of the rapidity with which the former sets, rendering it indifferent to variations in the level of the surface of the glass. Every worker of gelatine plates—say from 12 × 10 upwards—must be familiar with the annoyance of unevenly-coated glass, and it is almost impossible to avoid it; for, no matter how accurately the plate may be levelled during the time occupied in setting, the gelatine will find out the slightest variation in thickness or inequality in its surface level, forming places of various thickness in the film which will inevitably show in the resulting negative.

This emulsion is singularly free from many of the defects which tended to make the older methods unpopular. Rapidity is increased in proportion to the decrease in the quantity of pyroxyline employed, whilst blistering and slipping of the film seem totally absent. I refer to the use of the collodion in its unwashed condition. With a washed emulsion the difficulty of keeping the film on the glass is considerably increased, because the albumen substratum employed is not coagulated; but in the unwashed emulsion we have an alcoholic solution of nitrate of zinc which ensures perfect insolubility in the substratum and consequent adhesion of the film. It will thus bear pretty rough washing under a tap without damage.

The powdery condition of the silver bromide, when the small quantity of pyroxyline present has been contracted by immersion in water and then dried, renders it free from blisters during development. If we could examine the film under sufficient power to separate the molecules they would appear as if embedded in a collodion substratum only at the base—in a similar manner to an acorn in its cup. The pyroxyline in contracting adheres to the glass or substratum, leaving the molecules of silver bromide in contact with each other, like a fine powder. By passing the finger over the film the whole of this powder may be wiped off without disturbing the collodion. In this condition it is evident the greatest sensitiveness may be attained by employing proper means.

To prepare a rapid dry plate, then, by a collodion emulsion, it is only necessary to coat the prepared surface of the glass with the collodion, place in water to wash away the solvents and by-products, then flow over a ten- to twenty-grain solution of gelatine, and rear up at once to dry. Or the plate may be used whilst wet with equal results. A still further increase of sensitiveness is obtained by the addition of one grain of washing soda to the ounce of gelatine; or, if pyro. development be employed, by one or two grains of ferrocyanide of potassium. In my hands albumen or gum arabic has not succeeded so well as gelatine, because these, being soluble in the developer, act as powerful retarders, rendering longer exposure necessary to obtain equal results. Gelatine, however, remains stationary after setting and acts mechanically in isolating the molecules of silver bromide during development, rendering it possible to use the most powerful developers without restraining bromide, and is then removed from the plate without in any way injuring the collodion image.

The development may be by any of the formulæ in use for gelatine plates, using less or no bromide retarder; but a developer introduced by Mr. A. L. Henderson a few years ago seems to act especially well with collodion. I mean the ferrocyanide developer. The formula best suited is as follows:—

No. 1.

Pyrogallic acid	4 grains.
Saturated solution of ferrocyanide of potassium	1 ounce.

No. 2.

Liquor ammonia	10 drops.
Water	1 ounce.

For use mix equal parts of Nos. 1 and 2, and add an equal bulk of water. The same developer will develope several plates by adding a few drops of the ammonia solution as it gets weaker. Ferrous oxalate also acts with far greater energy upon collodion than it does upon gelatine, and will develope a clean, vigorous image, nearly as rapidly as a wet plate.

Intensification is extremely easy. After the development is complete remove the gelatine by a little warm water, and a short application of acid pyro. and silver will give density to any amount without any fear of staining. The acid pyro. should, however, be flowed over the film a few times before the silver is added in order to neutralise any alkali that may remain from the previous development.

There are many other and, perhaps, better methods of making and using such an emulsion as I have described. My object in writing has been rather to suggest a line for experiment than to give definite formulæ, being convinced, from trials I have made and by comparison with commercial gelatine plates, that equal sensitiveness may be readily attained and a better printing quality of negative produced.

EDWIN BANKS.

THE STORAGE OF PHOTOGRAPHIC CHEMICALS AND MATERIALS.

In many instances when chemicals are received from the wholesale houses they are allowed to lie about in paper, and little or no care is taken of them. Most of the chemicals very soon deteriorate by being allowed to remain in contact with the air, and then many complain about the impurity of their chemicals if they come to grief in any of the various manipulations. To keep them in good condition it requires a very dry atmosphere; but many with whom I am acquainted think an underground kitchen is suitable. In my opinion underground apartments are extremely bad for the purpose.

All chemicals should be kept in well-closed bottles or jars, many requiring special care. Take, for instance, nitric acid. This I always keep in a dark cupboard, for if exposed to the light it decomposes by giving off nitrous fumes. I think it best to keep all the mineral acids away from the light. Hyposulphite of soda is well known by all to be a very deliquescent salt; but, as a rule, most photographers buy it in the one-hundredweight casks, and it is well known how very soon after the cask has been opened a damp atmosphere affects it, especially in this variable climate of ours. As the large brown stoneware jars are now so cheap it is a good investment for the storage of hypo., care being taken to have a good-fitting bung to each; then, no matter what the state of the atmosphere, the contents of the jars are always dry and in good order.

Bottles with good-fitting corks are sufficient protection for many chemicals, such as sulphate of iron, citric acid, bromide of potassium, &c. Many others require stoppered bottles; for instance, the iodides of potassium and ammonium, which are highly deliquescent and require every precaution.

Some few months since I saw a kind of bottle which I thought might be pressed into service; and I have no doubt that the patentees might be induced, if there were a demand for them, to manufacture them for many purposes, not merely for the storage of chemicals. The bottle to which I allude is made for bottled ale and stout. The stopper, if I may so call it, is made of a material something like ebonite, with an india-rubber collar or washer; and on the part of the stopper there is about one turn of the thread of a screw which corresponds with a thread in the neck of the bottle. I may, perhaps, make myself better understood if I give a rough sketch.

These bottles, I find, are made to hold from about one quarter of a pint up to half-a-gallon; the patentees are Messrs. Barrett and Co., Bond-street, South Lambeth, London. The india-rubber collar,

I have no doubt, could be replaced by any flexible material suitable to the contents of the bottle, so that it would not be acted upon injuriously. Any gaseous fluid can be retained in these bottles, without deteriorating, for any length of time. They would be very useful for making saturated solutions of carbonate of ammonia, as

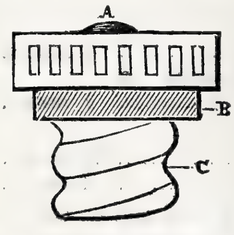


FIG. 1.

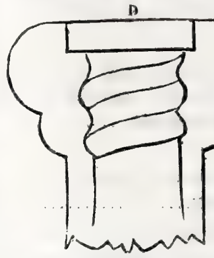


FIG. 2.

A, *fig.* 1, is the ebonite stopper. B is the india-rubber washer or collar, of a suitable size to fit in the recess or rebate in the neck of the bottle. C, thread or worm of screw. *Fig.* 2 shows a section of the bottle neck, D being the recess where the india-rubber collar fits in.

it is well known by all who are in the habit of working with this salt how soon the ammonia is given off and the solution becomes useless. The stopper only requires about one or two turns and it is perfectly air-tight. I give the idea for what it is worth.

While on the subject of bottles, I must not omit to mention that after taking a portion of any deliquescent salt from a bottle it is best to make the bottle slightly warm to drive out any damp air before replacing the stopper. I am in the habit of working with bromide of zinc, and I always adopt this plan. No matter how many times I have recourse to the bottle its contents are always dry and in good condition. Another thing as regards bottles: have them all labelled. Labels of all kinds are now to be had at a reasonable rate, and when placed on bottles allow them to become dry, just passing a brush over them with a little negative varnish. This will keep them from becoming detached and falling off, and then it is guesswork, after a time, to know what the bottle contained; but with very little trouble all this may be prevented.

Some photographers keep their stock of albumenised paper in a very careless condition and exposed to all changes of atmosphere. I have found nothing better than a close-fitting tin box, to hold about a ream of paper flat. I am now speaking of unsensitised paper. For the storage of ready-sensitised paper a tin box is also useful. I myself, like others, have only a small quantity at a time, as it is best to have it fresh; although I have now some by me that I have had six months, and it is just as good as the day I purchased it. One thing I find very bad, and that is to allow it to remain rolled up tightly in paper, packed, as it comes through the post. I find that if so left round a wooden roller it soon turns brown, especially if the wood of the roller be green, young wood. I always make it a rule to unpack it as soon as it arrives, and then roll it up loosely in tissue paper, placing it in a tin box taking in the whole sheets rolled up. This box has a deep, tight-fitting lid. If I require to retain prints for any time I keep them also in a tin box.

One important matter I must not omit to mention before I close, and that is the storage of dry plates. There is one thing to which I should like to call the attention of makers of dry plates, and it is this: before using either paper for wrapping the plates in, or the cardboard boxes in which they are usually sent out, they should be dried thoroughly. Before using, the little slips of cartridge paper employed to separate the edges of the plates should also be well dried. If this were done it would reduce the objectionable markings so often seen along the edges of the plates to a minimum. It is well known that gelatine readily absorbs moisture, and, knowing this to be the case, all possible precautions should be taken to guard against the evil.

For storing packets of dry plates tin boxes are the best for keeping out damp. Old deed boxes are very useful, and also biscuit boxes. The latter can be had at a reasonable rate at grocers' establishments. I generally keep my stock of plates in the attic in a cupboard close to the kitchen chimney, where a fire is burning for the best part of the twenty-four hours.

In conclusion: I think all will agree with me that to ensure success every possible care ought to be taken for the proper storage of chemicals and materials. W. Brooks.

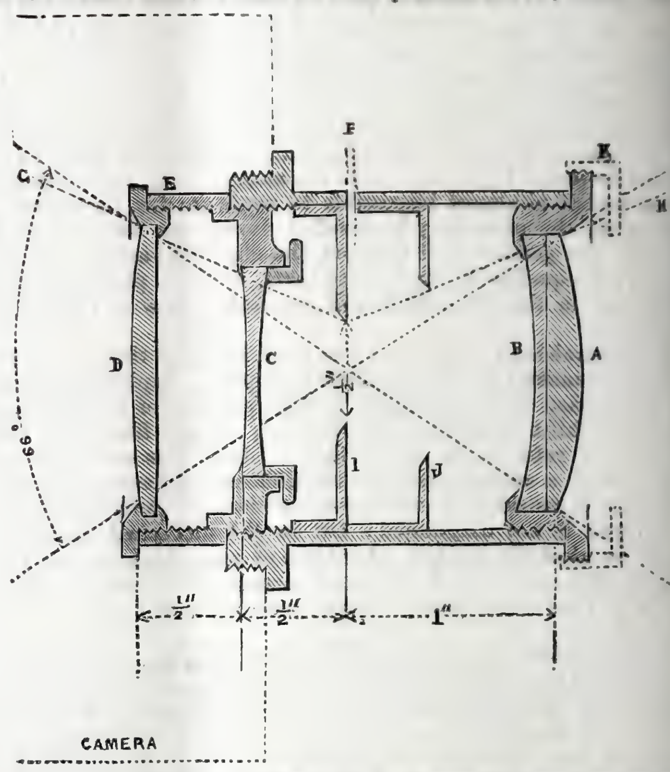
PHOTOGRAPHIC LENS SUITABLE FOR LANDSCAPES AND ARCHITECTURE.

The lens to be described, giving an angle of 66°, with a stop of $\frac{f}{15}$ and focal length of seven inches (measured from the stop), will cover a plate 7 × 5 sharp to the extreme corners, with straight marginal lines, great depth of focus (including near and distant objects) and true perspective.

The back lens can be replaced by others giving various foci up to nine inches from the stop, or even longer, without any alteration in the front or intermediate lenses. The back lens shown in the diagram is fifteen inches focus, and if two others—one of twenty-two (I prefer twenty and twenty-five) and the other of thirty—are used the combined foci will be about eight and nine inches respectively. But for these two the loose diaphragm used with the seven inch lens must be taken out and the full opening of the fixed stop only used, unless for extraordinarily fine definition indeed.

This lens gives the closest approximation to absolute flatness of field of anything I have yet seen—so much so that, if an object be focussed, the camera being held in the hand, and the object traversed all over the plate, not the slightest difference can be seen in the definition, even when using a strong pair of spectacles to examine the image. It is also extremely rapid in action, so that with it a plate of medium sensitiveness becomes a rapid one.

I have often thought that it would be possible to flatten the field, even when using a large stop, considerably more than is usually done, by sharpening the curves of the front lens and flattening those of the back one. Upon that idea I set to work and, as I possessed a front lens nearly as sharp as I wanted, I kept on flattening the back until I arrived at plano-convex, which, with the double concave, I found was all I required. It is important that the double-concave lens be in the position shown, which is not



A, Crown glass, plano-convex, 1·82-inch radius. B, Flint glass, plano-concave, 2·75-inches radius. C, Flint glass, double-concave, 30 and 30 inches radius. D, Crown glass, plano-convex, 7·80-inch radius, or equal to 15 inches focal length. E, Separate portion of mount. F, Slot for loose diaphragms. I, Fixed stop. J, A second fixed stop or diaphragm simply slipped into the tube, and arranged to cut the line G H. K, Hood, with a rectangular opening, in front of 1¼ × 1¼ inch, to admit only sufficient light to cover the plate.

only the best but also the most convenient, as the back lens can be changed without interfering with it, and the focal length of the combination altered at will.

I find it best to preserve a uniform ratio between the lenses, and this arrangement is based on a system of fives. For instance: the front lens is ten inches focus; the back lens is one and a-half time the front, or fifteen inches; and the combined focus of the double-concave is thirty inches. To show the necessity of this ratio being adhered to, a lens of fourteen inches will not do without using a smaller stop or altering the concave.

I cannot help remarking that, in working out the calculations to find the radius of lens B, the result was exactly one and a-half time the radius of A, even to the third place of decimals. I do not remember noticing such a result before. The figures given for radius B in the diagram are a trifle longer, because, of course, I do not know what density the combined element of A and B is likely to be formed of; it is possible the 2·75 may require a slight alteration.

[f a plano-convex lens of thirty inches focus be placed at the back, ing a combined focus of about nine inches from the stop, it and double concave together being neutral, the combination resolves elf into the original focal length of ten inches from the front s; and if the portion of the mount containing the two back ses be removed the focus on the screen will be found to be about same, but with this considerable difference—the field is round, marginal lines are cushion-shaped, and the definition bad. Re-ce the back portion, and the lens then gives a flat field, straight rginal lines, good definition, and covers a large plate quite sharp. One thing to be noted is that there is not the least sign of flare; leed this was to be expected with so many dissimilar curves and e extra diaphragms.

The best method of covering the slot in the tube to keep out all traneous light is by means of a piece of black elastic ribbon, out half-an-inch wide, the ends sewn together to form a band; it o retains in position the loose diaphragm when in use.

In conclusion: I expect this lens will meet with plenty of criti-m, but it will stand it upon trial. THOMAS FURNELL.

HOW TO MAKE A WATER VARNISH.

KE of shellac (in thin flakes) a quarter of a pound and water one nt, place them in a tin saucepan or other suitable vessel on the e or over a gas stove and raise to boiling-point. When this is ached add a few drops of a hot saturated solution of borax, stirring gorously with a glass rod or clean stick until the shellac is all ssolved, which will be in a few seconds. Do not use too much rax, but add slowly and stop short of complete solution rather an the other way. After this the solution is filtered through arcoal, and the water varnish is ready for use.

Some may ask—What is it fit for now it is made? That is what I tend to describe. First of all, for wet collodion negatives it is in-luable, as its use entirely does away with split films, and when ly one or two prints are required the negative need not be var-shed with spirit varnish. All that is required, after the negative washed, is to flood it with the water varnish, stand up to dry, and hen dry the negative is ready for the printer so far as the surface concerned. A film so protected stands a great deal of rough age and is not very easy to scratch, whilst for retouching the rface is superb. For wet collodion negatives the advantages are cer-in immunity from split films and saving of time, trouble, and ex-ense of spirit varnish, fire, &c., and risk of cracking the plate from e action of heat.

For gelatine negatives water varnish is applied directly after ey are washed, and when dry the retouching is performed and irit varnish applied in the usual way, when there will be little anger of the films being silver stained, no matter how long they re in use.

A gelatine negative, covered with water varnish and dried, was laced upon a shelf, and a cotton-wool plug out of a silver funnel was aid upon the film. At the end of three days no sign of a silver tain was visible, and this without any spirit varnish over it. I do ot doubt, from my own observations, that this water varnish will e found far superior to a film of plain collodion, besides being asier and simpler of application.

One important point in favour of a water varnish is the fact that t can be applied to the film when wet, and therefore with all its ores open; whilst that part of the varnish that does not sink into he film but remains upon the surface will give a grip or hold for he subsequent film of spirit varnish, affording a promise of security nore in accord with the known permanence of a well-varnished ollodion negative.

With these remarks I am content to leave the formula in the ands of photographers, with a firm conviction that those who dopt it will find great benefit in its use. W. T. WILKINSON.

A TOUR IN ITALY WITH THE CAMERA.

No. VII.

LEAVING the Pantheon by the Piazza di S. M. Sopra Minerva and pass-ng onwards by the Via del Gesu and the Via di Aracoeli we again ome to the Capitoline. Mounting the hill and descending by the Via lel Campidoglio we come to those grand ruins surrounding the Forum Romanum once more. Pursuing our course straight on by the Via delle Grazie we reach the arch which forms the subject of the follow-ing illustration—the Triumphal Arch of Titus—which was erected to commemorate his victories over the Jews in A.D. 70, and dedicated to him by his successor, Domitian, in A.D. 81. The words are—"*Senatus populusque Romanus divo Tito divi Vespasiani filio Vespasiano Augusto.*" Inside the arch on the left-hand side is a relief of the triumphal procession of the captive Jews, with the seven-branched candlestick. The picture is taken from the side next the Colisseum.

So we might go on to other scenes—reminiscences of the departed glory from the City of the Seven Hills—but we will hasten on to modern Rome. Of churches there are enough and perhaps to spare. There are over 300, and some of them extremely fine, especially inside. For the lover of architecture there is work for many a day with the camera. One of the easiest to take and one at the same time most interesting is that of St. Peter, the greatest of them all—a temple which cost nearly ten millions to build, and shattered to its foundations a faith it was intended to commemorate. St. Peter, *they say*, is buried under a canopy in the church. One curiosity inside is a sitting statue of St. Peter in bronze, which unbelieving critics affirm is but an ancient statue of Jupiter. However this may be, such questions have had little weight with devotees, who have wellnigh worn away the statue's right foot by constantly kissing it. With regard to the wonders and relics one has to see in Rome, I found it to be the best plan to quietly take in all I heard and saw and to reserve my judgment. This usually pleases all parties. However, during my wanderings in the Eternal City I discovered that many saints and some of the more ancient celebrities have several birthplaces and tombs, and from the relics of the same individuals I was forced to come to the conclusion that they had several bodies, which probably accounts for the former supposition. But I am digressing. On the wonders contained in that noble structure I think it would be needless to dwell. Its grandeur, symmetry, and magnificence are known to all.

The view of the exterior *façade* and dome make a good picture, and can be taken without any difficulty from the Piazza. Not very far from St. Peter's is the Castle of S. Angelo, and below the castle flows the famous "Father Tiber." The view of the castle is best obtained from the opposite bank of the river. A few fairly-interesting scenes of "Yellow Tiber" can be taken on either side of the Ponte di S. Angelo, or from several other points. Some few pictures—more interesting than artistic—of the sepulchral monuments along the Via Appia can be easily secured. It is best to hire a carriage for this excursion.

Street scenes are rather difficult in Rome, as frequently the streets do not boast of a pavement, and, as rules of the road do not exist or are not observed, one has always to be on the *qui vive*. The Ghetto is rather a too lively quarter. I once went there but did not attempt anything, as I set too high a value on my apparatus; moreover, my faith in the honesty of some of the sons of Abraham was not of the strongest.

To those who like photographing models plenty can be commanded in Rome, all possessing varying charms. Old and young, pretty and indifferent, youth and wrinkled age, may all be seen doing the *dolce far niente* whilst waiting to be selected. They are ever ready to oblige in return for the necessary fees.

The tourist photographer should not leave Rome without paying a visit to the Cascades of the Tivoli, where a day can be very pleasantly spent with the camera. In conclusion: although plenty of interesting pictures besides the ruins may be obtained in Rome, they require some looking for, which means a somewhat long stay in the Eternal City.

The art lover will certainly not leave Rome without paying several visits to at least two museums—the Vatican and the Capitoline. The former is simply overflowing with masterpieces of some of the greatest artists that have ever lived. Orders to view can be obtained at the Vatican itself without the slightest difficulty. Then the Capitoline: in this museum is the "she-wolf," with Romulus and Remus, which is supposed to have been cast some 300 B.C. The greatest work there is undoubtedly the *Dying Gladiator*, which forcibly recals those exquisite lines of Byron, and which so aptly describe the gem of art:—

"I see before me the gladiator lie;
He leans upon his hand—his manly brow
Consents to death, but conquers agony,
And his droop'd head sinks gradually low—
And through his side the last drops, ebbing slow
From the red gash, fall heavy, one by one,
Like the first of a thunder-shower; and now
The arena swims around him—he is gone,
Ere ceased the inhuman shout which hail'd the wretch who won."

Leaving Rome I decided to go direct to Naples, where I had dreamed of doing wondrous things on gelatine. Alas! like visions these dreams faded away before the reality. Naples has great pretensions to be called "Queen of the Mediterranean." To me it seemed to be a huge ant-hill teeming with life. In the daytime everywhere there is dirtiness, squalor, deafening noises, and aimless bustle. The Neapolitans, I should think, are the most degraded race in Europe. They revel in vice, and for idleness and cruelty they would be difficult to match in the civilised world. A poet's idea of Naples is, "Let me see Naples and die"—also a very true description of the place; for what with the impure water and bad smells one unaccustomed to such trifles stands a very good chance of quietly "shuffling off this mortal coil." I know it is proper to go into raptures over everything Neapolitan, but I could not help it; my olfactory and optic nerves would always rob me of my rising enthusiasm. Of course the Neapolitans are skilful thieves, so to do any photographic work in the streets is a case of an organised expedition, which does not assist the main work. In going out in a carriage I always took care to strap my apparatus to a part of it, and even then kept my eyes open. I must confess I frequently had the greatest contempt for the Neapolitan natives; they seem to have improved but little since the days of Pompeii.

Sometimes I would be admiring the charming bay from one of its many points of view—its waters of translucent blue rippling in gentle music upon the strand below; its tranquil surface broken here and there by the silver furrows of the numerous picturesque and quaint craft flitting to and fro; in the far distance the blue above melting into the blue below, and yonder Vesuvius, the fire mountain, capped with curling wreaths of smoke—and whilst in contemplation of such and similar scenes one from the numerous army of beggars would come up to me with hands extended, at the same time exhibiting some carefully-made-up or real sore or horrible deformity (perhaps also half made up for the occasion), and crying "Soldi! soldi! Signore," in the meantime not forgetting to help himself if he have the chance. At such times a cold shudder would run through me, and I would hasten away to perhaps a more sequestered spot.

One of my first trips with the camera in the Bay of Naples was to Bacoli. In this excursion the importunities of the street Arabs, guides, &c., male and female, are almost beyond human endurance. Well knowing what an adventure I was undertaking, I laid in a stock of choice Tuscan for the occasion. "Va," I found, had little effect. They took a little more notice of "Va ten." But it was usually only when I arrived at "Va al diavolo," spoken with a considerable amount of emphasis, that I stood a chance of being free. Even then a few bold spirits tried to bring me to despair.

After leaving Naples, and passing Virgil's tomb (*they say* the poet of Mantua was buried in a cave on the top of the rock just by), the road enters the long "Grotta di Posilipo," about a kilometer in length, well filled with dust of a very mundane origin, and perfumed with odours not altogether aromatic. At the other end of the grotto we pass through the village of Fuorigrotta—dirty and noisy enough—and by a straight and uninteresting road we reach the blue Mediterranean once more. Thence a pleasant drive brings us to Puzzuoli, with its Amphitheatre, Temple of Serapis, and extinct volcano of Solfatara, where steam is ever issuing from the earth, and large cavities are seen in the rocky sides. There is not really very much to interest the photographer in Puzzuoli. Leaving Puzzuoli, and passing by Monte Nuova—which, like a mushroom, was upheaved in a single day in the sixteenth century—the road to the right leads to Lake Alvernus, known by the ancients as the entrance to the infernal regions. The waters are dead an photographically uninteresting. By means of torches we passed throu the "Grotta del Pace," half-a-mile or more long, in search of t picturesque on the other side. The ruins of the once famous Gre city of Cumæ lay in the far distance—interesting enough, though n suitable for the camera. Retracing our steps with camera throu the torch-lit grotto, we again came to Lake Alvernus; thence a pleasa drive brought us to Baja or Baiæ, with its really lovely bay and rui of five ancient temples. In one of these—the Temple of Mercury, whe there is a fine echo—pretty dark-eyed native maidens dance, to t thrum of the tambourine and the clapping of the castanets, interspers with pieces of song, the "Tarentelle," in a manner at once nove charming, and weird.

Interesting views of the picturesque neighbourhood of Baiæ may b obtained, but they are somewhat troublesome to get without spendin a considerable amount of time on that object. Here, as elsewhere in th lovely Bay of Naples, everything is on too large a scale for art photo graphy. To balance a picture is difficult, and excessive contrast is th general rule. Pretty "bits" there are, no doubt, but they seemed t require much patience in searching them out. Arrived at Bacoli w ascended the height of the Piscina Mirabilis, whence one of the fines views of the Bay of Naples may be obtained. Here also I attempte some exposures; but, like most of my Neapolitan views, they turned ou rather indifferent photographs.

Another day I made an excursion to Puzzuoli and neighbourhoo with my camera. Puzzuoli was once the chief port of the Roma empire, and sheltered many a fleet of merchant ships. Its strand use to be covered with immense warehouses to accommodate her grea commerce. Today all is poverty, glaring out of every tumble-dow cottage and mud hut. One curious feature in the Bay of Naples is tha the paths along the slopes often run between walls, and generally it i very difficult to get any view at all. At Puzzuoli I spent a long time i trying to extricate myself from these walls, and only succeeded at las with the help of a native, who took me into a vineyard and told me might roam about the hills amongst the vineyards at my ease. This did for some hours with no opposition. I made a few exposures to ge something, but could not find anything of any particular interest Another day I spent at Portici, to try and get a few seascapes. Agai my efforts were unsuccessful, as I did not get a single picture.

J. J. ACWORTH, F.I.C., F.C.S.

ON THINGS IN GENERAL.

"A BAD workman always finds fault with his tools" is a very old proverb; and, judging of the frequency with which some people grumble at their dry plates, one cannot avoid a faint suspicion that, after all, it may be applicable to some of these grumblers. One must look the fact in the face that dry plates are not machine products, either in the manufacture of the coating or the placing it upon the glass, and in consequence some irregularities must be expected, particularly at the low prices at which many plates are now issued. At the same time it is quite within probability that some makers may occasionally have a faulty lot; but this must be very occasional, or with the keen competition now existent such makers would have to go to the wall in a very little time, if, indeed, such defects were not universal. Speaking for myself, I may say a bad commercial plate is an exceptional experience. Now and then a plate shows a little unevenness, and oftener than I like I find a number of minute scratches; but on the whole I cannot personally endorse the frequent complaints I read so much of.

Another point in dry-plate work which used much to exercise the minds of photographers was their sensibility to weak radiations. We were often told that, compared with wet, dry plates were less rapid in winter than in summer; and, again, that in excessively-bright light also they failed to show much superiority over wet plates. I thought the former idea had died a natural death, but it seems not to be so—at any-rate on the continent. At the Berlin Association, for example, Herr Schwartz said that with an exposure of an hour and a-half he thought "gelatine plates would be less sensitive than wet!" He said that he once gave such a plate five hours, and he felt convinced that if he could have been sure of the plate not drying he would have taken the view with a wet plate in less time. Herr Prümm "admitted that in a strong light * * * * the dry plate was the more sensitive!" while Herr Ruckwardt undertook to make the experiment. To an interior that would take two hours with wet he intended to give an hour, and half an hour with dry plates, and he would report the result.

There was an interesting discussion upon Obernetter's process, which, some little while ago, excited so lively an interest in this country. It appears that that gentleman has fourteen licensees among the members of the Association who have failed to work the method successfully; yet, in justice to the inventor, it should also be said that several gentlemen wrote to say they had been perfectly successful. Herr Obernetter's reply was unanswerable. He had worked the process himself for three years, invited the unsuccessful ones to send one of their number to see him work it, and he undertook to defray the expenses of his going over. This, it appears to me, was just and wise, and

rr Obernetter will lose nothing by it. Of course his method is a ret one, but no doubt it will ooze out some day.

[had some remarks to offer upon copyrights last month. What uld our English photographers say if our law were like the Italian, iich does not admit of a remedy against piracy of chemico-mechanical oducts such as photographs? Signor Naya, however, has managed avail himself of legal protection through the aid of the retoucher, iom some would put on such a very low pedestal. Signor Naya has en engaged in an extensive series of reproductions of pictures in the lace of the Doge and in the Venetian churches, and has found, like eryone else, that in copying oil paintings it is sometimes impossible reproduce all the details of the originals. He overcame this obstacle having large portions, even whole heads, interpolated by a clever toucher—he must be an artist indeed—and this original difficulty has ood him in good stead in obtaining a better footing for his contention. ie conservator of the Doge's palace deposed that they were works of t, and the pirate was defeated. We are not told the actual result; it, seeing that the money paid for "retouching" amounted in one ar to two thousand pounds (!), it is earnestly to be hoped the pirate in and will be heavily mulcted.

I think those gentlemen who have of late been engaged in the ticklish peration of taking photographs of the bottom of a man's throat deserve l the praise they have received. I have a feeling that the particular ie who was operated upon deserves a very lively acknowledgment of is services. It looks very well in print to talk about this mirror here, iother there, and soforth; but I am afraid that the majority of my eaders, if they tried to stick a mirror part way down their throats, ould soon be sick of, if not with, the operation.

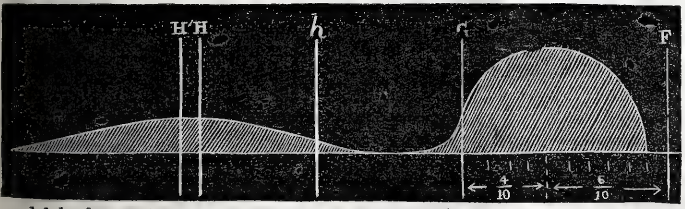
The old hypo.-bath controversy has been rather lively. It will, at nyrate, have called attention to a very probable source of evil. A ath of hypo. cannot last for ever; its solvent powers must gradually iminish, and when the point is arrived at that it will only just clear ie film there must, to put it in the mildest way, be danger of injurious ompounds being precipitated in, or left in, the film. Seeing, further, hat the simple operation of replenishing such stock baths is usually eft to junior hands, it would appear to be the wiser plan to have new bath fairly often, if only as a precautionary measure.

FREE LANCE.

IODIDE OF SILVER IN THE EMULSION.*

'ROM our indefatigable friend Herr Schumann we (*Wochenblatt*) have eceived once more the following detailed account of new and extended abours:—

"I have not yet been able to test any of the series of plates. Yet I am iot without gratifying news. Pure iodide emulsion prepared with excess of potassic iodide is of a pale yellow colour, so are the iodo-bromide emulsions produced by mixing. No single one of these shows the citron-yellow colour of my unmixed preparations, as I have hitherto prepared them simultaneous precipitation of Ag I and Ag Br in gelatine). It would seem from this as if the Ag I of the unmixed preparations were the sensitive modification, and as if, in the other cases, one had to do with the insensitive Ag I. This difference of colour would not say much if the spectral behaviour did not show equally extensive deviations from that of the iodide emulsions I have had until now. I poured a 12 × 15½ c. m. plate with two remainders of emulsion—pure gelatino-bromide and pure gelatino-iodide, both prepared with silver oxide of ammonia and not mixed until after being washed, when equal quantities of each were taken. Immediately after stiffening the plate was exposed in the Steinheil spectroscope to the light of the western sky: Eder's developer. The result was:—The strip between



G and *h* had remained almost without light action, although I had exposed for twenty-eight minutes. (That this remarkable behaviour of the emulsion is ascribable to the emulsion and not to the effect of cloudy light was shown me by a bromide plate which I exposed immediately after exposing the foregoing.) One spectrum upon the same plate (there are three upon it) which had a shorter exposure consists only of a broad band at $F\frac{6}{10}G$; and there the intensity is, like that of the emulsion rich (100°/₀) in iodide, considerable and still greater than that of the 50°/₀ iodide plates formerly sent you.

"I can scarcely believe that the spectral deviations result from the *wet* plate. Certainly, both the modifications of iodide of silver, however insensitive they may be in the chemical developer, exercise a very different influence upon the gelatino-bromide of silver. The above plate at least indicates that. Perhaps this case will throw a somewhat clearer light upon the history of iodide.

"Besides, the gelatino-iodide renders the emulsion difficult to penetrate. I have fixed with strong soda for a full hour, with increasing fluctuations. Since the mixed iodo-bromide emulsion seems to behave quite differently from the other iodo-bromide emulsions, the principal object I had in making my series will be a failure. Nevertheless I await the result with feverish anxiety."

* Concluded from page 176.

Two days later Herr Schumann writes:—

"Last night I tested my iodo-bromised series of mixed emulsions, and also five-per-cent. unmixed iodo-bromide and pure bromide emulsions, by magnesium light and Steinheil's large spectrograph. I obtained altogether forty-two spectra. The collective result, so far as it can be decided by testing wet plates, indicates that the mixed iodo-bromide emulsion in its spectral behaviour differs very considerably from the unmixed. The mixed iodo-bromide emulsion resembles the pure bromide emulsion more, only that on account of the iodine present the insensitiveness between G and H is increased. With a ten-per-cent. addition of gelatino-iodide the spectrum behind G already becomes very light, while with pure gelatino-bromide only a very slight and equal decrease of the blackening is perceptible. Towards the ultra-violet rays both preparations behave pretty much alike. The unmixed* iodo-bromised gelatine deviates very strikingly from the preparations just mentioned, with regard to its behaviour towards the less refrangible rays. It is distinctly distinguishable by the characteristic maximum, between *b* and F, from the pure gelatino-bromide and the mixed gelatino-iodo-bromide; and the hundredfold greater sensitiveness to colour towards the less refrangible rays—which I discovered and proved with my small and imperfect spectrograph—appeared so strikingly, when the large Steinheil spectrograph was used, that today I can describe Captain Abney's, Dr. Eder's, and Dr. Vogel's statements, which contradict my experiments, as erroneous. If Professor Vogel would only send me plates analogously prepared with pure gelatino-bromide and five per cent. gelatino-iodo-bromide, I would show him with his own plates that the iodide of silver contents increase the sensitiveness to colour of dry plates. Dr. Vogel would assuredly bestow greater confidence upon evidence so obtained than if I were to send him test plates of my emulsion. * * *

"This afternoon with the greatest speed I made two exposures, each with six plates, in order to learn the influence of my preparation upon the absorption. I selected, as I wrote to you before, plates lying one above the other of pure gelatino-bromide of silver, and mixed and unmixed gelatino-iodo-bromide, the sensitive films of which were in contact. My stereoscopic camera with two small aplanatics served to take a group of palms, &c., which I arranged as well as I could in the short time I had at my disposal. I have merely an hour at dinner time. Once more I found that the bromide plate transmitted a considerable quantity of light, which did not occur, or did so in a less degree, in the case of the emulsion containing iodine. At present I shall not mention any more of the peculiarities of these absorption plates, as I shall place them before you in a few days along with my latest spectrographic work, and then will briefly sketch the progress of my experiment.

"This evening, when spectrographing by magnesium light, I observed a very peculiar case of absorption. The developed absorption plate of *mixed* gelatino-iodo-bromide showed the maximum between F and G most intense where the ray had left the film, and not where it had entered it. Upon this side the maximum was pale and the edge of it only was darkly coloured. The bromide plate beneath showed a distinct image of this maximum. It almost seemed as if solarising action were present, since the reflection of the bromide plate could not possibly have acted so. I hope tonight to collect further material for my essay upon mixed iodo-bromide emulsion."

Four days later Herr Schumann writes:—

"Naturally the iodo-bromised gelatine (unmixed) was much more sensitive to the spectrum of the electric spark than a pure bromide plate simultaneously exposed, when I exposed both tonight for three-quarters of an hour in the Steinheil spectrograph. Keiser and Schmidt's conductor No. 6, a large jar element with five plates (chromic acid solution), two Leyden jars, and a spark apparatus with blunt platinum tips, served me for this experiment. The length of the spark amounted to about 8-10 m.m., the direction of the spark was that of the slit, which I opened to $0{\cdot}4 \times \frac{1}{2{\cdot}75}$ m.m., $= 0{\cdot}145$ m.m.

"The distance of the spark from the slit was about 20 m.m. I shall use my dipping battery of six elements for the first time on the next occasion. I have only exposed this one pair of plates, because I was busy developing other twenty plates which I exposed yesterday to the spectrum of cloud light in Steinheil's apparatus. The iodo-bromide plates were always exposed along with the pure bromide plates. The varying clearness of the sky (especially during the exposure of the sixth plate) made my series far from so unreliable as it would have been had the forementioned precaution not been taken. These sixty spectra again confirm what I wrote to you regarding the sensitiveness to colour of preparations Nos. 122-132. The unmixed iodo-bromide emulsion always takes the lead when it is a question of sensitiveness to the less refrangible rays. Sunlight—which, for want of a heliostat, I could not at present make use of—would only confirm the results of my experiments during the last few days. Of that I am firmly convinced, though, of course, I shall test plates with it also as soon as Herr Fuess forwards me the heliostat.

"From the experiments of the last few days it would seem as if, in the unmixed iodo-bromide of silver gelatine, one had to deal with a double combination of the silver haloid salts; at least the colour and spectral behaviour would seem to indicate that. I would assume this if I had not cause to hold fast by another view. Should not the *sensitive modification* of Ag I be contained in the unmixed emulsion, and, therefore, where *Ag Br and Ag I are precipitated* together in the iodised and bromised gelatine? and should not the insensitive Ag I be contained in the emulsion prepared by the mixture of pure gelatino-bromide of silver and pure gelatino-iodide of silver? The difference of colour between the two preparations supports that idea, and no less so does the behaviour with regard to sensitiveness. In gelatine poor

* It is to be borne in mind that by "unmixed" Herr Schumann means emulsion prepared in the usual way.—Ed. *Wochenblatt.*

in iodide of potassium certainly the conditions are fulfilled, under which dark Ag I forms, but in the richer solutions it indeed seems otherwise. Perhaps it is possible that in the latter case only sensitive Ag I is precipitated at first, and afterwards the insensitive. These are, however, only suppositions, in support of which proof may perhaps yet be produced. I have every hope of it, for as far back as the 8th March, 1882, I had busied myself with the preparation of mixed iodo-bromide emulsion, and then obtained very promising results with that emulsion. It is the same preparation which I mentioned in the beginning of this year in an article in the *Archiv*, and also in a letter to yourself. That emulsion positively contained the highly-sensitive Ag I, for it was precipitated with great excess of nitrate of silver, and then added with the nitrate, drop by drop, to the bromised gelatine. The *iodide of silver was finely divided*, and not flaky, so far as I could see by yellow light with the unaided eye. I have not yet tested the spectral behaviour of the emulsion, but shall do so soon, and then communicate all the details to you."

It is not primarily necessary to point out especially the great importance of this new work of Herr Schumann's, which throws a surprising light upon this region of experiment, and particularly upon Captain Abney's numerous published spectra. In order to obtain exact percentage results in his experiments Captain Abney has selected the method of preparing separate pure emulsions and then making mixtures of them in various proportions. Now, the curves belonging to them which he has published really coincide with Herr Schumann's new results, obtained with emulsion prepared in the same way. Therefore, by this coincidence of result—certainly unexpected by Herr Schumann—with an investigator from whose statements his own appeared to differ so completely, it is at once shown in this case what was the cause of the difference. Captain Abney had prepared his preparation by a method never practically used, and had assumed, *without ascertaining by experiment*, that the results of this method must be exactly the same as those of the usually-employed one. Herein lies his great and, if one may so, momentous error; for he has expended time and trouble in the investigation of a preparation which is never used in practice, without thereby attaining, as he undoubtedly intended, in addition to the purely-scientific result, a result which should be practically useful. On the contrary, his labours were, on account of this one over-hasty conclusion, adapted only to give rise to confusion in this region, and either to frighten one from the use of the best process or else to cause people to doubt the reliability of scientific investigation. But for this one certainly cannot hold Captain Abney alone answerable. He has only followed up a view, expressed by many others before him, that the same result was attained by both methods. Certainly, in a scientific experiment he ought first to have convinced himself experimentally of the correctness of this assumption, as we, on reading through his writings, decidedly believed that he had done, and as for such thorough experiments as are published in the *Philosophical Transactions* would be even more necessary.

Still the error is excusable, and we should rejoice that it has so soon been found out. At the same time it presents a warning—never in matters photographic to be too hasty in applying conclusions which are correct regarding one preparation to another. We know far too little of the chemical relations of this first preparation to allow us to do so. Thus, for example, Captain Abney's whole theory regarding the cause of the minimum as it appears in the spectrum of mixed emulsions is at least violently shaken. He assumes that the bromide of silver and iodide of silver are converted by the action of the light into sub-bromide and sub-iodide and free bromine and iodine respectively; and then he further argues that a double salt is formed by the free bromine with the sub-iodide and by the free iodine with the sub-bromide, which are both apparently of the same value. According to that, if one had equal combining proportions of iodide of silver and bromide of silver at the part of the spectrum where they are equally sensitive to light, every developable action, or even every action, obtained by copying would be suppressed should the new double salt be either insensitive to light or sensitive to light of another colour. That it is the latter, and particularly so at the part between G and F—which he strangely designates as green or bluish-green, while it is undoubtedly cyanide-blue and indigo-blue—Captain Abney then tries to prove by a special experiment. In the same way he finds a confirmation of his assumption in the fact that absorbents of iodine and bromine increase the particular phenomenon and produce an equally swelling out and falling in spectrum. Now, if if it were so, the question presents itself—Why does not this astonishing minimum between G and H also appear in emulsion prepared in the ordinary way? Since, if here one has only to do with a mixture (as Herr Schumann is provisionally inclined to assume) and not with a double compound of the haloid salts, there is no imaginable reason whatever why such a minimum should not appear with the ordinary emulsion, so long as one does not resolve to grasp the very doubtful assumption that the double compound, Ag_2 Br I, is sensitive the whole extent of the bromide of silver spectrum and beyond it as far as *b*, and only has its maximum between F and *b*. It is certainly otherwise if the iodide of silver be present in a constant double compound with the bromide of silver, which has its maximum sensitiveness between F and *b*, and elsewhere only an unimportant sensibility. Because, in this case, a perfectly-admissible explanation of all the phenomena of Herr Schumann's spectra, based also upon Captain Abney's theory, would actually be possible.

That is to say, in case in this instance the exchange action ind cated above were wholly or partly to take place, then the sensitiv Ag_2 Br I only would always be formed thereby; that is to say, if th sensitiveness of the double compound be generally present the iodin which has been set free must, in the last instance, either escape or forr some other compound with the gelatine. The increasing flatness of th spectrum which accompanies the greatly-increased addition of iodin would then be very simply explained thus—that everywhere the bro mide of silver spectrum has command only of a so much smaller quan tity of bromide of silver, and that the spectrum of the double compoun is really concentrated upon a narrow zone. We think that this questio would be comparatively easily decided if an emulsion were examine which was prepared so that to the quantity of nitrate of silver employe half the equivalent combining quantity of the purest iodide of potassiun and rather more than the suitable quantity of bromide of potassium wer used. In such an emulsion the double compound, if such exist, would be almost exclusively present, so that its properties and its spectra behaviour could easily be studied.

It is possible and, indeed, probable that the spectra which Herr Schumann is going to prepare by direct sun lighting with the help of Fuess' heliostat will exhibit slight deviations from those hitherto prepared; but great, or influencing the principle of comparative sen sitiveness to colour, they cannot be under any conditions, so that one can already glance confidently at the progress of the collective in vestigation. It will mark an epoch in scientific photography by pro moting a strictness equal to that of all the other natural sciences, and bring into play a precision hitherto unusual in this region.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATIONS FOR PATENTS.

No. 1943.—"Albums." R. MOSER.—*April* 17, 1883.

No. 1960.—"Enamelling Water-Colour or Oil Photographs." G. ROBEY —*April* 18, 1883.

No. 1971.—"An Apparatus for Automatically Exposing Bodies or Article to the Action of the Sun's Rays or to Light Otherwise Produced." W COOKE; a communication from R. Schlotterhoss.—*April* 18, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 1	Sheffield	Freemasons' Hall, Surrey-street.
" 1	Halifax	*Courier* Office, Regent-street.
" 2	Benevolent	181, Aldersgate-street.
" 2	Edinburgh	Hall, 5, St. Andrew-square.
" 3	London and Provincial	Mason's Hall, Basinghall-street.
" 3	South London	Society of Arts, John-st., Adelphi.
" 3	Bolton	The Baths.
" 3	Leeds	Mechanics' Institute.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held on Tuesday evening last, the 24th instant, Mr. H. Baden Pritchard occupied the chair.

Mr. Sands exhibited a "photographic gun," constructed for securing instantaneous negatives of subjects which there would not be time to arrange the camera for in the usual way. The instrument consisted of a stock which was applied to the shoulder, a sight for "aiming," and a circular plate, to which were attached a small lens, the tube of which served as the camera, and with changing-box arrangements. The changing-boxe were two circular brass chambers—one for exposed and the other for unexposed plates. These chambers, by rotating the plate before mentioned, were brought in succession opposite a recess in which the plates fitted during exposure. The plates were of one and a-half inch diameter, and fitted each into a metallic ring which, by simple mechanical arrangements, was removed to and from the changing-boxes and the exposure recess. The exposure was made by a spring shutter actuated by touching a trigger when the object to be photographed was properly sighted. Mr. Sands also showed a spring shutter for use with an ordinary camera. The novelty claimed for this shutter consisted of the manner in which the sliding piece moved up and down so as to give longer exposure to the foreground than to the sky.

The CHAIRMAN thought that it would be advantageous to prolong the lens-tube forward for shielding the lens. The instrument would then more resemble a blunderbuss in appearance.

Mr. A. COWAN showed some negatives taken with emulsion made by Dr. Monckhoven's formula with ammonia, published in 1879 and 1880. One plate shown had been coated with emulsion kept only an hour or so at 90°, and but slightly washed. Another plate was coated with the same emulsion after it had been re-melted and washed for twenty-four hours. The latter emulsion appeared to be about eight times more sensitive than the former. In answer to inquiries, Mr. Cowan said that the emulsion had been made without iodide, and that the re-melted portion was more sensitive than most commercial plates. Mr. Cowan then showed the method he had adopted for washing this and small experimental lots of emulsion. A sheet of paper was folded at the edges so as to form a tray or dish; the tray was laid upon a levelled glass plate, and the emulsion

poured into it and allowed to set; the edges of the paper were then unfolded and turned back over the edges of the glass, which was then lowered into a dipping bath, the water in which was changed occasionally. After washing, the sheet of gelatino-bromide and paper was warmed, and when the emulsion was melted the paper was taken out. The film of emulsion was about one-eighth of an inch in thickness, and the washing appeared to be quite sufficiently performed.

Mr. W. BEDFORD said that with emulsion in sheets cut into strips he had found five hours' washing ample. He also remarked that when a washed emulsion had been heated rather strongly for some time green fog resulted.

Captain W. de W. ABNEY showed two tubes hermetically sealed and containing set gelatine. In one, which had been heated to 200° several times, there was very slight decomposition; but in the other, which had only been once heated, there was a considerable amount of fungoid growth. In a third tube, which was prepared like the last-mentioned one, but which had been kept in darkness, there was scarcely any of the fungoid decomposition.

Mr. ARTHUR DEBENHAM said he had frequently seen carbon prints, both single and double transfers, on paper and on opal glass, partially covered with a mould or fungus. He should like to know if this experience were general.

Captain ABNEY had observed mould on the shadows of crayon drawings. On inspection it was found that these shadows had been touched over with gum.

Mr. W. COLES exhibited a retouching desk, which was described in our columns last week.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on the 19th instant, the chair was occupied by Mr. A. Cowan.

A lantern for the dark room was exhibited, sent by Messrs. Marion and Co. The lantern was of large size, and contained a paraffine lamp. The principal novelty appeared to be a hood of tin that was hinged to the top of the front side of the lantern, and worked with sufficient stiffness to remain in any position in which it was placed. This hood, being adjusted to a proper angle, reflected light downwards into the developing dish whilst screening the eyes from the flame of the lamp. A moulded glass dish for developing was also shown by the same firm. Running nearly the length of the inside of the dish were two slight ridges, which kept the plate from absolutely touching the bottom, and so prevented it from sticking to the glass surface. Three studs were formed on the outside of the bottom, so that it would stand level and not adhere to a wet bench on which it might be placed. One of the studs was arranged to come under the middle of the end of the plate, and allowed of a corresponding depression being made on the inside of the dish, in which the tip of the finger could be placed the more conveniently to lift the plate. For the same convenience, and for pouring, a lip was placed in the centre of that end of the bath where the depression in the bottom existed.

Some discussion took place on a new small-sized *carte* photograph which it had been proposed to introduce. The opinion of the body of the members appeared to be unfavourable to its introduction.

A question was asked—What is the advantage gained by the addition of salt to the washing water of prints before toning? It was replied that the toning bath when salt was omitted was very soon decomposed by the nitrate of silver introduced by the prints; that the reddening of the silver image which the salt solution caused allowed a more exact judgment to be formed of the extent to which the gold toning was carried; and that prints so treated remained after fixing of nearly the same colour they appeared to be whilst in the toning bath.

Mr. A. L. HENDERSON said that, instead of washing in salt water, he for the same purpose added salt in considerable quantity to the toning solution itself. He also remarked that sometimes it was found that the acetate bath changed to a yellowish colour, and that in this condition it refused to tone properly, although a considerable addition of gold were made to it. In answer to a question, he said this was not owing to acidity; that the bath was kept neutral with chalk.

Another question was then read:—Is anything gained in our climate by fuming sensitised paper with ammonia?

Mr. N. S. TULLY said that in his experience ammonia fuming involved trouble without any advantage.

Mr. HENDERSON thought fumed paper printed better, and particularly prints on fumed paper gave better results when enlarged from than those upon paper which had not been so treated.

Mr. A. J. BROWN considered that the two important points in copying photographs in the camera were to have a very good light, and rather to under-expose so as not to bring out the grain.

Mr. HENDERSON said that although in a well-exposed negative from a paper print the grain was more visible to the eye than in an under-exposed one, yet if it were properly intensified there would be no more indication of this grain in the resulting print than from the less-exposed plate.

It was ordered that copies of the rules which had been recently revised and printed should be sent to the photographic journals.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting of this Society was held in the Mechanics' Institute, Princess-street, on Thursday, the 12th inst.,—Mr. John Pollitt, Vice-President, in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. A. BROTHERS said that anyone wishing to make photographs of microscopic objects with apparatus not specially constructed for the purpose would require a microscope and a bellows camera with portrait lens, and showed by a sketch on the black board how the microscope and camera should be arranged. The microscope, object, condensing lens, and light being placed in the usual way the camera and lens should be arranged on a line with the microscope, the portrait lens being close up to the eyepiece of the microscope, when the object, after careful adjustment, will be seen on the ground glass of the camera, enlarged in proportion to the power of the microscope and the length to which the camera may be drawn out. Allowance must be made in the usual way for the difference between the visual and actinic foci of the object-glass, and a very powerful light will be required.

The CHAIRMAN said it had often occurred to him that a similar arrangement might be adapted to a telescope when photographing the moon.

Mr. BROTHERS, in reply, said he had obtained photographs of the moon with a Barlow lens which gave the image enlarged about one diameter, and this succeeded fairly with the full moon; but he considered that, owing to the feeble light of the moon, no advantage would be gained by attempting a greater enlargement direct. The case of photographing the sun was different, and pictures had been made on a large scale by M. Janssen, at Meudon, in France, with great success.

Mr. H. SMITH showed a camera, slide, and camera stand of his own making. The slide is constructed so as to allow a carrier, containing two plates placed back to back, to be inserted. Any number of carriers might be used, and, by means of a bag, the plates changed when out in the field.

It was suggested that a changing-box made with grooves for these carriers to fit in would act with greater certainty than having to transfer the glass plates only, as in the present form of changing-boxes.

Mr. A. COVENTRY exhibited a new drying-box he had made, and referring to one he had shown previously, in which the air travelled over the plates one after the other, explained that the top ones were very much longer in drying, which he found objectionable. In the new box—which contains fourteen shelves capable of holding fifty-six quarter-plates or fourteen of 9×7 inches—the opening at the bottom for admission of air and the outlet at the top are about equal. At the back of each shelf is an opening one-fourteenth of these. On the top is a chimney five or six feet high, with Bunsen burner. The air enters, passes over the plates into a chamber at the back, and is carried off by the chimney, the result being that the plate on the top shelf dries as quickly as the one on the lowest. He (Mr. Coventry) also stated that he had lately been using common soda with the sulphite developer with great advantage, as plates developed with it were very clear, which, on using ammonia, would only give green fog.

Mr. J. SCHOFIELD also said he had had plates giving green fog with using ammonia in the developer; but the same plates with ferrous oxalate were all that could be wished.

Mr. W. J. CHADWICK showed a camera and slides for taking pictures $3\frac{1}{4} \times 3\frac{1}{4}$ for the lantern.

The question af outdoor meetings for the summer was then discussed, and a committee—consisting of Messrs. Chadwick, Coote, Leigh, Pollitt, Sefton, and Wade—was appointed to select the places to be visited.

Mr. J. GREATOREX moved that, in addition to the usual meeting on Saturdays, there should be three Wednesdays put on the list for such members as could not attend on the former day, which was approved.

Votes of thanks having been passed to Mr. Coventry and the other contributors, the meeting was adjourned to Thursday, May 10th, when Mr. J. Dale will read a paper *On the Recovery of the Materials Used in the Ferrous Oxalate Developer.*

BOLTON PHOTOGRAPHIC SOCIETY.

ANOTHER of those delightful open meetings for which the Bolton Photographic Society has now become so well known was held on Tuesday evening, the 17th inst., in the Baths Assembly Room, which was thronged by a large and appreciative gathering of the *élite* of the town, who seemed to thoroughly enjoy the charming bill of fare provided for their delectation. The exhibits of photographs and photographic apparatus were of the most interesting description, and spoke volumes for the progress made by members of the Society.

The principal contributors were Mr. J. R. Bridson, J.P., of Bell Isle, Windermere (one of the Vice-Presidents), Mr. T. Parkinson, Mr. R. Harwood, Mr. Councillor J. W. Hawksworth (Secretary), Mr. J. C. Sewell, Mr. J. Ashworth, of Turton, and Mr. John Taylor, and in some cases the work was of the highest possible class. A collection of pictures lent by the Autotype Company, London, was a source of great attraction, the subjects being well chosen and the delicate finish admirable.

Mr. W. Banks, of Corporation-street, exhibited a number of Hunter and Sands' cameras, with instantaneous shutters of the most ingenious description, and the same gentleman had also on view a small dynamo made at his own works from his own drawings for the purpose of electrical experiments in the Board School Science Classes. The dynamo was used several times during the evening, furnishing electricity for a number of Swan's incandescent lamps, which were tested with the greatest success, to the gratification of the company present. The microscopes, stereoscopes, &c., which were also on view on Mr. Banks's table, were freely examined, and appeared to afford unlimited pleasure.

The musical portion of the programme, which was in the hands of Messrs. Warburton, Houghton, Howarth, and Walls, Mr. G. Halliwell presiding at the piano, was very good, the quartettes, solos, &c., being rendered with gratifying taste and precision.

Not the least pleasing part of the evening's proceedings was the exhibition of views which had been taken by the members, and which were thrown on to a large sheet by a pair of dissolving-view lanterns of great power, a description of each being given by Mr. J. H. Galloway, whose raciness often convulsed the audience with laughter.

During an interval in the proceedings the Secretary (Mr. Hawksworth), read the annual report, which showed the Society to be in a flourishing condition.

Mr. John HICK, J.P., the President, then delivered a brief but interesting address on the objects of the Society and on the progress which had been made by the art since he, in 1842, was elected one of the first members

of the first photographic society in England. He referred in glowing terms to the elevating character of the art as pursued by amateurs, and contended that it tended to make all its devotees artists in the truest sense of the word. Having spoken of the peculiar opportuneness of each of the great inventions which, during the nineteenth century, have given such a stimulus to civilisation, he dealt with the many important uses to which photography was now applied in the various constructive branches of trade, and concluded by wishing the Society every success, and hoping that the number of its members would greatly increase.

The proceedings terminated with a cordial vote of thanks to the Chairman and all who had assisted in the evening's entertainment, which was carried on the motion of the Rev. R. Best, seconded by the Rev. J. W. Cundey, head master of the Bolton Church Institute.

Correspondence.

THE SENSITIVENESS OF DRY PLATES.

To the Editors.

Gentlemen,—If makers of plates would look at results more closely they would see the advisability of adopting some simple standard such as I suggest. Sunshine in England may be, as you infer, a variable quantity; still it is more constant, surely, than Balmain's paint, and less costly than a sensitometer.

I hold it to be a *duty* on the part of makers to give users some idea of the sensitiveness of their plates, and it is a loophole for dishonest representatives to give such vague ideas, which, for want of a standard, we are bound to accept.

I buy one man's plates, which are said to be ten times as quick as wet, and find them to be three times as quick as some that are labelled twenty times; and yet each maker may be able to prove he is right, because nobody knows the rapidity of a wet plate. Suppose, again, that each maker has (say) a hundred customers: why should *each* of those customers be put to the trouble, expense, and loss of time in testing his plates, when he himself could do it for all, and would, if honest enough?—I am, yours, &c., J. H. T. Ellerbeck.

Liverpool, April 20, 1883.

THE SOUTH LONDON ARTISTIC COMPETITION.

To the Editors.

Gentlemen,—It would only have been graceful on the part of Mr. F. A. Bridge to have added to his letter of last week, with reference to the South London Artistic Competition, that it was in *February* I was the successful contributor—a fact which has failed to be chronicled in your columns and on the minutes of the Society.—I am, yours, &c.,

18, *Lancaster-road North, Stroud-green, N.*, John Nesbit.

April 24, 1883.

RE ADAMS'S "BRILLIANT."

To the Editors.

Gentlemen,—Your correspondent H. J. Gover has made such a thoroughly untrue attack upon the above and upon us (page 229) that we feel assured you will allow a reply.

He says that he has "analysed the 'brilliant;'" that he finds it "simply an acid solution of ferric oxalate;" and that its cost is "3s. 6d. per pint."

All three assertions are *untrue*:—1. His "analysis" is not correct; for—2. We do not put a grain of ferric oxalate into it, nor indeed any oxalic acid in any form whatever. This we have stated before.—3. Its price is not 3s. 6d. per pint. A 3s. 6d. bottle (half-a-pint) makes four pints of the "brilliant," or 10½d. per pint.

Why this analytical genius should endeavour to damage us we cannot imagine; but we shall look for his apology and retractation in the next number of the Journal following this one, failing which he will hear from us in another way.—We are, yours, &c., Adams and Co.

Liverpool, April 23, 1883.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered—

Harry Wheeler, Vandyck Studio, Weymouth.—*Photograph of the Old House, Weymouth.*

Exchanges.—In our next.

E. Edwardson.—We know nothing more of the battery than was published at the time.

Transfer.—Make the coating of the paper softer before attempting to transfer the picture.

Durham.—Imperfect fixation is clearly the cause of the stains. Probably the hyposulphite of soda solution is not strong enough.

R. B. Y.—Clearly the negatives are too feeble to yield sufficient relief for surface printing-blocks. Try some of a more vigorous character.

A. Sheppard.—The paper has evidently been exposed to moisture, and is now quite useless. It is not worth the trouble to try and improve it, for it can never be made workable.

Amateur.—Plates prepared with emulsion containing a chloride will keep very well if the emulsion be perfectly washed. The bromo-iodo-chloride emulsion will do quite well for opal plates and transparencies.

Scotus.—The crystals of nitrate of silver being slightly discoloured will be no detriment in compounding a silver bath. Do not make the solution more acid than is just sufficient to yield clean plates when they are developed.

Thulie.—We do not now remember the purport of your previous query, but probably the plan mentioned will answer your purpose. Gelatine has replaced collodion plates for the majority of purposes throughout Great Britain.

S. J. P.—Both in the Taupenot and the old albumen processes the sensitising bath rapidly became discoloured; but it was frequently employed until it was very dark indeed before it was decolorised. This was done by shaking the solution up with a small quantity of kaolin and then filtering. Use the developing solution warm—about 90° or 100°.

T. Edge.—If the paper turn yellow when it is sensitised it is clear that it is unsuitable for photographic purposes. Probably it contains a trace of hyposulphite of soda used as an "anti-chlor." The only remedy we can suggest is to try another make of paper. It is quite possible that a similar character of paper from another mill would be free from the evil.

A. Simpkins.—As the ink refuses to "take" on any portion of the plate except in the very deepest shadows it is a sign that it absorbs too much water. In all probability it has received insufficient exposure in the printing-frame. You might, with advantage, increase the proportion of bichromate you are using by one-half. This will render the plates more sensitive and assist you generally.

Conductor.—Phosphorus can be dissolved in bisulphide of carbon, and an ounce in a pint of the solvent will be a good strength to employ. These are both very dangerous substances to deal with, and you cannot be too careful in their employment. Bear in mind that the solution will take fire spontaneously, if it be exposed to the atmosphere. Surely you can get a good conducting surface without having recourse to such dangerous substances.

Nit. Sil.—By treating the negative bath in the manner you propose you will not get rid of the iodide of silver, as that will be precipitated at the same time as the carbonate. The best plan for you to pursue is to throw down the silver as a chloride, wash, and then boil with a small quantity of glucose and a caustic alkali. This will reduce the chloride of silver to the metallic state. Wash this and redissolve in nitric acid. You will then obtain the nitrate of silver solution in a state of purity.

K. L. M.—The only way to ascertain if the old collodio-bromide emulsion is in good working order is to try it by coating a plate, and exposing it in the camera. Develope in the same manner as gelatino-bromide plates are developed, but using less ammonia. You will find instructions for working in some of the back volumes of the Journal. No independent work is published on the subject. There is but one way of ascertaining the amount of gold in the toning bath, and that is by making an assay. A little practice, however, will enable you to judge, by its working, if it contain sufficient gold for toning properly.

Received.—W. H. Harrison; Lyddell Sawyer. Thanks. In our next.

Photographic Club, Ashley's Hotel, Henrietta-street.—The subject for discussion at the next meeting of this Club, on Wednesday next, May 2nd, will be—*On Focussing.*

South London Photographic Society.—At the forthcoming meeting, to be held at the House of the Society of Arts, on Thursday next, May 3rd, at eight o'clock, Mr. F. A. Bridge will read a short paper on *Lenses, Cameras, and Stands for Small Work.* Mr. W. Cobb will read a paper on *Photography from a Balloon.* The following, from the question-box (postponed from last meeting), will also be discussed:—*When large pictures are required, is it better to take them direct, or to take small negatives and then enlarge them?* Mr. G. Smith, Mr. E. W. Foxlee, Mr. W. Brooks, and several other gentlemen have promised to take part in the discussion.

LONDON GAZETTE, *Tuesday, April* 24, 1883.

Petition for Liquidation by Arrangement.

James Sunderland, carrying on business at 10, 48, 50, and 51, Great Western-arcade, Birmingham, at 53, Queen-street, Wolverhampton, and at 2, Stafford-street, Dudley, photographer and picture dealer, and formerly also carrying on the same business at 75, St. Paul's Churchyard, London, 44, Bath-street, Leamington, the Market-place, Redditch, and at 6b, Norfolk-row, Sheffield, and now residing at 77, Booth-street, Handsworth, Staffordshire.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1200. Vol. XXX.—MAY 4, 1883.

DIFFUSION AND DIALYSIS.

In returning to this subject it is our purpose to enter more into details with regard to the diffusing power of various substances, to state some of the accepted principles governing their action, and to point out their possible significance in photographic operations. We may briefly summarise the main facts by saying that chemical substances are broadly divisible into two classes, typified respectively by crystals and glue-like bodies. The former have been termed "crystalloïd," and the latter "colloïd." When solutions of these bodies are placed in water so as not to be mixed by agitation the crystalloïds have a tendency to diffuse into the surrounding water with comparative rapidity, while colloïds take a far longer period. If an animal membrane or other similar body be placed between the solution and the water the latter, practically, will not pass through the membrane at all, while the crystalloïds will not be checked. Professor Graham utilised this property in devising the now well-known process of dialysis, which has been of priceless value in the arts and sciences.

It is found that all salts do not diffuse with equal rapidity, and that the rate of diffusion increases considerably with the temperature. Thus, hydrochloric acid at a temperature of 120° Fahr. will diffuse at more than double the rapidity that it would at a temperature of 60°—a fact which evidently will have great influence in the freeing of gelatine emulsion by dialysis, or gelatine plates by washing, from salts required to be removed, especially in a limited period of time. It must be observed, though, that when a membrane or other septum is employed heat has less influence in this respect.

One admitted fact of great importance is that the presence of one salt has little influence upon another in the same solution in affecting the rate of diffusion, except when the solutions are strong, in which case the normal diffusing powers of the substances do not appear to be called into action. It follows from this fact, and from each salt having its own ratio, that it is possible to partially separate salts by taking advantage of their passing through a membrane at different rates; and these conditions will be found to offer a most valid theoretical consideration as to the usefulness of employing two "hypo." baths in fixing gelatine plates. So strong is this diffusive power, and so persistent the rate belonging to each substance, that well-defined double salts, such as alum, when placed in the dialyser, are decomposed, one of the constituent salts passing through at a much quicker rate than the other, and so having unequal mixtures on each side of the septum.

Now, in the case of a hypo. bath (particularly a well-used one) the first action is the production of a double hyposulphite of silver and soda. If by diffusion—we are not aware of any actual data available as to their diffusive powers—the constituent salts become separated and an insufficient amount of the hypo. be left, there must be produced within the film a most unstable salt of silver, though, when the hypo. was largely in excess, its effect would be neutralised. When, however, as we have said, a well-used bath is employed, we cannot but believe that the instructions to use a second bath of hypo. has many recommendations in its favour from this point of view alone.

The substance most generally employed as a septum in dialysing operations is the well-known parchment paper; but when, as is frequently the case, it is found to have minute holes in its texture they are "stopped" by cementing a small piece of the paper with white of egg over the spot, or even placing a little liquid albumen upon it, and applying a hot iron to coagulate the moist albumen Herr J. E. Enklaar states that a membrane far superior to parchment paper is formed by hare or rabbit bladder carefully purified, which he advises to be done by prolonged treatment with water, alcohol, and ether. He states that this material acquires its maximum transmissive power only after it has been used several times—more or less according to the salt used for the dialysing experiments. He has, further, verified the law that "the rate of diffusion of molecules of salts in water is proportional to the density of the saline solutions;" or, in other words, that, other conditions being the same, the quantity of a salt which passes through the membrane is proportional to the amount of salt dissolved.

The following list of photographically-interesting chemicals, extracted from a much larger one, gives the quantity of salt in grains diffused into water:—

Substance.	Per Centage.	Grains.	Time.
Hydrochloric acid	2	15·04	5 days.
Acetic acid	„	11·31	10 „
Ammonia	„	9·59	4·04 „
Alcohol	„	8·62	10 „
Sulphate of magnesia......	„	12·79	16·17 „
Nitrate of silver	„	13·61	7 „
Bromide of potassium......	„	12·46	5·716 „
Hyposulphite of soda	„	11·89	9·9 „

The above table was formed by actual experiment without a septum, and the quantity operated upon exactly the same. Two per cent. represented 41·4 grains.

It will be seen what a remarkable difference exists among the salts even in this restricted selection, and the important part played by the varying powers of individual salts has, we think, scarcely received sufficient attention by photographic experimentalists. The practical application of freeing emulsion by the process of diffusion of the soluble salts is too well known to require further notice now, beyond calling attention to the law—"*The velocity with which a soluble salt diffuses from a stronger into a weaker solution is proportioned to the difference of concentration between two contiguous strata.*"

Turning, now, to that branch of the subject which comes under the head of "osmose," we may give the osmotic equivalent of a few substances, the term expressing, as we have explained, the proportion of water which passes through the dialysing membrane to replace the salt passing in a contrary direction:—

Osmose of one-per-cent. solutions in membrane.

	Degrees.
Oxalic acid	− 148.
Hydrochloric acid, 0·1 per cent.	− 92.
Chloride of sodium	+ 2.
Nitrate of silver..	34.
Sulphate of magnesium	14.
Nitrate of cadmium	137.
Bichloride of mercury	121.
Phosphate of soda.....................................	311.
Carbonate of potash	439.

These proportions, however, as we pointed out last week, are liable to be interfered with (unlike the diffusion of the salt itself) by the presence of other salts. Thus, the high equivalent of carbonate of potassium is reduced to nothing by the addition of chloride of sodium.

The behaviour of animal membranes, &c., in the presence of acids or alkalies is apparently anomalous. In very weak solutions the membranes, &c., expand greatly; but in strong solutions the opposite is the rule, so that the equivalents in the last table would not apply.

We would conclude by giving the details of an experiment which anyone may try, and which, read in the light of the laws we have described, explains a cause of frilling on gelatine plates very fully.

Let a gelatine plate remain for a day or two in the developer till the film is almost entirely loosened, and then let it be well washed; the film will not be very unlike a loosened collodion film. Upon placing it in the hypo. it will, by virtue of osmotic action, lose more water than it receives salt, and will contract till it becomes considerably smaller than the glass; but when placed carefully in water to wash the opposite action takes place, the film takes up more water than salt passes out from it, and consequently swells inordinately. If now it be put into a ten-per-cent. hydrochloric acid solution it will contract again, and so on. No experiment could be desired better to illustrate the action that takes place; and we will here conclude our remarks by expressing the hope that this brief summary of principles may have tended to throw a little light on some perplexing and annoying phenomena.

PORTRAITURE FOR AMATEURS.

We will now redeem the promise made last year that we would resume the subject of amateur photography, and give some practical hints on taking groups, &c., in the open air. This we were unable to do, until the season had become too far advanced to permit of successful outdoor portraiture, on account of the great pressure on our space at the time. In resuming the subject we do so with a great deal of pleasure, inasmuch as, since the former articles appeared, we have received a large number of very successful pictures in the form of portraits and figure studies, sent to us by amateurs who before had never attempted to take a likeness, or even thought such a thing possible without apparatus specially constructed for the purpose, and the possession of, at least, something in the form of a "glass room" to serve as a studio.

In the present as in the former articles we shall not enter into the question as to which is the most preferable form of apparatus to employ in amateur portraiture, but shall simply content ourselves by showing how the best results may be obtained with the appliances at command, whatever may be their construction. When writing before on this subject we advised the student in portraiture in ordinary rooms to confine his attention to single figure pictures, and those only of the bust or three-quarter length, unless an unusually large window were available. Our reason for this was that the student should thoroughly comprehend the principles of lighting the model, so as to obtain the requisite degree of *chiaroscuro;* and this is by no means easy of accomplishment by the tyro when more than one figure has to be dealt with in the picture. However, with judgment, groups of two or three persons may be successfully taken in an ordinary drawing-room with even a moderate-sized window. But it is manifest that when more than one figure is included in the picture greater skill is required in the lighting, otherwise it will be impossible to secure even illumination over the whole of them; and, unless the window be a somewhat large one—a bay, for example—it will not be advisable to attempt more than half or three-quarter lengths. Nevertheless, very pleasing pictures in this form may be produced with a little taste and judgment displayed in the posing.

Assuming that the reader is familiar with what appeared in our last volume, we shall, before proceeding with the hints on outdoor portraiture, give a few practical ones on taking groups in an ordinary sitting-room. In the first place, let us suppose that we wish to secure a picture of a mother and child, and in the present instance we will assume that the latter is an infant in a light dress.

Now, in all probability the child's complexion is much fairer than that of the parents, and also the dress much lighter; consequently a different exposure in the camera or treatment in the developer would be necessary if each portrait were taken separately. Hence, if both received the same amount of illumination, the probability is that either the one would, to some extent, be overdone in the negative, and the other underdone. By way of experiment let us arrange the group in the following manner:—Let the lady sit by the window, facing somewhat into the room, so that when the camera is placed close to the wall—as we have always directed it should be—a three-quarter face portrait will result. Now, let the baby be placed on her lap so that it shall face the window. If the lady look slightly downwards toward the child a pleasing and, at the same time, natural pose will be obtained.

It will now be noticed that the shadows on the face of the lady are somewhat heavy; but they may easily be modified by the employment of the reflector. If we now take a negative we shall find that, although the portrait of the mother may be satisfactory that of the child is anything but pleasing. In all probability the face and dress is over-exposed and the eyes have a glaring light upon them, so that, when the negative is printed from, the portrait of the parent may be very good, while that of the infant—face and dress—is little more than a white mass without detail.

Now let us arrange the group in a manner the reverse of that we have just suggested, and let the mother sit more round towards the light, taking the child on her lap, so that it, to a great extent, backs the light. By this means we shall secure the strongest light on the features of the mother, while the face of the child will be in fairly deep shadow, so also will the major portion of its dress. The lighting on the mother's face will now partake somewhat of the "Rembrandt" character; hence we shall have to bring the reflector into requisition, and we shall notice that when the shadows on the mother's face are sufficiently softened so also will be those on the face of the child. If we now take a second negative we shall find that there is a very marked difference between this and the former one, as in this the illumination on the two faces will be to a considerable extent equalised, and good *chiaroscuro* be secured in both. The light dress, also, will be found to possess good detail, because, for the most part, it was arranged so as to be in shadow.

We have suggested the foregoing experiment simply to illustrate that, when two different complexions or a light and dark dress have to appear in the same picture, by a judicious management of the light and a little consideration in the posing much may be accomplished in the way of securing a harmonious result. Attention to this matter is of more importance when working indoors, when the light is more direct and concentrated than in the open air, when, of course, it is more diffused.

In taking groups in an ordinary room it will always be desirable to get the faces as close together as possible, as then there will be less difficulty in obtaining even illumination over them, and they will also be secured in better focus without the necessity of employing stops, entailing a longer exposure, which, as a rule, can be ill afforded under the circumstances. In the case of groups of children, or of a child and an adult, the younger one may often be kept without movement by having its head posed in contact with that of the elder—say, for example, with a child standing on the mother's knee, resting its head on her shoulder, or with a "pick-a-back" pose, when the child's head may be made to rest against the mother's or elder person's cheek. Moreover, when groups are taken as half or three-quarter length the effect will always be more artistic when the faces are grouped in close proximity than when they are at a distance apart.

It sometimes happens that with all care one face may come out more dense than another. When this occurs the discrepancy may often be ameliorated in the printing by varnishing the back of the negative with a matt varnish, and then scraping it away from those portions where the density is too great, so that they print deeper than they otherwise would.

Our next article on this subject will treat on outdoor portraiture.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter I.—Nature and Properties of Light.

Since the last series of articles on photographic lenses appeared in our volume for 1869 many changes have taken place, in consequence

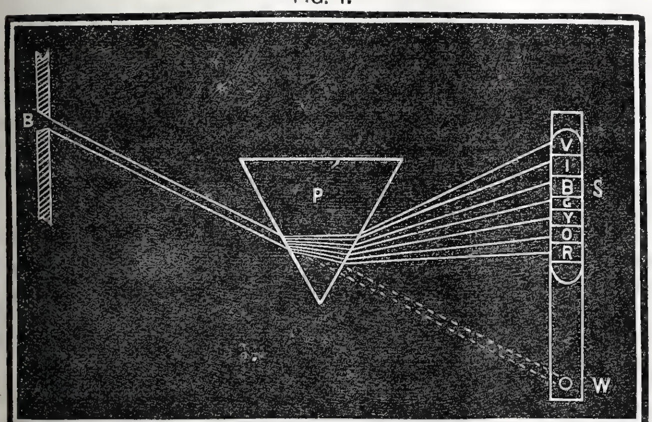
f which the publication of another series has been considered esirable. The new recruits by which the ranks of photography ave been strengthened since the date mentioned may be numbered y thousands, and the principles upon which photographic lenses re constructed have received many fresh applications. Again: by he introduction of plates possessing a degree of sensitiveness far xceeding in this respect those in use more than twelve years since, he applications of objectives of the slower class have received great xtension, and this in turn has reacted and led to greater attention eing bestowed upon instruments of that character. The value of ptical glass possessing greater density than that formerly employed as also been duly recognised and appreciated, to the undoubted dvantage of the opticians' art.

In order that the inexperienced photographer—the class for whom his series of articles is specially intended—may receive the greatest ossible benefit, we shall assume him to be ignorant of the various echnical terms that must necessarily be employed when treating on uch a subject, and shall explain them as fully and clearly as ossible. For the same reason we shall avoid all mathematical erms and formulæ, which, however useful to the lens manufacturer, would not fall within the scope of these chapters.

As a fitting introduction to the subject of lenses it is necessary that an explanatory remark be made on light. Without entering upon this abstruse topic it is enough for our present purpose to observe that the undulatory theory of light is now generally accepted. This assumes light to be a certain result of setting in motion the ether which pervades all space, and owing to that motion we see objects upon which such ether waves fall.

But the functions of light are not confined to rendering objects visible; they also include heating and chemical action, or *actinism*. These three properties of lighting, heating, and actinism may be very easily demonstrated by the following simple experiment:—Cover up a south window by an opaque screen, allowing the sun's rays to be admitted only through a small aperture. Now intercept the rays thus admitted by a prism, so as to have them spread out upon a sheet of white paper, and observe the gorgeous spectacle the rays then present. The beam of white sunlight is decomposed into its primary constituents, as shown in the adjoining diagram (*fig.* 1),

FIG. 1.



n which B represents the aperture through which the beam of light is admitted, and which beam, but for the interposition of the prism P would, without deviating from its straight path, fall at W. But the prism bends the ray and decomposes it into the primary and secondary colours indicated by the initial letters of the spectrum S, the violet ray V having been bent or refracted in a greater degree than the red ray R; from which circumstance the violet and blue rays of the spectrum are popularly spoken of as the visible rays of greatest refrangibility.

If a strip of sensitised paper be pinned up so as to receive the spectrum it will soon be found that it becomes dark; but the darkening power of the light is confined to the rays at and beyond the violet end. If, however, a thermometer be placed at the various colours of the spectrum, the mercury will rise in the most pronounced manner at, and even beyond, the red end; hence the application of the term "heat rays" to these. That the yellow is the luminous or light-giving ray is sufficiently demonstrated by the sense of sight. Now, while the foregoing is correct in the popular signification, it is also the case that all the rays induce chemical change, and it is possible to prepare a sensitive surface upon which the red rays will exercise more prompt action than the so-called actinic or violet light. But this need not be considered at the present stage.

We shall here sum up the truth or law to be deduced from what has been said. Light always travels in a straight line as long as the density of the transparent medium through which it is passing remains unchanged. Upon entering a denser medium obliquely it suffers refraction or bending, the amount of the refraction depending altogether upon the density of the medium. Pure water refracts more powerfully than air; water containing a salt—such as nitrate of silver—in solution exceeds pure water in its refractive power; crown glass exceeds salted water, and is in turn exceeded by flint glass, which last must yield the palm to the diamond and other gems. Suppose, then, we had four simple lenses all precisely alike so far as curvature and outward form were concerned, but one of them was formed by water, the others being made of crown glass, flint glass, and diamond respectively, each would have a different focus from the other, the water having the longest and the diamond the shortest.

We have alluded to the fact of optical glass of greater density being utilised at the present time in comparison with that employed several years ago. One practical advantage arising from this may be perceived from the principles just enunciated. It is this: that with a given diameter and form of lens it is possible to obtain a shorter focus and, consequently, greater intensity of illumination than when the objective is formed of lighter material.

Our attention has been drawn by more than one correspondent to the fact that the lens described by Mr. Thomas Furnell in our last issue bears a somewhat close resemblance to others that have gone before. Such is, no doubt, the case; but there are points of difference between Mr. Furnell's lens and its predecessors of the same class that render it in a manner a distinctive instrument, though the general principle of its construction may not be new. The lens to which it bears the strongest resemblance is one that was patented by Mr. Howard Grubb, of Dublin, so far back as 1871. This consisted, as in Mr. Furnell's, of an ordinary cemented combination with its convex side to the front, the correction for distortion being effected by means of two simple lenses placed behind it. But in Mr. Grubb's instrument some importance was attached to the position of these two correcting lenses, one being placed anterior, the other posterior, to the diaphragm, whereas in Mr. Furnell's *both* are behind the diaphragm. The particulars regarding the radii of curvature of the different lenses as given by Mr. Furnell will be useful to those who may wish to try the effect of such a combination with materials ready to hand.

Among the names of candidates for the honour of Fellowship in the Royal Society, and recommended by the Council for election—which recommendation, as our readers are aware, is tantamount to the actual bestowal in due course of the coveted honour—we are pleased to note that of a gentleman who has long been closely associated with our art-science, and from whose pen many contributions of great scientific value and interest have from time to time appeared in our columns—Mr. Howard Grubb, F.R.A.S. This distinguished optician's name is now of world-wide celebrity, and its presence upon a photographic lens is a sure guarantee of the excellence of the instrument; but, of late years, the fame of the photographic achievements of Mr. Grubb has been eclipsed by that of the astronomical instruments he has made and the observatories he has designed and erected, which are in evidence in every quarter of the globe.

Considerable interest has lately been excited in literary circles by the question of the Ashburnham Papers, a portion of which are

said to have been, in the first instance, improperly obtained from their true owners. Some *on dits* were to the effect that they had been purchased for the continent, and others that our own Government had acquired the MSS. It is now stated that the Government will not purchase the whole of them, but are willing to secure a portion. Lord Ashburnham has consented to divide his treasures, and the Trustees of the British Museum have recommended the purchase of a portion. Our readers have little to do with the Ashburnham MSS., but will not be uninterested to learn that the Anglo-Saxon part of them, forty-three in number, ranging in date from 694 to 1040, are to be reproduced by photography, the Treasury having sanctioned their reproduction by photozincography at the Ordnance Survey Office. The value of such applications of photography will be appreciated when it is stated that the estimated worth of the entire collection is not far from two hundred thousand pounds.

Oxalic acid required for the production of oxalate of potash in modern times is always prepared commercially by an ingenious process, which, in brief, consists of the heating together of sawdust and caustic alkali, usually soda and potash combined. The acid is produced in large quantity by the conversion of the vegetable matter, and is afterwards separated and purified by a series of processes. Lately, another means of producing the acid has been invented—this time by a process almost the reverse of the one just described, the vegetable matter being replaced by animal and the alkali by acid. Waste leather from saddlers' or shoemakers' shops, and even woollen rags, horn, hair, &c., have been laid under contribution. These waste materials are heated with one part of sulphuric acid and four of water, and the mass thus obtained is treated, at a temperature of 176° Fahr., with nitric acid one part and water three parts. Oxalic acid is then obtained by digestion of the product.

We learn that Mr. Browning has recently sent to the Royal Observatory at Rome a set of apparatus which he has made for Professor Tacchini, consisting of a very powerful direct-vision spectroscope fitted to a photographic camera. The apparatus is intended to be used for the purpose of photographing the spectra of the flames which issue from Vesuvius when in a state of eruption. The scales of the spectroscope for reading off the position of the lines in any spectrum is illuminated by means of a small incandescent electric lamp.

Our readers will remember the excitement caused in the scientific world by the publication of the result of experiments made by MM. Cailletet and Raoul Pictet, which resulted in the liquefaction of oxygen and other hitherto "permanent" gases. Whatever future possibilities might have been in store for liquefied oxygen to be as readily purchasable as liquefied sulphurous acid, the above experiments had no practical issue at the time in any such direction, for the liquefied gases were not seen as so much liquid but simply as a cloudy mass issuing from a tap, small drops of which were heard to fall in a pattering fashion upon a piece of paper placed below. The subject has, however, been followed up by other experimenters, and early this month it was announced that S. Wroblewski and K. Olozewski had succeeded in obtaining the long-looked-for result. By subjecting the gas to immense pressure, reducing it to the lowest temperature possible, and then still further allowing it to cool by releasing the pressure, they have produced veritable liquid oxygen visible at the bottom of a glass tube in the form of a "clear meniscus." At the same time, they ascertained the exact freezing points of certain liquids. Alcohol became viscous at about − 129° C., and solidified in the form of a white body at about − 130·5° C.; sulphide of carbon froze at − 116° C. On April 10, another despatch was sent by M. Wroblewski:—"Nitrogen cooled, liquefied by expansion, meniscus visible, liquid colourless." At the sitting of the Academy of Sciences, on April 23, further particulars of the results obtained by the beautiful experiments of the above-named gentleman were given. At a temperature so extraordinarily low as − 360 (vide *La Nature*) and a pressure of 160 atmospheres no change of state was visible; but a sudden expansion gave rise to an ebullition, only comparable to that caused by the suitable heating of carbonic aci When, however, the expansion was so managed as to cause t pressure to remain at fifty atmospheres, nitrogen was changed a colourless transparent liquid, forming a clear meniscus at t surface.

ASTRONOMICAL PHOTOGRAPHY.

Part I.

When we consider the important place occupied by photography all expeditions for the observation of eclipses of the sun during t last twenty-three years, it is a matter of some surprise that the are not more workers in this department of the art. Apart fro the work done during the very few minutes available, amounti to about half-an-hour spread over the period named, including t whole of the solar eclipses within that period, the number workers in applying photography to astronomical purposes probab does not exceed a score or two; and, if we limit the number to tho who have published their results, possibly half-a-score would inclu all. The reason for this may be found in supposed difficulties. will be my aim to show that since the introduction of the gelati process some of the difficulty has been removed; but, even if t collodion method be adopted, there is no reason why amateurs bot in astronomy and photography should not work together to greater extent than hitherto.

It may almost seem superfluous to write on the subject for th purpose of showing "how to do it." Astronomers know what the want, and photographers know how to apply their skill, and yet ho little has been done! Absurd as it may seem, I have many time been asked—"How do you photograph the moon? Do you use th magnesium light?" Such a want of knowledge of the subject ca not be attributed to either astronomers or photographers, but ther is evidently room for a few hints. One would suppose—now tha photography is so popular and its practice so easy, while the telescop is to be found in so many hands—that we should have more worker in this interesting branch. I shall endeavour to show that th additional apparatus required is of a very simple kind, and tha there is much pleasure to be derived from the pursuit of astrono mical photography.

Before going into the practical details of the subject it ma prove interesting if I give a short outline of what has already bee accomplished. It is always a matter of some interest to know wh was the first to do a certain thing, although the work of suc pioneers may soon have been surpassed. Such was the case i photographing the moon; the first attempts were comparativ failures, but it was proved to be possible. So also in photographing the solar corona. How this could be done was first demonstrated in 1870, when a picture of the wonderful fringe of light always seen surrounding the eclipsed sun was obtained under somewhat adverse atmospheric conditions. In the following year, with almost identical apparatus (the lenses were of the same kind and aperture), the most perfect results were obtained by two or three observers in India. The late Dr. J. W. Draper, in 1840, showed that celestial objects could be photographed, and, more or less successfully, others followed, until about 1858, when Dr. De la Rue obtained excellent pictures of the moon. But a few years later, Mr. Rutherfurd, of New York, surpassed everything that had been previously done, and, so far as I have seen, his work still remains unequalled.

In some of the applications of photography to astronomical purposes the first attempts have been successful. Such was the case in 1860, when Dr. De la Rue's photographs showed, without the slightest doubt, that the solar prominences, so long a matter of wonder and speculation, were, by the passage of the moon across them, projections from the surface of the sun. So, too, the comparison of two photographs of the eclipse, taken in 1870 at stations widely separated, clearly settled the point that the corona was an appendage of the sun; and all photographs of the corona since taken have only confirmed the results then obtained. Photographs alone could, and did, settle this much-disputed point. It is a curious fact that out of twenty drawings of the corona made during the eclipse of 1860 no two agreed; and so it is in all cases of the kind. Photography alone can be relied upon.

Another achievement may now be credited to photography in the picture of the great nebula in Orion. No drawing, however carefully done, could be so accurate as to stand comparison with another drawing made a few years, or even a few days, later. But in photographs which have now been obtained, including all stars down to about the fourteenth magnitude, we have the means of comparison with such as may be done years hence, thus enabling astronomers

to say whether or not there has been any change of form or detail. Although we have gelatine plates of extreme sensitiveness, the exposure for this wonderful nebula is so long that no clockwork can be made to keep the object absolutely on one place, and this, with the addition of atmospheric difficulties, may for a time make it a matter of some doubt; but so much success has been achieved that we may fairly expect still greater.

It is still within the limits of possibility that we may before long have photographic charts of the stars; and for this telescopes are not wanted, but cameras with suitable lenses, mounted so as to follow the stars, or "equatorially," as it is termed.

Some of the most interesting work to which photography has been applied is in the application of the spectroscope; but this is a department in which very few amateurs will care to experiment. It is better left in such hands as those of Dr. Huggins and the public observatories. The apparatus required is expensive and difficult to manipulate, and the results obtained can only be interpreted by those who have made spectroscopy a special study.

One of the most recent attempts in the application of photography is that by Dr. Huggins in making photographs of the solar corona in the full blaze of daylight. How this attempt was made need not be referred to here further than to say that it was by cutting off the atmospheric glare by means of coloured glasses. This, of course, is a matter which can be taken up by anyone, and full particulars will be found in the paper read before the Royal Society.

Another feat never accomplished until lately is that of photographing a comet. The great comet which was seen last autumn—with a very long exposure (in one case of over two hours) and on a gelatine plate—was successfully photographed. A somewhat remarkable photograph was taken by Dr. Schuster during the eclipse, in May last, in Egypt: on the same plates with the picture of the corona appears a small comet. When we bear in mind that it required between one and two hours to photograph the large and bright comet referred to, and only a few seconds to obtain the corona and comet on the same plate, there must have been much greater intensity in the light of the small comet, owing, probably, to its proximity to the sun, or the plates used were much more sensitive than in the other case. We know that Captain Abney prepared plates specially; but still it is remarkable that this small comet should have its picture secured in so short a time as compared with the other.

There are two great difficulties in applying photography to astronomical research, and in the case of the moon there is a third. We have always the motion of the earth to counteract, and it is only on rare occasions that the atmospheric conditions are favourable. The times when the air is still are few, and discouragement is likely to follow disappointment by clouds appearing just when everything may be ready for a good night's work. A good stock of patience is desirable —indeed necessary. In the case of the Moon, which is one of the most interesting objects to the photo-astronomer, we have her own motion in her orbit to contend with. If the Moon be closely watched it will be noticed, by comparison with any star that may be near, that she moves towards the *east* to the extent of about her own diameter in an hour. Clearly, then, the driving power of the telescope adjusted to follow a star which appears to move in the contrary direction, or towards the *west*, must be readjusted to follow the erratic Moon. There is still another trouble at certain periods of her revolution due to the slanting direction of her motion: she does not always follow the direct motion of the telescope (or the stars).

I propose in Part II. to describe the method of photographing the Moon. She is certainly the most interesting of the celestial objects from a photographic point of view; and, notwithstanding the difficulties referred to, I may be able to show that good results can be obtained with very simple means.

A. Brothers, F.R.A.S.

INTENSIFICATION AND REDUCTION.

Ever since the introduction of the now all-prevalent gelatine process there has ever and anon been an outcry as to intensification. First one and then another method of intensifying has been introduced, extolled, and finally died a natural death. Only one has stood against all its opponents, and that the earliest of all, namely, the mercuric intensifier.

It has been alleged over and over again that negatives treated with ammonia and mercury will not stand the test of time. Some allege that negatives so treated fade away, and others, on the contrary, that the intensification goes on *ad infinitum*. I have negatives at the present time taken and intensified some three years ago, and which show no traces of deterioration in either way. The reason of this, in my opinion, is that they were thoroughly washed and freed from the thiosulphite of soda preparatory to the application of the mercuric chloride. Many operators, on taking the *cliché* from the soda bath and finding it to lack density, give it a rinse under the tap and apply the mercury at once. This is a great mistake, as a plate needing intensification should be allowed to wash for at least three or four hours in running water. This is best managed by the aid of zinc troughs, into which the water is, so to speak, injected at the bottom. The thiosulphite salt being heavy sinks, and by the water entering the trough at the bottom it is kept in thorough solution, while every ounce of water which escapes over the side of the trough carries with it its due proportion of soda in solution. In practice I usually find it best to dry my *cliché* before intensifying, as then I can see better what amount of extra density is required.

Complaints have been made that a small additional amount of density cannot be obtained by the use of mercury and ammonia, but that a negative almost dense enough *before* treatment is far too dense *after*. This complaint is utterly untenable in that form. If the gentleman to whom it owes its paternity had said it became too dense after treatment with a *saturated solution* of mercury I could well have believed him; for a saturated solution, though often recommended, should very rarely be used — in fact, only when the negative to be operated upon is a mere ghost. According to the density required so should the strength of the mercury solution be computed. One very necessary precaution in this method is to see that your mercury solution is *always clear*. If it be at all turbid, dirty, or show a milky appearance, the resulting negative will be unequal and far from satisfactory. This same turbidity is a sure test for thiosulphite. If on pouring your mercury on to a plate or immersing the plate in the mercury it becomes at all turbid, you may be sure the plate has not been sufficiently washed, and the best thing to do is to set it washing again *at once*.

Thorough washing between the applications of mercury and ammonia is also a necessity, and half-an-hour or an hour in the trough, after intensification is completed, will do no harm.

All necessity for intensification can be utterly done away with by the use of a stronger developer; that is, stronger all round—not merely stronger in pyro., but also stronger in the ammonia and bromide solution. A very good developer, which I have found very suitable for every brand of plate that I have used, is made as follows:—

Solution A.

Liq. ammonia, ·880	1 ounce.
Bromide of ammonium	3 drachms.
Water	10 ounces.

Solution B.

Pyrogallic acid	½ ounce.
Methylated spirit	7 ounces.
Water	8 „

For a half-plate I add to one ounce of water one drachm of solution B and three drachms of solution A. This is a strong and quick developer, and very rarely gives either over- or under-intensity. If the resulting picture should be too dense, the density is easily reduced by flooding the plate when fixed (*and still wet with the thiosulphite*) with a solution of perchloride of iron in water. This should be of a light sherry colour, and on coming into connection and conjunction with the thiosulphite it changes to a bright green, reducing the negative rapidly and *equally*. The negative could also be reduced after washing by the perchloride alone; but by using it in conjunction with the soda the reduction is a great deal more equal, the simple perchloride having a decided tendency to eat out any veiled shadows and give a black and white appearance to the prints. I have never seen this method of reduction advocated or even mentioned before; but after using it personally for a considerable time I can heartily recommend it to the profession.

Another method of reduction which is very useful when the negative does not require very much, is simply to take it from the soda bath, when fixed, and, without washing, stand it on a shelf or in a rack for half-an-hour or so, when it will be found to be materially less dense. The cause of this reduction is that the evaporation of the water strengthens the soda and thereby reduces the image. This method I do not claim as original, it having been, to the best of my belief, accidentally discovered by Mr. Fred. Bathurst.

C. Brangwin Barnes.

TRANSATLANTIC JOTTINGS.

An ingenious form of washing apparatus, described in the *Photographic Times* (New York), is the invention of Mr. J. G. Tunny, of

Edinburgh, from whose pen valuable hints have often been given to our readers over a series of years longer than many of our contributors can remember. Briefly described, the new method consists in placing the prints flat on a cloth-covered board, protecting them with a linen cloth, and passing the whole several times through a modified clothes-wringing machine, the modification consisting in superseding the upper roller by one of perforated zinc, through which a stream of water is kept flowing during the operation. It is stated that prints so treated are as insensible to the starch and iodine test as those subjected to the ordinary washing for twenty-four hours. That some contrivance for the better washing of prints is still a desideratum cannot be denied. There is too much of the system of turning the tap upon a dish of prints and the rest-and-be-thankful style of thing still practised to enable the utmost possible permanency to be obtained.

The soda developer—to which the name of Mr. H. J. Newton is always linked—is evidently continually gaining ground across the water. The editor of the Journal named writes of it:—"There is an amount of quiet, dogged persistence in the soda that does not belong to the ammonia, which seems to lose its power very soon; whereas the soda goes on building up the picture till every detail is out." At meetings, in the correspondence columns, and elsewhere, the merits of this developer are continually being lauded, while in this country few operators have taken it up or given a word of praise to it. Certainly, as Mr. Tunny (who has been spending a lengthened holiday in that country) states, gelatine work is decidedly behindhand there, so that we can scarcely expect American operators' opinions to be equally valuable with those of the Old World; yet, as some of the foremost men have nothing but good to say of it, we cannot avoid thinking that the last word has not been uttered here upon the process.

If the *Boston Journal*, as quoted in our New York contemporary, under the heading of "The Latest Boston Novelty," be a veracious witness, a state of things prevails there calculated to shock the ethical perceptions of most people in Great Britain. It is neither more nor less than the "running" of a studio presided over by a lady, and whose entire staff is feminine also, with the object of photographing "ladies" in a guise in which no modest woman would present herself before a man. For the credit of the sex we can but hope that the whole story is a *canard;* but details are given so fully that it is difficult to imagine any one being guilty of such purely-libellous invention. If true, we can only characterise the story as sickening. When it is stated that theatrical properties are kept, and the "tights" of the stage put on to non-professional limbs, a smile only is raised; but when it is stated, among other details, that a young lady of good family repeatedly goes to be photographed in the style known as "the nude" among artists, we do not know whether most to deplore the morbid feeling which prompts such indelicacy or to censure those who pander to it.

A new method of reversing the camera, so as to enable a horizonal or vertical view to be taken with little trouble, is brought out by the Scovill Manufacturing Company. Whatever merits or demerits it may possess it is certainly not short of novelty. As far as the diagram seems to show, a long hinge is fixed to one side of the camera, and the tripod attached to it when it (the hinge) is closed. To reverse the camera it is hinged *on to its side*, at the side of the tripod, and tightened by a strut or stay. The arrangement generally favoured in this country consists, as most of our readers are aware, of a "reversing-back"—a subsidiary framework usable only with a square camera, and capable of being placed with its slide runners or grooves either upright or horizontal. As the arranging and disarranging occupies but a few seconds of time, any apparatus to take its place should be either lighter or cheaper. We have not sufficient data before us to say whether the Scovill or the English pattern excels in these respects.

We learn that "black varnish may be removed from collodion positives by chloroform or benzole," neither of which, it is stated, will dissolve the film. *We* use a penknife; or, if the varnish be at the front of the glass, turpentine.

A gun-camera, used by M. Marey for photographing birds on the wing, was described and illustrated in these columns some time ago. One for taking small pictures of ordinary subjects was recently brought before the British photographic public, and we now learn that an American gentleman (Mr. Kilburn) has been taking a series of pictures with a gun-camera with the two-hundredth part of a second's exposure. We may, therefore, expect the use of the pistolgraph to be shortly revived.

PHOTOGRAPHY APPLIED TO METEOROLOGY AT KEW OBSERVATORY.

No. II.

The waxed papers, described in my last, when iodised look nearly black in the yellow light of the operating room; in daylight they are reddish-brown. After being sensitised they are, while still wet, floated on never less than two dishes of water to remove excess of nitrate of silver, and then pinned up to dry at the normal temperature of the air of the room. In order to economise the developing solution the latter is not poured into a bath, but upon a sheet of plate glass 24 × 19 inches, placed in a porcelain dish to catch any waste liquid which may run off the glass. This sheet of glass is levelled inside the developing dish by means of wooden wedges resting upon the ends of two wooden bars disposed under the plate in the form of a cross. Eight ounces of developer are required to cover this sheet, instead of the larger quantity which would have been necessary had a glass or porcelain dish with uneven surface been employed. In the course of time the polished surface of the sheet of plate glass has been curiously eaten away in places by the acids used in the photographic solutions.

The prints by this waxed paper process are found, after trial during a long series of years, to be quite permanent, provided the fixing liquid is well washed out of them. All Government work is done upon these sheets—that is to say, the indications given by the barograph and thermograph are recorded upon them. The waxed paper is bought, ready pressed and cut, from Mr. Sanford, 88, Godolphin-road, Shepherd's Bush, London.

In the other self-recording photographic instruments at Kew ready-prepared bromide of silver paper, purchased from Messrs. Morgan and Kidd, of Greenwich, has been on trial for some months, and will probably be permanently adopted, since it is more sensitive than the waxed sheets, and the time of the operator is economised by the employment of ready-sensitised and quick-working paper. Positive copies of the records given by the instruments are taken by exposing a sheet of bromised paper under each paper negative for two and a-half minutes at a distance of four feet from a gas flame. Time alone can show whether prints on this paper will be as durable as on the old, and as yet there has been small experience at Kew in working it during hot weather. As it is so much more sensitive than the other it gives the Kew authorities the opportunity, should they so desire, of using larger recording drums and sheets of paper to obtain photographic diagrams on a larger and more complete scale. Minute blisters appear on the new paper on trial at Kew, during the closing manipulations.

As there is occasionally some contention about the best proportions of bromide and iodide in emulsions intended for special purposes, the following statement of Dr. Balfour Stewart, regarding the best proportions of bromide and iodide of silver in the waxed paper process for use in gaslight, may be of interest:—

"A comparison of the spectra of the two kinds of light showed a very marked difference. While in sunlight the spectral rays which are around and above the fixed line G (the indigo and higher rays) are so intense and numerous as completely to overpower the small space between and about F and G (the blue and upper portions of the green)—a part of the spectrum which affects bromide more than iodide of silver; in gaslight the case was quite different. The great bulk of photographic rays was found to lie within the limits of the visible spectrum, and consequently the photographic action of this light was likely to be far more energetic on bromide than on iodide of silver. These suppositions were fully borne out by experiment. On introducing a little bromide of potassium into the iodising bath the change was very apparent. It requires a certain proportion to be observed between the two to obtain the best results. If the iodide of potassium be in excess the resulting silver salt will be wanting in sensitiveness, requiring a comparatively long development to render an image visible; while, if the bromide be in excess, there will be a great want of vigour in the impression, the picture being red and transparent. When the proportion between the two is properly adjusted the paper will be extremely sensitive, the picture presenting a vigorous black appearance, without the least approach to red. The addition of a chloride was found to produce a somewhat similar effect to that of a bromide, but in a less marked degree." . . . . "I think the best results are obtained when the iodide and bromide are mixed in the proportion of their atomic weights, the strength being as follows:—Iodide of potassium, 512·5 grains; bromide of potassium, 417·5 grains; distilled water, forty ounces."

I see a possible source of error in the preceding experiments, for no information is given of any change having been made in the strength of the sensitising nitrate of silver bath. To get the best results a stronger bath should be employed in sensitising bromide of silver than is used in sensitising iodide of silver, and the immersion

ould be longer, otherwise insensitiveness will result from the omide not having had proper treatment.

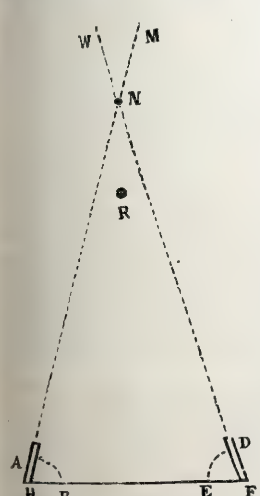
Before describing the self-recording photographic instruments now work, I will turn to the subject of some new experiments now ;ing tried at Kew, to determine occasionally the height of clouds, , Captain Abney's photographic method. Captain Abney is the test member elected of the Kew Committee of the Royal Society, hich has the Observatory under its management. Mr. G. M. 'hipple is the superintendent of the Observatory, and Mr. W. oxall has charge of the photographic operations.

The attention of meteorologists has of late been forcibly drawn , the necessity for studying the changes and movements in the pper clouds as an aid to obtaining evidence of the nature of coming eather. The axis of a cyclone is probably not vertical, its upper ortion being in advance of the lower in relation to the direction in 'hich the cyclone is moving; hence the higher clouds sometimes re affected by an approaching cyclone before its influence affects he winds blowing at the surface of the earth. Most of these yclones travel from near the Gulf of Mexico in a north-easterly irection, some of them touching the British Islands in their course, nd others missing these islands by passing a little to the north-vest of the west coasts of Ireland and Scotland. Some of the yclones which miss our shores break upon the coast of Norway.

The Rev. Clement Ley, a well-known meteorologist, is the chief ioneer in the study of the movements and transformations of louds, and has succeeded thereby in foretelling coming weather with considerable accuracy. The upper clouds (especially the cirrus) re of most value for the purpose, and the necessity for photographic records of their appearances and of their altitudes is consequently beginning to be felt. As an example of the occasional certainty in weather prognostication to which this study may lead, it may be mentioned that, on the morning of the bank holiday of August, 1881, Mr. Ley happened to be in London, and upon observing certain appearances in the upper clouds he entered the telegraph office in the Strand, and, although the weather was then charmingly fine, telegraphed to Mr. Robert Scott, the head of the Government Meteorological Department:—"Heavy thunderstorm ordered for four o'clock this afternoon." At four o'clock a terrific thunderstorm burst over London.

Captain Abney's arrangement for measuring the height of clouds has been tried to some extent at Chatham. It consists of two cameras placed at measured distances apart, and provided with instantaneous shutters, which can be released at the same instant by means of electricity. The cameras being provided with graduated circles, also with wires for giving known positions on the plates, afford means of trigonometrically fixing the position of any cloud to which the instruments may be simultaneously directed. The Meteorological Council has in view the adoption of this apparatus for continuous use at its central station at Kew.

The accompanying diagram represents the principle of these trigonometrical measurements for ascertaining the distance of remote objects. Let N be a distant star, mountain top, or portion of a cloud, the distance of which is to be discovered. A base line, H F, of any determined length, is first measured along the ground. The instruments, A H and D F, whether telescopes or cameras, are then placed at the ends of the line with the central axis of each directed to the object N; the said instruments will then form particular angles A H B and D F E with the base line. If, now, a line H F drawn upon a sheet of paper be assumed to be the length of the real base line, and two other lines, H M and F W, be drawn at the ends of it, and inclined to the base line at the same angles as those of the axes of the instruments, the two lines will intersect each other on paper at the point N, and, the assumed length of H F being known, the lengths of the lines H N or F N can be ascertained by applying the same scale of measurement, whereby the actual distance of N becomes known.



Supposing the cloud or star to be at R, it is evident that with the same length of base line the instruments must be inclined at different angles to those indicated in the diagram to cause their longitudinal axes to point to R.

A little consideration will show that the more distant the object the longer must be the base line to give an easily-measured angle. For instance: a base line a yard long would be useless in measuring with any ordinary apparatus the distance of an object five miles off, since the axes of the instruments would be, practically speaking, parallel to each other; hence, in measuring the distances of the planets, base lines several thousands of miles long are generally used. In measuring the distances of clouds I am told that Captain Abney has managed pretty well with a base line about two hundred yards long, and that the general tendency of his experiments so far has been to prove that cirrus clouds are lower than was previously supposed. At Kew he can have plenty of base line, for the Observatory is in the middle of the Old Deer Park, with a wide expanse of flat park land all round it. This situation, far removed from public roads and other sources of disturbance, favours exactitude in the working of the instruments, by rendering them less liable to vibration from the shaking of the ground.

The cirrus cloud is the highest of all, and is "the only cloud which presents angular forms, and parallel, or nearly parallel, threads, or bundles of threads, apparently kept apart from one another by repulsion. It is the only cloud which is not normally rounded in outline, and which is sometimes composed of striæ at right angles, or nearly at right angles, to each other. It is the only cloud which sometimes appears to radiate from a point on or below the horizon, thus showing that the lines are parallel to each other, and their real length in their apparent direction." So said Mr. F. A. Rollo Russell, son of the late Earl Russell, at the last meeting of the Meteorological Society. In his paper he described twelve varieties of cirrus clouds, giving temporary or permanent names to most of them, and stating what kind of coming weather they usually indicated, so far as his observations have gone. He states that in some cases these clouds give trustworthy indications of approaching storms before such indications are given by the barometer. Sometimes storms reach the west coast at night when the Meteorological Office in London is closed, so no warnings can be sent out for the guidance of mariners on the east coast. If the sailors studied cirrus clouds as well as the barometer, they would be more independent of such warnings from London; and Mr. Russell cited a case in point in the matter of a storm which broke with much fury over the Berwickshire coast on the 14th of October, 1881, the approach of which was indicated by cirrus clouds on the afternoon of the 13th.

By giving attention to cirrus clouds and photographing them occasionally, photographers may add to the value of other local forecasts of the weather, and in seaport towns gradually, as they gain experience, make themselves of much service to mariners.

William H. Harrison.

NOTES ON PHOTOGRAPHY.

Lecture XX.—Platinotype Printing.

This process was invented and has been perfected by Mr. Willis. Suitable paper is sensitised with the following mixture:—

Ferric oxalate, $Fe_2 (C_2 O_4)_3$ .... 60 grains.
Potassic chloro-platinite, $2 K Cl, Pt Cl_2$ ...... 60 ,,
Water .... 1 ounce.

The materials are mixed immediately before use and spread over the paper, which is then dried with the aid of heat and is ready for printing.

To preserve the sensitive paper it is absolutely necessary that it should be kept dry, and for this purpose tin cases containing asbestos saturated with anhydrous chloride of calcium are employed. It is, however, better to use it as soon after sensitising as possible. The time occupied in printing is about one-third that taken with silver. The time of exposure can be judged either by looking at the print when the image is seen of a brown colour on a yellow ground, or with an actinometer. If the printing be continued too long the brown colour lightens from reverse action (solarisation). To keep the paper thoroughly dry whilst printing vulcanised gutta-percha pads are used, and after printing the prints are placed at once in a calcium tube. The best results are obtained with negatives having a full scale of gradation from opaque high lights to bare glass shadows. The action of light is to reduce the ferric oxalate on the paper to the ferrous condition, the platinum salt undergoing no visible change.

To obtain the platinum image the following solution is made:—

Potassium oxalate, $K_2 (C_2 O_4)$ .... 120 grains,
Water .... 1 ounce,
Acidified with oxalic acid.

This is placed in an enamelled iron dish and heated with a gas burner to about 180° or 200° Fahr. (nearly boiling). The exposed prints are then slowly drawn through the hot solution, sensitised side downwards. To facilitate this the paper may conveniently be held at two ends and weighted between with a thick glass rod. The development takes

place and is completed almost immediately the paper touches the liquid, the reaction being as follows:—

$$3(2KCl, PtCl_2) + 6Fe(C_2O_4) = 3Pt + 2Fe_2(C_2O_4)_3 + Fe_2Cl_6 + 6KCl.$$

The action does not occur so long as the salts are in the dry condition; but immediately the print is immersed in the oxalate of potash the ferrous oxalate is dissolved, and at once reduces the platinum salt with which it is in contact. After development the prints are washed (not fixed) in water acidulated with hydrochloric acid until every trace of colour due to iron is gone, then in water, and finally placed between clean blotting-paper to dry.

Over-exposed prints can be cured to some extent by using a colder developing-bath, and under-exposed prints by using a hotter bath. Paper which has deteriorated by damp or by being kept too long is useless, and cannot be restored. Platinotype prints are probably as permanent, if not more so, than those produced by any process known with the same basis. Prints on wood, silk, and other fabrics can also be obtained.

To work the process a license and the requisite materials must be obtained from the Platinotype Company. Whether from a theoretical or a practical point of view, or from the results obtainable, platinotype is the most perfect of processes, and should be familiar to every photographer who loves his art. E. H. Farmer.

A TOUR IN ITALY WITH THE CAMERA.

No. VIII.

Capri I also visited. In this island is the famous Blue Grotto, so aptly described in the poetical language of Dante as "a morsel of sky fallen from heaven above." The entrance to this fairy land of blue is by means of a small boat through a low and narrow archway. On arriving at the entrance everybody has to lie down, and at a suitable moment, when the waters have partially receded, the boatman makes a rush through the opening. Whenever there is any sea on one stands a good chance of getting wet through. Such was, unluckily, the case with us. However, the ducking we got did not hinder us admiring the beautiful. I wondered how long it would take to photograph this azure cave, where everything was blue—our boat, the rocks above us, and the limpid and translucent waters around us. Even we seemed all the bluer since our wetting. On landing at Capri afterwards I could not help remarking one "thing of beauty," and that was the Capri girls, who are celebrated for their remarkably florid complexions. Some beach scenes are really all there is to be got at Capri. I tried to secure a few views further inland, but met with no great success. Capri—with its almost perpetual spring, its sea and sky of lovely blue, and its ever-balmy airs—must really be a very pleasant place.

From Capri I went to Sorrento, Tasso's home. Sorrento nestles amongst orange bowers, beautiful flowers are ever perfuming its balmy zephyrs, and maiden-hair ferns peep out of every rock and wall crevice — the most charming resort in the Bay of Naples; so I thought whilst staying at the Hotel Bristol. There are, however, only a few picturesque views suitable for the camera to be obtained at Sorrento. Leaving this little paradise of beauty we drove to Pompeii, passing on our way through Castellamare, which for dirt and degradation almost outvies Naples itself. The views along the road are extremely grand and beautiful, though unsuitable for the camera.

Pompeii, as is well known, possesses extraordinary interest, and would certainly be a field for the photographic tourist; but, being a government acquisition, one is not allowed to take a camera inside the place. Today the streets, furrowed by chariot wheels and crossed by stepping-stones, appear almost exactly as they were last trodden down by the busy Pompeians some eighteen centuries ago. We can still make out the shops where the tavern-keeper, baker, chemist, and others plied their trades. The first we recognise easily by means of the fixed earthenware receptacles for the various wines he sold; the second yet more easily from the large oven where he baked his bread, and which today might in some cases be still employed for the same purpose; and the third always has the sign of Esculapius over his door. The temples of Pompeii, its courts of justice, amphitheatre, forum, thermæ, and mansions of the wealthy are all still grand in their ruins, and tell us in silent language what the place once was.

A large portion of the antique city is still buried under the ashes, or, rather, covered with fertile fields, where we might survey the scene before us and say with the Italian poet:—

> "Where now I sit once on a time there stood
> Thy walls, Pompeii, towering loftily!
> Now they are girdled round by many a rood
> Of rustic field. All hushed thy minstrelsy,
> Thy dance, and song; and o'er thy streets doth brood
> A lonely sadness mourning silently!"

In the museum, at the entrance, are loaves of charred bread, locks, safes, bottles, &c., which were once used by the Pompeians; so that the saying that the eruption of Vesuvius did not destroy but preserved Pompeii is not very far from the truth. The most wonderfully preserved and, at the same time, most interesting, as giving us an insight into the domestic life of the Pompeians, are the wall-paintings, which today, after the lapse of eighteen centuries, retain a marvellous freshness. Excavations go on daily, and, in one house they were clearing, these decorated walls at once attracted my attention. The best of these mural paintings are at the museum at Naples, and they far surpassed anything I could have conceived possible to have been preserved to us. Then, as now, pictorial art was indigenous to fair Italia. The guides have a large collection of photographs on sale, fairly well done, and all possessing great interest.

Another day I devoted to the ascent of Vesuvius. An easy carriage drive—as far as we were concerned, though not for the horses, *via* Portici—brought us to the Observatory, 2,000 feet high, the home of Professor Palmieri, who is up here and watches Vesuvius as a doctor would a patient. He feels the pulse of the fiery mountain every morning, and lets the world know if his patient gets angry or out of order. Passing by the Observatory, the footpath crosses old lava streams assuming all sorts of fantastic shapes — interesting to the photographer only from a geological point of view. The ascent from the base of the cone to the top, some 1,500 feet, is somewhat fatiguing, as the angle is a steep one and the way not by any means solid and firm, but loose and sandy. At the top the air is often filled with sulphurous emanations, which frequently renders breathing a rather difficult process. Putting aside such trifles, our efforts were well rewarded with any amount of frightful noises, explosions, fire, and masses of molten lava constantly being shot high up into the air, and in some cases falling quite close to us, which always caused the guides (who set a high value on a whole skin) to stampede. I much regretted I had not got my camera with me. I should certainly have stood my chance in the rain of fire, and have got an instantaneous picture of the flame, smoke, and lava in mid-air.

The exquisite scenery between Amalfi and Salerno, and the ruined city of Paestum, with the grand old Temple of Neptune, I reserved for a future visit with the camera.

Naples, with its charming bay, certainly cannot be called the home of the photographer. For the painter, who has a different command of his subjects, there is undoubtedly plenty of scope. Neapolitan views are often troublesome to get, and on the whole disappointing. Such was my experience. Then there is the disagreeable side of Neapolitan life, with its hosts of beggars and extortion in every dealing. It is always necessary in every transaction to know what there is to pay beforehand, and often to give but one-half or one-third demanded. In the days before 1870 Rome used to be nearly as bad as Naples. However, since the Italian government has taken matters into its own hands Rome has vastly improved in every respect, and beggary is daily diminishing. The same process with Naples is, unfortunately, more gradual.

Bidding farewell to Naples and its lovely bay I proceeded direct to Rome, and thence to Pisa. At Pisa the only objects of interest are the Cathedral, Leaning Campanile, and Baptistery. The most interesting is naturally the Campanile, better known as the "Leaning Tower," which rises in eight tiers of colonnades to a height of 180 feet, and leans thirteen feet out of the perpendicular. Nobody seems to know whether the object was intentional or accidental. The ascent of about 300 steps to the top is easily made, and the view is interesting. The Leaning Tower makes a very fine picture by itself, and is best obtained from the roadway. The next best picture is a group of the Baptistery, Cathedral, and Campanile, taken from beside the Octroi Bureau. Other views of the Cathedral—*façade*, &c.—naturally suggest themselves to the photographic artist. The Campo Santo is an interesting burial-ground, but is scarcely suitable for the camera. Two of my best pictures were taken a little before five p.m., just before sunset. The sky was darkly overcast, and from the far west the setting sun was trying to pour its last golden rays upon these interesting edifices. In the east were heavy banks of dark clouds. The exposure I gave was about five seconds with the smallest stop. The results could scarcely have been better, and the clouds came out well. Next morning, to make sure, I went and got duplicates, which were in every way inferior. The afternoon is the best, as the light is in the right direction then.

I also paid a visit to Leghorn to try and get some pictures of the picturesque fishing-boats, which I believed could be obtained there. Unfortunately, my expectations were not realised. I did a considerable amount of wandering about, but did not expose a single plate during the morning.

Leaving Pisa I passed by the charming Bay of Spezia, not having time to pay the town a visit. Spezia is certainly interesting, and, from what I remember of the place from a previous stay, a short time there would certainly be repaid. My next halting-place was Rapallo, where I obtained the two illustrations in this week's Journal. Rapallo is an extremely interesting place for the tourist photographer. A week might be spent there very comfortably with the camera, especially at such a resting-place as the Hotel de l'Europe, where the sanitary appliances are perfect and quite uncontinental. The town is a quaint one, and

umerous picturesque views of a variety of objects can be easily btained. Both the pictures were taken along the high road leading to 'oagli, which is lined most of the way with olive trees that in summer ffer a welcome shade to the pedestrian. The upper one is the road vith the olive trees, ind yonder is Rapallo, urrounded with orange groves. The lower one 's one of the many picuresque roadside cottages one meets with along the Zoagli route. Not only in this direction, but also along the road leading to St. Margherita and Genoa, an endless variety of pretty pictures may be obtained; in fact, the whole coast line from here to Genoa is extremely picturesque—I think even more so than the Riviera Ponente for the photographer. Much of the beautiful scenery is lost to the traveller in the railway carriage in consequence of the train passing through a series of tunnels. The tourist photographer might spend a couple of weeks very profitably at the numerous fishing villages between Chiavari and Genoa, and a series of very interesting results should be easily secured.

Genoa, although, perhaps, entitled to the epithet of "La Superba," does not contain any great attractions for the camera. There are merely the chief places of interest and general views from the surrounding heights.

Leaving Genoa, I went along the Riviera Ponente as far as Savona, but as the weather was indifferent my camera remained idle. Leaving Savona I struck northwards, *via* Bra to Turin, and here practically began and ended my tour in Italy as far as the camera was concerned.

After leaving Venice I did not develope any more plates, but trusted to the experience I had already gained; for, although useful to see what one is getting at the time, it is more satisfactory to develope at home, as far as the resulting negative is concerned.

The rapidity of my plates varied from about 19 – 22 on Warnerke's sensitometer. I quite believe in a sensitive plate provided the quality be good, and there seems to be no reason why sensitiveness and quality should not go hand in hand. I always somewhat over-exposed, making a practice of calculating the proper exposure and then adding a certain length of time to it, so as always, if possible, to be on the right side. The result was only one slightly under-exposed plate. For intensity I prefer to get a negative fully dense; then reduce, if necessary, with very dilute nitric acid, which in some cases seems to clear the film.

With reference to changing plates: I used no excessive care in changing at night. I closed the shutters of the room and rigged up my ruby lantern, which was anything but light-tight when I finished my last change. My exposed plates, after carefully numbering with a reference number, were separated with the usual folded blotting-paper, and packed, quickly as possible, in the same paper from which a fresh half-dozen were taken. Before leaving England I took with me a few extra sheets of orange paper, so that I always gave the repacked plates an additional covering.

One point is well for the tourist photographer to be careful about (especially when on an extended tour), and that is to write fully the history of each view taken in a note-book for the purpose, *at the time of exposure, if possible*. I did this, I thought, fairly well; but should have been glad in many cases of additional information on arrival home.

Then, again, my experience leads me to think it better to take rather too few than too many plates, to value each plate very highly (that is, if it be good, and does not fog or frill), and only expose on such objects as are really worth being portrayed, one good picture being worth any number of indifferent ones.

From the way in which my baggage got thrown about I believe they thought I had it loaded with stones or books, so paid little attention to my statements of its fragility. I quite expected a large quantity of my glass broken. However, nothing was amiss, so that in future I shall have little anxiety on that score.

Of the whole of my tours in Italy and elsewhere I think I never spent one more pleasantly than this "Tour in Italy with the Camera."

J. J. Acworth, F.I.C., F.C.S.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

VENTNOR AND NEIGHBOURHOOD.

At this time of the year, when the light is beginning to improve and the opportunities for outdoor photography are increasing daily, it is pleasant for the amateur who has an "outing" in view to recollect that there are a few spots in England where he can, early or late, indulge in his favourite hobby. Foremost among these stands the Isle of Wight, and I know of no better place to spend a week or a fortnight in pursuit of the "black art" at this season of the year. For numerous reasons it recommends itself to the photographic tourist. It is within a few hours of London, the variety of scenery is all that could be desired, the light is better and lasts longer than in most other places, and last, but not least, those comforts which appeal more particularly to the inner man are to be had at very moderate rates; in fact, living there is much cheaper than one might imagine. The short acquaintance I made with the Isle of Wight was confined to the southern part, and of this only can I speak.

Having but a few days to stay, I made up my mind to stop at the same town all the time, and selected Ventnor as my head-quarters. Here I put up at the "Clarendon"—a very comfortable boarding establishment—where the tourist is accommodated at the most reasonable of rates, and without any of those hotel abominations which come under the heads of "attendance," "extras," &c.

My first plates were exposed on the cliffs to the west of Ventnor, a very good view of which place can be obtained from a point dominating the town a little to the back. Farther in, from the very edge of the cliff, a panoramic view embracing a wider angle can be taken in the same direction on a "slip." It may be well here to explain what I understand by a "slip." Finding some time ago that for certain landscape subjects, especially those of a panoramic description, a great part of the plate was wasted in foreground and sky, I hit upon the idea of cutting a whole plate in half lengthwise; this makes an uncommon size of plate, but very effective in some cases. The "slip" is easily inserted in a whole-plate double back by cutting a plain whole-plate glass into four, lengthwise, and using one of the pieces thus formed to fill the space left empty at the top of the slide, and doing the same for the bottom, thus:

Plain Glass.
PLATE.
Plain Glass.

The three pieces of glass will be found to remain in place without any further support than the metal division.

Going farther west in the same direction from Ventnor you come to Steep Hill Cove, where two or three good "shots" may be had, the best view being from a mound about half way up the slope of the shore, looking west. This spot has of late years lost in picturesqueness, some thatched cottages having been replaced by slate-roofed ones. Ascending thence to the highest point of the shore, and trespassing for the time into a field where rabbit-shooting is frequently indulged in, you behold, on looking back towards Ventnor, one of the grandest views in the neighbourhood. On the left, Steep Hill Castle rises out of a mass of foliage, which extends a good way across the picture; then a snake-like road, rather chalky, but relieving the foliage, which commences again, continues to the other side. In the distance the Downs, 800 feet in height, rising at the back of Ventnor, complete the picture. This will want careful exposure and development in order to retain the distance, which, in a case like this, has a tendency to be a little too faint. The aforesaid rabbit-shooting is a nuisance to the photographer. A notice board tells you plainly that it is dangerous to remain there, as "you may be shot," and while I had my head under my focussing-cloth a rather gruff warning came to me to "get out of the line of fire."

But, to resume: there is matter for more slips in this neighbourhood, and towards Niton and Blackgang lots of "bits" are to be found also suitable for half plates. On the shingle itself, a little nearer to Ventnor, is a mass of broken rock that has fallen away from the cliff, and which is well worth a plate.

Coming back to Ventnor, several views may be taken of it from the pier. The town is built round a small bay, and the houses rise in terraces one behind the other with the High Downs at the back, the only drawback to the picturesqueness of the scene being the too modern appearance of the buildings. Going east from Ventnor a good view may be had from the cliff, embracing nearly the whole of the coast line of the "undercliff," and part of Ventnor, with the sea front, boats, &c., in the foreground.

Leaving Ventnor by the road leading away from the High-street, Bonchurch is soon reached. Although the pond here and its surroundings have been "done to death" photographically, it is impossible to resist the temptation to expose a few plates. I would especially recommend some "bits" in the way of ferns and flowers on the bank facing the roadway. Fuschias may be seen here in full bloom at the end of October. In exposing in this spot an obnoxious lamp-post will have to be "dodged," or it will obtrude itself rather unpleasantly in the picture. The best time for exposing here is the forenoon.

From Bonchurch to Shanklin is a charming walk. The way lie[s] through the "landslip," which is a delightful place for bits of roc[k] and brushwood. One could remain here all day exposing all the time for at every turn something new meets the eye. I was forgetting t[o] mention the old church at Bonchurch, which one sees soon after leavin[g] the village. It is a very old building, dating from somewhere abou[t] the time of the Conquest, and is more interesting as an old relic tha[n] as a photographic object. In my opinion it forms but a poor subjec[t] for the camera, besides which it is in a position very awkward to ge[t] at. After leaving this old place and just before entering the "land slip" the road follows the sea coast once more, and here a halt can b[e] made before a little cottage nestling in some thick brushwood at the bottom of a small cove backed up by a cliff. This makes a very good picture.

After passing through the "landslip" and into a small wood, where some good plates can be secured—exposure longer on account of the foliage overhead—the road leads through some fields past an old farmhouse. This farmhouse is worth a plate. A "slip" will do, it being a long building with low trees on each side. When I took it a number of cows were conveniently chewing the cud in front of it, so there being a good light on I was able to secure a good instantaneous picture. I may mention that about this part there are always plenty of cattle grazing, which will give ample opportunities to those who are fond of animal studies.

At Shanklin I did not find so many interesting spots as at Ventnor. There are some thatched cottages in the village that might be picturesque if they were not so modern; but the object towards which the photographer will naturally bend his footsteps is the Chine. Here a certain amount of disappointment will be experienced, as the Chine is not what it used to be. Two years ago it was badly damaged by a severe storm, and some of the finest trees were blown down. Fortunately for the photographer, some of them have fallen in very picturesque positions, forming bridges over small ravines, &c., and, having been left where they fell, can still be made available. What is most to be deplored is the almost, if not total, absence of water; and, unless the photographer be in a position to carry a supply with him and have it poured down at the right moment, he must give up any idea of taking away with him any views such as were secured five or six years back, before the water was "turned off" or otherwise failed. In spite of these drawbacks, several good plates may be secured in the Chine on a bright, sunny day from points of view selected on the winding path which goes down it. I would especially recommend a plate to be exposed on an old stone bridge from a position a little below it and looking up the Chine; it stands out dark against a light distance and with the water sparkling beneath. Stay, though, I forgot; there is no water now. Nevertheless, even barring the water, it makes a very good picture. Plenty of "bits" may be had down the Chine, notably among some large ferns, which grow in abundance here.

My peregrinations in this direction did not extend beyond Shanklin, and I will close by saying a few words about an inland excursion to be made from Ventnor. There are coaches which start on stated mornings at ten o'clock, visiting the principal places of interest in the island, and returning home by six o'clock. The one I took called at Blackgang, Carisbrooke, and Newport. At the first-named place I was not given time to unlimber. I did not regret it, however, after all, because the place is very bleak and bare, and there is not much to be seen at the Chine. At Carisbrooke we stopped for lunch, after which we had two hours for a stroll in the environs. I was not long in making my way to the old castle, where I exposed several plates, the most successful one being of the much-photographed entrance gate. Coming down again, and climbing over a fence into a field, a pretty view of the town of Carisbrooke is seen, with a pool of water in the foreground; this made a very good slip. A last plate (or slip, rather) I exposed on the coach as it was about to start from opposite the "Red Lion Hotel." At Newport no opportunity offered to do anything for want of time.

This sums up my photographic experience of the Isle of Wight, and gives but a faint idea of what is to be done there. Early in the season marine subjects may be had in plenty, but in autumn yachts, boats, bathing-machines, &c., are hauled up high and dry for the winter. I must leave to abler pens than mine the task of describing more minutely and completely the beauties of this part of the island, many of which must of course have escaped my notice in the short stay I made there; and I will end by offering a word of advice to the amateur who may contemplate visiting the Isle of Wight. It is this:—Do not attempt to develope your plates there, as the water contains something which seems to restrain the action of pyro. I found I had to use about three times the usual strength to obtain density. ARISTIDE REIMANN.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

PATENTS GRANTED IN FRANCE.

No. 151,583.—"A Photographic Apparatus." BRETANGE.—*Dated October* 16, 1882.

No. 151,684.—"A Collecting Album." ACKERMANN.—*Dated October* 21, 1882.

No. 151,849.—"Applying Electric Light to Photography." CHESNAY.—*Dated October* 31, 1882.

CERTIFICATE OF ADDITION.

No. 146,702.—"A Funeral Mount for Photographs." OLIVE.—*Dated October* 16, 1882.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 7	W. Riding of Yorkshire	Godwin-street, Bradford.
" 8	Great Britain	5A, Pall Mall East.
" 8	Newcastle-on-Tyne	College of Science.
" 9	Cheltenham Amateur	
" 10	Manchester	Mechanics' Institution.
" 10	London and Provincial	Mason's Hall, Basinghall-street.
" 11	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 26th ultimo, the chair was occupied by Mr. W. E. Debenham.

Mr. A. COWAN described some experiments with bromide of silver dissolved in alkaline bromides, to be subsequently precipitated in emulsion making. He started with twelve grains of bromide of silver and one ounce of water. To this he added alkaline bromide sufficient to saturate the water, but the whole of the bromide of silver was not taken up. He only succeeded in making a complete solution when the water had been increased to an ounce and a-half, and the alkaline bromide to 400 grains if of ammonium, or 500 grains if of potassium. The solubility of the silver compound so depended upon the concentrated condition of the alkaline bromide which served as solvent, that the addition of a very small quantity of water was sufficient to throw down some of the bromide of silver as a milky turbidity.

Mr. A. J. BROWN had also experimented in the same direction. By using a boiling saturated solution of ammonium-bromide he had been able to dissolve fifteen grains of bromide of silver in 200 grains of the ammonium salt.

The CHAIRMAN remarked that the large quantity of bromide required—if an average were struck between Mr. Cowan's results and Mr. Brown's—would make the emulsion cost as much for bromide as it did for silver. Moreover, if the idea were, as he understood, to get a very fine state of division by precipitating from this solution whilst in contact with the gelatine, there would arise the difficulty that gelatine solution containing, as this would, from ten to forty times as much alkaline bromide as solid gelatine would not set, but remain liquid when cold.

Mr. A. L. HENDERSON said he intended to experiment with an emulsion made upon the plan in question, and he should get over the difficulty of the gelatine refusing to set by precipitating it with alcohol.

Mr. COWAN then showed two negatives made with emulsion prepared according to Dr. Monckhoven's formula, published in 1879 and 1880. In one case some of the emulsion had been taken out of the washing trough whilst still containing a large proportion of the ammonia and soluble salts, melted, set, and put to wash again. The washing in all occupied twenty-four hours, and the portion treated as described appeared to be about eight times as sensitive as the remainder of the emulsion, which was simply washed for the same time in the usual way. He (Mr. Cowan) also showed a method of washing small batches of emulsion by pouring it on to paper lying on a levelled glass, and suspending the paper with or without the glass, in a vertical water bath. Muslin might be used instead of paper, but then, he thought, the glass should be waxed to ensure the sheet of emulsion stripping clean when set.

Mr. HENDERSON observed that ripening of emulsion might be accomplished in various ways. One way was to heat the set emulsion in alcohol. It then did not liquefy, and so the bromide could not become coarse. Dr. Dawson had found that the addition of ammonia to washed emulsion caused it to yield five degrees higher registration in the sensitometer. He (Mr. Henderson) also read a letter from Professor Stebbing describing a method of working emulsion with a paper support instead of glass; the film separated when dry.

Mr. W. Coles showed a retouching desk.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of this Association was held on Thursday evening, the 26th ult.,—Mr. B. Boothroyd, President, in the chair.

After the usual preliminary business had been transacted, the following gentlemen were elected members of the Association:—Messrs. J. Earp, W. Raws, R. L. Rees, and T. Robertson.

The CHAIRMAN announced the donation of some books to the library by Mr. H. Wharmby, and said that the Librarian would be happy to receive further donations from members eager to emulate Mr. Wharmby's excellent example.

The Hon. Secretary read a communication from the Secretaries of the Associated *Soirée* Committee, requesting the election of delegates to represent the Association in making the arrangements for the seventh *soirée*.

The Rev. H. J. Palmer, Mr. J. H. T. Ellerbeck, and Mr. E. Roberts were elected as representatives of the Association.

On the motion of the Chairman it was resolved, on behalf of the Association, to renew its annual donation to the guarantee fund of the associated *soirée*.

The Rev. H. J. Palmer then brought forward the subject of the hospitable invitation, given by Mr. L. Hughes at the last meeting of the members, to spend a photographic day in Conway. After some discussion it was decided to fix upon Saturday, June 9th, as the date of the excursion, and the Secretary was requested to communicate with Mr. Hughes and ascertain if the day chosen would be a convenient one for him.

The CHAIRMAN called attention to the two cameras upon the table. The new sciopticon camera, exhibited by Mr. Wood, was remarkable for the cleverness of the arrangement whereby the back could be made to swing in any direction, for its size and compactness, and for its extraordinary and very useful length of focus. Mr. Beer's 10 × 8 *méritoire* seemed to leave nothing to desire as regards lightness, strength, and price.

Mr. W. H. KIRKBY made some remarks on the importance of Mr. Wharmby's recent question on the subject of the hypo. bath, and said that, in his experience, whereas prints must have of necessity a fresh fixing bath for each batch, gelatine plates might be fixed in any number and in repeated batches in the hypo. so long as the solution did not become saturated with sulphide of silver.

The Rev. H. J. PALMER called attention to two very useful photographic appliances—Mr. Openshaw's pocket book for registering exposures, and some American mounting cards, to be obtained at Mr. J. J. Atkinson's. He (Mr. Palmer) had recently been victimised into the promise of a large contribution of prints to a bazaar, and it would have been an impossibility, in the pressure of other duties, to have mounted the prints in the ordinary way. The mounts in question contained the adhesive substance upon their surface, and all that was necessary to be done was merely to take the print from the last washing water, place it upon the prepared card, and throw it down to dry. In his experience the result was better, on the whole, than in the case of prints which had been dried, covered with adhesive matter, and then placed on ordinary mounts, while the saving of time and trouble was very considerable.

Mr. L. Hughes had promised to deliver a paper on *Microphotography*, and as this had been announced on the circulars the attendance of members interested in this subject was large. From some unexplained cause, however, Mr. Hughes did not arrive, and the consequent disappointment was considerable.

Dr. KENYON exhibited some 12 × 10 prints of views taken recently by himself during the ascent of Cader Idris. He said that it was quite possible, by taking the last train to Corwen and sleeping there, and then the first train on the following day to Dolgelley, to ascend Cader, spend a photographic day among its lakes and precipices, and return to Liverpool in the evening.

Mr. A. W. BEER proposed an excursion to Plumley and Knutsford for the 18th of May; and having, at the request of the Chairman, undertaken to conduct the members to the most favourable points in the neighbourhood for photographic work, the Secretary was requested to make the necessary announcements. Cordial thanks were accorded to Mr. Beer.

Mr. Ellerbeck exhibited some very fine prints of negatives on Edwards's plates, and the meeting was adjourned to the last Thursday in May.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Association was held on Tuesday, the 25th ult., at the Town Hall, Hanley,—Mr. Charles Alfieri in the chair.

The CHAIRMAN, in the course of some remarks, said that it gave him pleasure to see a society revived which, in that district, had years ago a prosperous existence. He hoped that the Society would make for itself a reputation by doing only really artistic and scientific work. He then called upon Mr. John Lockett to read a paper; and, in response to the invitation,

Mr. LOCKETT (Hanley) read a very able and instructive paper on *Emulsions for Beginners*. He alluded briefly to collodion emulsions, giving a description of some, and described at length a simple and effectual method of making a bromo-chloro-iodide emulsion suitable for almost all purposes—the same, in fact, by which he prepared the gelatine plates in which he deals commercially. He strongly advocated treating the emulsion with bichromate of potash. His lucid description was listened to with great interest, and the paper was freely discussed.

Mr. H. GOVER asked whether Mr. Lockett did not find that the bichromate exerted a slowing action.

Mr. LOCKETT replied that it did not, provided the emulsion be well washed.

A MEMBER inquired the reason for using bichromate at all.

Mr. GOVER said it was to convert any accidentally-formed sub-bromide of silver into bromide.

Mr. LOCKETT found a great contrast between an emulsion treated as above and one not so treated.

Mr. POTTER inquired whether such a small percentage of sodic silicate made an efficient substratum.

Mr. LOCKETT replied that if the plates were previously well cleaned it was better than a gelatine or albumen substratum.

The CHAIRMAN proposed a vote of thanks to Mr. Lockett, which was carried unanimously.

Mr. F. J. EMERY said that it gave him great pleasure to be a member of a society which he hoped would do public service by securing photographic representations of curious archæological relics, some of which were now passing away, but for which no district was so celebrated as the county of Stafford.

It was resolved that a question-box be introduced, and, on Mr. Emery's proposition, it was agreed that three vice-presidents be elected as representatives of the towns of Burslem, Hanley, and Stoke-upon-Trent, and that meetings be held at each place in rotation—the next meeting to be at Burslem. The meeting was then adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Association met on the 16th March, when the chair was occupied by the President Dr. H. W. Vogel, who exhibited a very richly-illustrated

work on spectral analysis, by Herr Schellen, recently added to the library of the Association.

Herr O. LINDNER introduced to the notice of the meeting a police regulation respecting the construction of glass houses, according to which beams running the length of the glass house must be supported by pillars indifferently, whether the beams be of wood or of iron. One might imagine how such an arrangement would interfere with the usefulness of the glass house. Further: the iron supports of the glass roof must be much stronger and the pitch of the roof much steeper than is usual at present; and, instead of the single T-shaped iron, double T irons are prescribed: ⊤⊥ He (Herr Lindner) remarked that if these regulations were enforced he thought he must give up his intention of building a copying glass house, as the cost of building would be greatly increased, and the utility at the same time greatly diminshed.

Herr QUIDDE remarked that several times during snowstorms the roof of Herr Schauer's glass house had been covered to a depth of two feet with snow, and, though several panes of glass may have been broken, the astragals were uninjured. It was the same during the unusually severe storms of hail in 1877.

Inquiry was made by several persons present as to whether these regulations had been drawn up by an expert, but no information on that point was available.

The CHAIRMAN thought it would be advisable for the Association to take steps to have these regulations altered. He then gave a description of the accommodation to be allotted to photography and the allied photomechanical processes in the new Polytechnic Buildings at Charlottenburg. Space will be set apart for lichtdruck, &c., and a suite of small dark rooms is to be reserved for scientific photographic research.

The account was listened to with great interest, but regret was expressed for the loss of time entailed by the student having to go backwards and forwards between Berlin and Charlottenburg.

Herr BERGMANN showed a sample of what is called "glass paper"—a sort of silk paper prepared with a sticky, fatty oil, which serves as an adhesive medium and causes the paper to adhere to the glass. The paper must be used shortly after it is prepared, before the oil dries up. The smell is rather disagreeable, but soon disappears. The object of the glass paper is to exclude direct sunlight, and is used as a substitute for ground glass.

Herr SCHWARTZ said that in the official report of the meeting of the 10th February his remarks respecting the proportionate sensitiveness to light of wet and dry plates were incorrectly given. The point he wished to insist upon was that the proportion between the sensitiveness of the two plates varied. What the relation between the two might be, in the case of exposures of four or five hours, he had never been able to determine, as he had not succeeded in exposing a wet plate for so long a time without its being injured.

Herr LINDNER tried to explain the variations in sensibility by assuming that during long exposures wet plates became more sensitive owing to a *new formation* of bromide of silver, while the sensitiveness of the gelatine plates remained the same from beginning to end. He had frequently found a wet plate that had been made ready some time before it was exposed more sensitive than another plate sensitised at the same time and used at once. He had often utilised this small observation when taking the portraits of children.

Herr Schwartz considered the variableness of wet plates a serious fault.

The CHAIRMAN pointed out that the colour of the light might have had a good deal to do with the matter. Thus wet plates are very little sensitive to pale blue, while gelatine plates show considerable sensitiveness for that colour. (Of course the pure spectral colour is meant here. Usually pale blue contains so much white that its action is very similar to that of the latter.) In regard to protracted exposures he (the Chairman) discouraged the use of glycerine in the silver bath, because it is often impure, and because it catches and retains dust and dirties the bath. He prefers Herr Nöhring's plan:—A sheet of plate glass, through which the photograph is made, is placed in the dark slide in front of the sensitive plate, the object being to prevent evaporation and the drying of the plate. Of course there must be a slight space between the two plates; that is, they must not be in contact, as that would injure the film. He (the Chairman) added he could bear witness that in a closed dark slide a plate so protected might be exposed for more than half-an-hour to the burning rays of the summer sun.

In reply to an inquiry whether wet or dry plates were best suited for photographing oil paintings,

Herr FECHNER remarked that wet plates gave the best results as regards colour, and such plates could be better worked up by the needle than dry plates.

Herr SCHAARWÄCHTER said that with gelatine plates certain spots might be rendered transparent, which could not be done with wet ones.

A member complained that the Phœnix Insurance Company would only insure negatives for the value of the glass. Many other companies did the same, though it appeared that the Silesian and Basel Companies insured the full value of the negative, but required proof of the value put upon it.

Herr QUIDDE said the reasonableness of this demand was obvious. A claim might be made for a portrait negative, yet it might be absolutely worthless, never having been ordered from or worth ordering from. On the other hand, those who publish landscapes are in a different position, as their negatives represent given numbers in a published catalogue, and are therefore more easily identified and their respective values estimated, as they can easily be proved to have been used in the preparation of a known commercial article.

The meeting was shortly afterwards adjourned.

THE annual yearly meeting of the above Society took place on the 5th ult.,—Dr. Vogel presiding.

The CHAIRMAN stated that since last meeting Herr Bergmann and he had inquired about the police regulations mentioned at the previous meeting, and they found that no special regulations existed for the construction of glass houses, but that the plans have to be submitted, like those of all other buildings, for police inspection, and they are only sanctioned when they comply with the requirements of safety. The restrictions imposed in the case of the glass house at the new Polytechnic Buildings at Charlottenburg were not so rigorous as those mentioned by Herr Lindner at the meeting on the 16th March. He (the Chairman), however, advised anyone who intended to build a glass house to have the plans drawn out by a competent architect, as they would then be more likely to be sanctioned by the department.

Herr MARTINI said that he now tested a sample plate of each batch of emulsion with a Warnerke sensitometer, by exposing the plate for half-a-minute to the light produced by burning an inch of magnesium wire, and interposing the plate upon which the scale is marked between the light and the sensitive plate. He then developed the plate and marked the highest number of the scale shown upon the batch.

The CHAIRMAN admitted that, as a rule, the sensitometer scale tablets produced by Woodburytype were usually pretty uniform. Their yellowish colour slightly influences the result by shutting off the blue rays. He doubted, however, whether all the tablets furnished by Mr. Warnerke were of precisely the same clearness. In testing, what is most important is that the temperature of the developer should always be the same, as a higher temperature would bring out a higher number on the scale. He (the Chairman) recommended a temperature of 17° R., attainable in winter by slightly warming the developer, and in summer by slightly cooling it with ice.

Herr ANSCHÜTZ showed a number of instantaneous views of running horses, like those of Muybridge and Marey, and some enlargements of the same, enlarged to thirty times the original size. He (Herr Anschütz) also showed a camera-stand for portraiture. The camera is raised by pressing the foot upon a pedal, and it continues to rise, as long as the pressure is continued, until the desired height is reached. To lower it one presses upon a second pedal, and it sinks somewhat too suddenly if a hand be not put out to restrain it.

Herr SCHAARWÄCHTER thought the camera-stand hardly firm enough.

Herr ANSCHÜTZ also showed a sciopticon for enlarging with.

The Treasurer then presented the annual report, and the office-bearers for last year were all re-elected:—*President:* Dr. H. W. Vogel.—*Vice-President:* Herr Prümm.—*Treasurer:* Herr Bergmann.—*Secretaries:* Herren Quidde and Reichard.—*Committee:* Herren Schaarwächter, Fechner, Wight, Hartmann, and Lindner. The meeting was then adjourned.

Correspondence.

IODIDE OF SILVER IN GELATINE EMULSION.

To the EDITORS.

GENTLEMEN,—I am sorry to trouble you again regarding Herr Schumann's experiments with gelatino-bromo-iodide of silver. I should not have done so had not the editor of the *Wochenblatt* commented on my own experiments. Allow me to say that he is in error in supposing that I did not try every method of mixing the iodide and bromide.

I once heard a well-known bishop give a discourse on Cain and Abel, and the whole force of the moral he wished to draw rested on the argument that Abel was the elder. Dr. Stolze's editorial comments run on all fours with this. The bishop was wrong in his premisses, and he ought to have known better.—I am, yours, &c., W. DE W. ABNEY.

April 28, 1883.

COPYING PAINTINGS.

To the EDITORS.

GENTLEMEN,—The "secret process" employed by continental photographers for the correction of negatives from old pictures consists simply, as you have conjectured, in having the back of the negative carefully painted so as to veil the portions which (as in case of red draperies, &c.) are thinner than they relatively ought to be to reproduce the general optical effect.

This is done by well-trained painters retained for this special work, and sometimes painters may spend a fortnight on an important negative. The actual printing surface is not, as a rule, disturbed. The work is one which must be done seriously and by capable men, or it destroys the value of the photograph.—I am, yours, &c.,

Florence, April 24, 1883. W. J. STILLMAN.

THE COMPARATIVE RAPIDITY OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—I beg to enclose a few notes of my experiences with different commercial gelatine dry plates obtained during the course of the past nine months, which may, perhaps, prove of some service to your correspondent "A Bewildered Amateur," and to others who, like myself, have suffered from the want of some precise statement of the rapidity on the part of the manufacturers.

During a stay on the continent, in last autumn and this spring, having exhausted my supply of English plates, with whose peculiarities as regards exposure, development, &c., I had become pretty well acquainted, I was obliged to fall back upon those of local manufacture, and had the disappointment of losing several negatives taken upon them

through insufficient exposure, though I had given them half as long again an exposure as I was in the habit of giving my English plates. On my return to England I procured a sensitometer, and occupied some spare hours in testing the remainder of these plates, with some of those of English makers which I happened to have also by me. The foreign ones, made by Garcin (of Lyons), Darval, and van Monckhoven, gave sensitometer numbers of 12, 14, and 14 respectively, while, of the English makers, Marion's Britannia plates gave 16, Rouch's 20, and the "Paget Prize," marked "50 times wet collodion," gave 22.

According to Warnerke's scale the relative rapidities of these plates would be:—

Darval and Monckhoven are	$1\frac{3}{4}$	times as rapid as	Garcin's.
Marion's	,, 3	,, ,,	,,
Rouch's	,, 9	,, ,,	,,
"Paget Prize"	,, 16	,, ,,	,,

All were developed with the same solution, a fresh quantity being used for each plate, containing—

Pyro	3 grains.
Sulphite of soda	6 ,,
Bromide of ammonia	3 ,,
Solution of ammonia (1 in 3)	20 minims.
Water	2 ounces.

So far as I am aware the only makers who have adopted Warnerke's scale are Mr. J. Cadett and Professor Stebbing; others, using some scale of their own, which has no ascertainable relation to the standard one, mark their plates as "10, 20, 40, or 60 times," presumably, more rapid than wet collodion; while a large number abstain altogether from committing themselves to any statement of rapidity.

As there are more than fifty brands of dry plates advertised in the photographic journals and almanacs, the prices of which vary from 1s. 6d. to 3s. per dozen quarter-plates, it is easy to understand how much some official statement of their relative rapidities would aid the beginner. Should my other engagements allow I hope at some future time to continue further experiments in this direction; in the meantime, my communication may perhaps induce others to bring forth their experience.

Rapidity is, of course, only one of the requisites of a good plate. Adequate density of image, freedom from spots, markings, flaws in the coating, bubbles, and imperfections in the glass as well as from fog and frilling, have also to be considered in estimating the real value of a gelatine plate. Should the reluctance of manufacturers to adopt a definite standard still be maintained, possibly some club or association of amateurs may be induced to take up the investigation, and to publish the results for the benefit of their less fortunate brethren.—I am, yours, &c., G. C. Henderson, M.D.

May 1, 1883.

THE HYPO. FIXING BATH.

To the Editors.

Gentlemen,—Will you permit me to make a correction in your next issue? From the communications which have reached me, and also those which have appeared from your correspondents, Mr. W. E. Debenham and "Argus," it appears that an erroneous impression has been created in regard to the length of my practice. The error is that a note of warning has been raised on the ground of my being only an "eight-months'" amateur.

Permit me to say that if the term "years" be substituted for "months" it will be nearer the mark. If, therefore, your readers will understand that the eight months' use of the old hypo. bath refers only to the last eight months of an eight years' practice of nearly all the older methods of photography, they will perhaps attach a little more credit to my testimony.

Of course, I know that even an eight years' practice is but a limited one in constrast to some; but it has been long enough to satisfy me that there are too many theorists in the photographic world, who are never more delighted than when they are splitting hairs in the shape of contending for such matters as "technical" excellence (whatever that may mean), chemical problems, and the like, which seldom come within the scope of everyday practice, and tend very much to place obstacles in the amateur's way. True, we should aim at the utmost possible excellence, but "practical" excellence can be better understood, is of more importance, yet, I am afraid, too often lost sight of.

Eight months' use of the old hypo. bath, coupled with my past experience in these matters, have been sufficient also to satisfy me that if any probability existed of negatives going "hopelessly to destruction," as Mr. Debenham puts it, indications would not be wanting ere this to prove the truth of such an assertion. Subsequent experiments have, however, convinced me that the truer cause of stained negatives is attributable not so much to the use of an old hypo. bath as in the *nature and mode of development*. In proof of this, it is a well-known fact that professional photographers only mix up a fresh hypo. bath for each day's use, and many venture for each week's use without any objectionable results, totally regardless of the plate-maker's instructions to use a clean and fresh bath for each plate. After all, then, the latter course is not essential to good work, and it remains an open question to what extent a hypo. bath may be used.—I am, yours, &c.,

50, *Stanley-street, Cheetham, Manchester,* Chas. J. Hall.
April 30, 1883.

THE KEEPING QUALITIES OF GELATINE PLATES.

To the Editors.

Gentlemen,—In photographic chat the question often arises—"How long will a gelatine plate keep?"

I enclose a print from a plate which was made on the 9th February, 1881, and was exposed and developed on the 22nd April, 1883—more than two years and two months. It does not appear to me to have deteriorated at all.—I am, yours, &c., Edwin Dodds.

Gateshead, Low Fell, April 25, 1883.

"THE STORAGE OF PHOTOGRAPHIC CHEMICALS"—POTASSIUM IODIDE.

To the Editors.

Gentlemen,—I have annually to do with many hundredweights of this salt, but have never found *extraordinary* precautions in storing it necessary, provided the bottles containing it be kept corked.

I have never come across a *deliquescent* sample; in fact, it has always been understood by me that only potassium iodide, contaminated with a quantity of undecomposed (from manufacture) potassic hydrate is addicted to the failing.—I am, yours, &c.,

Stoke-upon-Trent, May 1, 1883. W. B. Allison.

"THE SOUTH LONDON ARTISTIC COMPETITION."

To the Editors.

Gentlemen,—"It would only have been graceful on the part of" Mr. J. Nesbit "to have added to his letter of last week, with reference to the South London Artistic Competition," that in *February* Mr. W. Cobb was *also* a successful competitor.

As to the fact having "failed to be chronicled in your columns and on the minutes of the Society" I need not trespass on your space, because if there has been any omission on your part I am not responsible, and if there has been any on mine it concerns only the members of the Society and not the general public.—I am yours, &c.,

9, *Norfolk-road, Dalston-lane, London, E., April* 30, 1883. F. A. Bridge, *Hon. Sec. and Treasurer.*

"ADAMS'S BRILLIANT."

To the Editors.

Gentlemen,—Like many others, I have bought Adams's "Brilliant" and found it, for clearing purposes, neither more or less effective than other remedies costing a mere trifle; but today I took a head on a 15 × 12 plate, and found it so dense as to be of little value. It occurred to me to use the "Brilliant" as a reducing agent. I did this with a result that makes me think the "Brilliant" well worth its cost, for it saved my plate and showed me, as an amateur, the means of doing what hitherto I have failed in.—I am, yours, &c.,

April 27, 1883. William Adcock.

To the Editors.

Gentlemen,—The motive in my last letter was certainly not to damage or in any way depreciate the photographic value of Messrs. Adams's "Brilliant," the good qualities of which have already been commented on in this Journal, but rather to point out its chemical composition. Every practical photographer should know the chemical composition of the materials he uses. That its base is iron in the ferric state is pretty conclusive, and probably an organic acid, which I had every reason to believe was oxalic acid. Taking it to be so simple a compound I thought it ought to be sold cheaper.

But as Messrs. Adams and Co. state positively that there is not a grain of oxalic acid in their "Brilliant," and it consequently not being ferric oxalate, I feel in duty bound to tender them an apology for my letter of the 13th ult.; but I may add, at the same time, that I was not aware they had stated so before.—I am, yours, &c., H. J. Gover.

May 1, 1883.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely offered for sale, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* nom de plume *be thought desirable), otherwise the notice will not appear.*

What offers in exchange for a splendid 10 × 8 view lens, really good?—Address, A. J. B., 17, Hindon-street, Pimlico.

I will exchange a Marion's promenade lens, cost £12 10s., for a large camera with double slides, or offers.—Address, A. B., 61, Chapeltown-road, Leeds.

I will exchange a sewing-machine, in good working order, for anything useful in photography.—Address, by letter only, H. Iris, 36, Richard-street, Liverpool-road, Islington, N.

We will exchange a No. 2B Dallmeyer's portrait lens for a fifteen-inch portable symmetrical, or a sixteen-inch rapid symmetrical or rapid rectilinear.—Address, Gibson and Son, chemists, Hexham.

Wanted, portrait and group lenses, by any good maker, larger than Ross's No. 2, not necessarily modern but must be good, in exchange for other apparatus; list sent.—Address, C. R. Trueman, The Studio, South-wold.

I will exchange an old style balustrade, one of Timperley's, for a half-plate portrait lens, by a good maker, or a rapid rectilinear for whole or 10 × 8 plates. Difference adjusted.—Address, G. Howarth, Smithy-bridge, near Rochdale.

I will exchange my portable photographic studio, eight feet square, on wood floor, roof and sides part glass, panelled throughout, for a good steel-noted English concertina.—Address, "British Lion," Raven-street, St. Helens, Lancashire.

We will exchange Seavey's interior background, Seavey's rustic bridge, and Seavey's *plaque* and background, all as good as new. Wanted, Seavey's backgrounds, good 8½ × 6½ landscape lens, and instantaneous shutter.—Address, A. Cox and Co., Tavistock-chambers, Nottingham.

I will exchange, for a good half-plate lens, The British Journal of Photography for 1880-81-82, tripod stand, *carte* rolling-press, copying-camera with extra bodies, 10 × 8 rubber-lined bath, and Ottewill's changing-box for eighteen stereo. plates.—Address, W. B., Stoke-road, Guildford.

I will exchange a 12 × 10 square, nearly new, portable bellows-body tourist's camera, rising and sliding fronts, folding tailboard, swing-back, single dark slide, with two inner frames, by C. E. Elliott, for a 10 × 8 tourist's camera with two or more double dark slides; also, a coke furnace for vitrified enamelling, for anything useful.—Address, J. Kirk, photographer, Cowes, I. W.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Notice.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* nom de plume *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

J. A. M.—The U.S. number for your 24-inch lens with No. 5 circle should be 100.

A. B. Z.—For general purposes employ the convex side of the lens next the focussing-screen and the stop in front.

Nemo.—If the shadows of the negative are clear Schlippe's salt will probably remove the stain. We can suggest nothing better.

Z.—The grease spots on the carbon enlargement may, doubtless, be removed with a pledget of cotton wool moistened with benzole.

S. Timpson.—Apply to Messrs. Hopkin and Williams. If they do not supply the chemical we are unable to say where it can be procured.

L. Hart.—We see no reason why you should consider glass positives more permanent than ferrotypes. We should say, all things being equal, that one is quite as permanent as the other.

D. Legg.—There is no method of preventing the paper from "stretching" when it is wetted. The best remedy is always to cut the paper so that the length of the face is printed in the direction of least expansion.

Joyce.—It is more a matter of conscience than of law as to whether you may use the royal arms. If you do use them, by virtue of your appointment to the office mentioned, it will indicate that you are not over modest.

S. Michell.—We are afraid that, pretty subjects as they are, the views will not command a very ready sale in London. They are merely of local interest. Write to Messrs. Marion and Co., Soho-square; possibly they may assist you.

R. J. Fox.—1. Very good indeed.—2. The process is, to say the least of it, very promising. We advise you to continue your experiments.—3. We doubt if a patent for the process could be made valid, as it follows so closely on what has been done before and published.

Vignette.—1. If you wish to vignette the enlargements your best plan will be to place a vignetting mask, made out of a piece of cardboard, between the enlarging lens and the paper, and to keep it moving during the exposure.—2. It is very much a matter of opinion; they are certainly very good.

Manager.—As you confess that you know nothing whatever of photography yourself, we should advise you to act upon the suggestion of the operator, if he be a practical man who understands his business. We are afraid, without seeing the studio, that our advice would be of no value whatever.

S. B. T.—The cause of your failure with the bitumen process is twofold:—First, you have employed far too thick a solution; and, secondly, you have not exposed long enough in the printing-frame. Dilute the solution with four or five times its bulk of benzole, and expose for a much longer time. Six or eight hours to bright sunshine, in some cases, will not be too long. Under any circumstances ten minutes will be of no use whatever, however bright the light may be. Remember the bitumen process is a very slow one.

Magician.—The so-called "magic pictures" are made as follow:—After the print is washed, instead of toning it, immerse it in a solution of bichloride of mercury until the whole of the image disappears; then wash well and dry. Now take some blotting-paper and moisten it with a solution of the hyposulphite of soda and dry it. To make the image appear damp a couple of pieces of this paper with water and press the paper bearing the invisible image between them, when the photograph will appear of a brown colour.

Received.—W. J. Stillman. In our next.

Photographic Club, Ashley's Hotel, Henrietta-street.—The subject for discussion at the forthcoming meeting of this Club, on Wednesday next, the 9th inst., will be—*Instantaneous Shutters or Exposers.*

Photographic Society of Great Britain.—The next meeting of this Society will take place on Tuesday next, the 8th inst., at eight o'clock, at the Gallery, 5a, Pall Mall East (the summer exhibition of the Royal Society of Painters in Water-Colours being on view), when a paper will be read by Mr. J. R. Sawyer, on *Photography in Relation to Colour.*

Obituary.—We have received the following sad intelligence in a note from Mr. Thomas Fall, of Baker-street, almost at the moment of going to press. Very many of our readers knew Mr. Collins personally, and all who were acquainted with him will join us in deploring the loss of one who was always ready to help with his advice in any technical matters in which he was *au fait*:—"*Baker-street, May* 2, 1883.—I have a sad duty to perform in asking you to record the death (rather sudden at last) of a valued and respected member of our profession, Mr. C. G. Collins, of Cochrane-street, St. John's Wood, who died this morning. He had been suffering more or less for some months past from nerve depression and general prostration. Three weeks ago I took him to Hastings for a few days, which seemed to revive him; on his return, however, the old symptoms set in, when he lingered till this morning. His was the most affectionate nature I ever knew—sympathetic, and always on the alert to advise or assist. From his varied practical knowledge of the mechanical requirements of photographers his loss will be felt by his many friends, and who was not his friend that knew him? As is well known, during the past three or four years his time and energies have been devoted to the management of the Photographic Artists' Co-operative Supply Association, Limited. His private business has been practically and successfully carried on by his eldest son, who, I am glad to say, inherits all his late father's genius in anticipating and supplying the wants of the profession. For the information of friends who may be desirous of paying a last tribute of respect to his memory, I may add that the date of his interment (at Willesden), which is not yet fixed, can be ascertained by applying to me.—I am, yours, &c., Thos. Fall."

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For two Weeks ending May 2, 1883.
These Observations are Taken at 8.30 a.m.

April	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
19	29·39	NW	47	47	—	50	44	Raining.
20	30·08	N	50	46	93	59	43	Cloudy.
21	30·24	E	49	45	90	53	41	Cloudy.
23	29·92	E	41	37	83	45	36	Cloudy.
24	29·96	NE	41	39	—	52	31	Cloudy.
25	29·60	NW	45	42	83	52	38	Cloudy.
26	29·78	SE	51	45	106	61	36	Bright & Clear.
27	29·46	E	53	50	74	61	48	Overcast.
28	29·43	W	52	51	89	59	49	Raining.
30	29·71	W	52	47	107	63	43	Bright & Clear.
May								
1	29·75	E	49	46	105	63	45	Overcast.
2	29·93	NE	43	42	—	48	42	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1201. Vol. XXX.—MAY 11, 1883.

MEASURING THE SENSITIVENESS OF DRY PLATES.

The question raised by "A Bewildered Amateur," and commented on more recently by Mr. J. H. T. Ellerbeck, is one that cannot fail to interest all users of commercial dry plates. The worthlessness of the arbitrary standard of measurement so much in vogue has long since been pointed out; indeed, in the abstract, we venture to think that the expression "so many times quicker than wet" is about as explanatory as "as big as a piece of chalk." In the one case you have to establish the rapidity of your wet plate, and in the other the dimensions of your chalk, either of which operations is at least as difficult as the subsequent comparison of results.

But, granting the inutility of the present mode of classing our plates, it is not by any means an easy matter to substitute a better, nor is it advisable to do so hastily. If anyone will take the trouble to consider the matter very carefully he will find that the more deeply he goes into the subject the more and the greater are the difficulties which crop up. But turn which way he may he will invariably find himself face to face with *the* great difficulty that underlays all, namely, the establishment of a standard of illumination. That end attained all the rest were easy, but pending that consummation we must be content with a compromise.

But let us look at the matter as it has been touched upon in recent correspondence. It is proposed to substitute for the comparison between wet and dry plates a method of measuring the rapidity of the latter by stating the exposure necessary, under favourable circumstances, with a certain lens and stop. This, as we remarked in an append to a previous letter of Mr. Ellerbeck's, was the method usually adopted by dry-plate makers before the days of gelatine; but we question whether in inexperienced hands it is any more to be relied on than "ten times wet." Indeed, the adoption of such a plan presupposes a knowledge and judgment in the matter of light on the part of the user of the plates that only experience can bring. But, in addition to this, the *maker* of the plates forms a very important factor in the case. His judgment of what constitutes a "good light" or "favourable circumstances"—or whatever may be the conditions under which his comparisons are made—may be quite as eccentric as his ideas upon the actual or relative sensitiveness of a wet plate. In fact, each maker of plates is still at liberty to adopt an arbitrary standard, which, if worked up to rigidly, may be useful with his own plates and quite useless when applied to any others.

It is possible that some of our readers may think it an easy matter to define the conditions under which such trials are to be made—as, for instance, "an open view in sunshine" or some "stock subject" which, in a certain light and with a certain lens and stop, requires a definite exposure. But it is obvious that this forms no standard at all, and that in the absence of actual actinometric measurement everything depends upon the judgment of the operator in making the necessary allowances for variations in the light. In fact, with such a system of measurement the conditions are so liable to variation and in so many different ways that we are forced to turn in the direction of sensitometric tests as the only means of securing even approximately-accurate results.

We need not here stay to argue whether the Warnerke sensitometer is or is not a reliable standard for use under all conditions; suffice it that after several months' trial the Sensitometer Committee selected it as the most reliable they could find. With regard to the doubt expressed by Mr. Ellerbeck as to whether luminous paint is a trustworthy source of illumination, we think, as it is now manufactured, it is more to be depended on for uniformity than the sunshine of our variable clime. We have ourselves experimented with a great many different samples of sulphide of calcium, both in the form of powder and paint, and the differences in value have been surprisingly small. At anyrate, we are convinced that a sufficient degree of uniformity can be secured to satisfy the requirements of any user of plates who may elect to test his own.

But there is reason in Mr. Ellerbeck's argument that the consumer should not have the onus cast upon him of trying the sensitiveness of the plates he purchases. It is unjust to him that he should have to waste one plate perhaps from each packet in order to be sure that his films are correctly classed; especially is this so when the manufacturer has it in his power to do what is required with comparatively so much less trouble. Instead of wasting one plate out of every dozen or so a single trial will suffice for a very large batch, which may then be relied upon as being as near to absolute uniformity as it is possible to reach. But the valuation to be of use must be *correct*, and must be stated in terms that are readily intelligible.

The first condition depends upon the care and honesty of the maker; the second is fulfilled by the standard sensitometer. To those who habitually use the sensitometer, the statement that a certain plate "gives No. 18" conveys as distinct and intelligible a meaning for all practical purposes as that a quarter-plate is $4\frac{1}{2}$ by $3\frac{1}{4}$ in dimension. Even those who are not personally acquainted with the instrument may learn the relative value of the sensitometer *figures*, and so secure a nearer approach to accuracy.

We would propose, then, that plate manufacturers should follow the example of Mr. Cadett, Professor Stebbing, and Mr. England, and state the degree of rapidity of their plates in sensitometer figures, instead of in terms that are unintelligible. There might be a little difficulty at first to the consumer until he became accustomed to the new terms; but this trouble could be lessened by for a time giving both the old and new systems, thus marking the plates—"*Sensitometer number 22* (*25 times wet*)." Little or no extra trouble would be incurred by the manufacturer, while, if carefully and honestly carried out, the advantage to the user would be incalculable, and we should hear fewer complaints of such anomalies as that quoted by Mr. Ellerbeck, namely, of plates stated ten times as quick as wet being really three times as rapid as others reputed to be twenty times. This is no imaginary case, as we have had numerous opportunities of discovering.

If this system were generally adopted by the makers it would involve to the consumer neither the expense of a sensitometer nor the necessity or trouble of using it; and it would, at anyrate, place before him figures with a more definite meaning than "20 times wet."

PORTRAITURE FOR AMATEURS.

Before proceeding further with our practical hints on this subject it will be well to make a few remarks on the apparatus and its management. As we have mentioned before, it is not our intention to enter into the question as to the best form of lens to employ for the production of portrait groups, but simply to point out the best method of utilising those which the amateur student in portraiture may have in his possession If he be the possessor of more than one instrument it will always be advisable to employ that with the largest aperture in proportion to its focal length—that is, provided it will, with its full opening or nearly so, cover the size of picture it is intended to take.

The reason for this is obvious when we consider that, in taking groups of several persons, it is imperative that the exposure should be as brief as possible consistent with obtaining a fully-exposed negative, so as to reduce the chances of sitters, or at least some of them, moving during the operation. Nothing mars a picture so much as to see in a group of half-a-dozen or more one or two blurred figures? Yet how often does this occur, though, of course, it might have been obviated had it been possible to have diminished the time of exposure?

Compound lenses of the "rapid" type (rectilinear or symmetrical) have a much larger aperture in relation to their focal length than that possessed by a single or landscape lens. But many of these lenses, unfortunately, will not cover anything like the full size they are stated to do unless stopped down considerably. In some cases, in the cheaper forms, this is the case to such an extent that they at once become as slow, or even slower, in action than the single lens. Therefore it is clear we shall gain nothing by employing such an instrument, except when we are working on a smaller-sized plate than that it is said to cover. Then, and then only, shall we retain the benefit of the larger opening, while with the single lens, with its fixed stop, no corresponding advantage will be obtained in using a smaller-sized plate. Seeing the advisability of working with as large an aperture as possible, it will be necessary, as we shall presently show, to so arrange our group as to accommodate the lens in every possible way.

In photographing a landscape we must, of course, take the subject as we find it, and get all portions approximately sharp by the employment of stops, assisted with the swing-back of the camera, if it be provided with one; but, as we have said before, the employment of small stops in portraiture is not permissible when the best results are to be obtained, unless under exceptional conditions of light or with extremely-sensitive plates. That the tyro—and it is for him that the present articles are especially written—shall the better comprehend the characteristics of his lenses, which may have been overlooked when employing them for landscape purposes only, and then with small diaphragms, let us proceed to make a few experiments, and if the results of these be borne in mind they will be found to materially assist him in arranging his subjects without the necessity of having to alter them afterwards. When this has to be done to any material extent it always tends to weary the sitters, and frequently introduces a considerable amount of *badinage* at the operator's expense, and, if he be at all nervous, often to his discomfiture.

In the first place, let the student provide himself with six or eight rods or laths—say six feet long, and pointed at one end, so that they can be fixed in the ground. Now on one of these rods, about the middle or a little above, pin a piece of printed matter—say, for example, an address card—and then place the rod in the ground. Let us then take a second rod and on this affix another card near the top, and place this also in the ground so that it occupies the same plane with regard to the camera as the other. These two cards may be taken to represent the faces of a group of two persons, the one sitting and the other standing. Now let us place the camera so that the image of the two cards occupy the same positions on the ground glass as the faces would do on the full size of picture the lens is supposed to cover. If we now focus the lower card, using the full opening of the lens, we shall find that, when we have obtained it sharply defined, the upper one representing the face of the standing figure is quite out of focus.

It is true that by inserting a small diaphragm we can obtain both cards fairly sharp; but, as we have already explained, it is very undesirable to obtain sharpness in this manner. If the camera be provided with a swing-back we can, by taking advantage of that, secure both images in focus at the same time, and this plan may with advantage be adopted when a group of two figures only are to be dealt with.

But let us suppose that, instead of two, we have three persons in our group, and that the third is sitting on the ground or on a low stool close to the feet of the standing figure, as this is a very common pose for three figures. This we will represent by another card pinned (say) a couple of feet from the bottom of the rod representing the standing figure. If the centre card be now focussed and the swinging-back is brought into operation, in order to bring the upper card into focus we shall find that in proportion as we get that image sharp so we make the bottom one worse than before; therefore in such a case as this the swinging-back will prove useless. Having adjusted the back of the camera so that it is quite upright, and focussed the centre card, let some one remove the lath representing the standing figure, bringing it slightly nearer the camera, and it will be found that it may be so placed that the image can be obtained in focus while that in the centre is also sharp, while at the same time the card fixed nearer the bottom of the rod will also be better defined.

Hence it will be seen, in practice, that in taking a sitting and standing figure in a group the standing one must be posed slightly nearer the camera than the other; and, by mentally noting how much the tallest rod was in advance of the other, to obtain the sharpest image on the focussing screen we can easily judge how the figures may be arranged to the best advantage without having to move them afterwards. All this arises from the lens, no matter what its form, having more or less a round field; for it is impossible for the optician to give us a lens that will delineate over a large area with a flat one. This matter will be duly treated upon in the series of articles on photographic optics now appearing in our columns.

Seeing what has to be done to accommodate the lens when our group is composed of two or three figures only, let us try an experiment with an imaginary group or, we might say, a crowd—such as a school or a club, in which the figures and surroundings are distributed over a space of (say) thirty feet, and which have to be spread as widely as possible lengthways over the plate. For this purpose we stick one of our rods as before with a card upon it into the ground, and on either side, and fifteen feet from it, place another, and at equal distances between these two others, all in a straight line.

Now, let us place our camera so that the images of the two outer rods are formed at the margins of the focussing-screen, when, of course, the middle one will come in the centre. If we now focus the card on the centre rod we shall see that all the others are indistinct. Without altering the focus of the lens let some person move one of the rods next the middle one a little more forward until it is obtained sharply defined, then the next, and finally the end one. When all on one side of the middle rod are secured in focus we shall find that by placing those on the other side relatively the same distance in advance they will also be equally in focus. This teaches us, as in the case of the first experiments, that those objects whose images are formed near the margin of the plate should always be arranged more in advance than those in the centre. In a word, the group should be posed in a curve, the radius of which—and it varies with different lenses—may be determined by the foregoing experiments.

By this time the student will doubtless have noticed that, however carefully the marginal objects may have been arranged in focus, they can never be obtained so crisply defined as the central

nes. This arises from the lens being deficient in marginal definition. Much of this may, however, be remedied by the employment f stops; but, as we shall explain in our next article on this subject, t is sometimes advantageous in practice to sacrifice a certain proportion of definition in order to secure rapidity in the exposure.

FOREGROUND "BITS" AND WOODLAND STUDIES.

Notwithstanding the great development which the powers of our art-science has received since the use of gelatine plates has become the rule rather than the exception, and the addition to the ranks of photography of vast numbers of amateurs who have taken up its practice—their time, in many cases, tied down neither by professional requirements nor pecuniary considerations—it is surprising that the beaten track of figures or landscapes is not departed from to a far greater extent than appears to be the case. Lovely scenes from distant climes—hill and dale, forest and plain—are brought home in well-tended negatives; but the pretty "bits" that lie at our very feet—the roadside bank, studded with bramble and nettle, tall grass and creeping ivy, the carpet of the woods and forests, the lovely harebell, the common yet graceful bracken, and a hundred other wonderful arrangements of form and glancing lights and shadows—how often do they attract? How often do we see loving, artistic care spent upon them?

Yet we do not hesitate to say that if a tithe of the troubles undergone in seeking after beautiful landscapes or fresh combinations of trees and hills and running streams—one tithe of the time spent in weary tramping with camera and tripod to reach some famous view—were devoted to the seeking out and securing in the camera of pretty roadside "bits" or studies of nature *in petto*, there would be such a rich harvest that a new vista would be opened out to the gaze of the average photographer.

A well-known painter was walking out with a friend one bright summer's day. "Ha!" said he; "I see a hundred guineas there!" A little pool of water, a moss-covered stone or two, and a drooping fern were all that his astonished companion could see; but, for all that, the painter's instinct was right. The pretty little "bit" was transferred to canvas—not a large one, it is true—and in due course adorned the walls of the Academy, when not only one but several hundreds of guineas were brought out of that little corner. Although guineas by hundreds are not commonly the pay for photographs, we hold a very strong opinion that good payment could be freely secured by the production of photographs equally simple, selected with judgment and treated with artistic feeling.

It is astonishing out of what trivial elements a "subject" may be made. We once saw a remarkably-taking photograph made up of part of a tree trunk, an old gate, and a heap of stones—the latter the only point that could be improved upon. No portrait of the place being involved, artistic license was fully permissible, and the printing-in of some such foreground "bit" as we are treating of would have made the picture we allude to into a veritable gem.

The first picture in our series of "ink-photos." showed what effects could be obtained by grouping of flowers and ferns. Can it be supposed that equally-picturesque elements in pictorial juxtaposition are not to be found ready disposed by the cunning hand of nature, and as fit for immediate transference to the gelatine plate of the photographer as to the canvas of the painter-artist? The maiden-hair fern of the greenhouse is but a cultivated variety of a hardy English fern, and how beautiful does either appear, with its slender hair-like stems and its almost ethereal lightness! True, the beautiful plant is comparatively rare; but rarity is the very point we would avoid, and we would say that the commonest fern to be seen would be just as effective—indeed, for foreground work, more effective—than the finest frond of the fern we name, even though it had been cultivated indoors with every care. The common male fern, to be seen in almost any ditch or hedge bank, with its surroundings of grass and moss and weed, is capable of most effective employment to help a picture. Even that most widely-spread of all ferns, the common bracken—that would be admired by all for its intrinsic beauty if it were not so common, whether growing, as we have seen it, to a height of seven and eight feet or to more lowly dimensions—would, with its frequent surroundings—be they of quickset hedge, or banks of weed, or shivering grasses, or, showing the hand of man, a half-concealed fence, part hid by huge shoots of dog-rose, sweet-scented woodbine, or climbing bindweed, with its graceful flowers—make parts of pictures to delight the artistic eye, or, in truth, whole pictures, if carefully treated. A clump of fern fronds itself, indeed, is a sufficiently-beautiful object to be worthy of picturing, and few are the neighbourhoods where they may not be found; while, if the wanderer can come across some roadside-well with its outer lichen-covered stones and broad leaves—fronds, the purist would call them—of bright green hart's-tongue projecting from the cool sides, with mosses in vigorous growth, breaking up the otherwise flat sides, he may in half-an-hour's time obtain pictures that will continue to please, often as he may admire them, when the grandest views in his collection will pall.

The common hemlock, heracleum, fool's parsley, and the large number of umbelliferous plants that haunt the roadsides, the hedges, and ditches—has anyone ever studied their beauty? Surely not, or we should have had them reproduced on the walls of our exhibitions long ere now; while the countless beauties of the tangled mass of briar and bramble, creeping and climbing plant—here the bole of a great tree, with its rugged skin overgrown with lichen and moss, and there a young sapling struggling through, crowning the mass with hues and forms of endless variety—all forming a sight that may be seen for miles in any country lane or bordering any cultivated field, not to speak of the picturesque nooks and corners in the less-frequented byeways and heaths—these all form a mine of wealth of beauty inexhaustible and almost unworked.

There is no room for the busy amateur to say he cannot go afield to photograph, or his time does not allow him to get such views as he sees in his friends' collections. Let him take advantage of our hints, and it will please very many besides ourselves if they should lead to the next autumnal exhibition of photographs, showing what photography can do for foreground "bits" and woodland studies.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter II.—Central and Oblique Definition.—Chromatic Aberration and the Forms of Lenses.

A pertinent question arises at this stage—What constitutes the leading distinction between the optics of photography and those optical laws which distinguish the instruments employed in any other cognate branches of applied science—the telescope, for example? To this it may be replied, that the optical laws of the telescope have reference to the production of an exceedingly-sharp image of such objects as are directly in front of the instrument or placed in such a position that rays from them will be transmitted as nearly as possible in a direct line, or axially, through the large outer lens or object-glass of the telescope. Photographic optics, on the other hand, include not only central or axial rays but oblique ones also. What would be the pictorial value of a delineation of natural objects subtending an angle of only one or two degrees, no matter how well defined such a spot might be?

But photographic optical science, in addition to embracing the oblique in contradistinction to the normal or axial transmission of rays, differs also from telescopic optics in this respect—that, whereas with the formation of a visual image capable of being *seen* sharply all the requirements of the latter are fulfilled, the former demands something more, namely, that the chemical or actinic rays, which were shown in the previous chapter to be mainly confined to the violet end of the spectrum, shall be united with the luminous or yellow rays, so as to ensure their all coming to a focus on the same plane. A telescope object-glass, therefore, is corrected for the visual rays alone; and, if employed in the production of a photograph, such a picture would not be sharp unless the sensitive plate were placed in the plane upon which the actinic rays were brought to their focus, and which would be at some little distance from the sharpest visible focus. Not so with a photographic lens, which must have its visual and actinic foci to coincide. What has been said applies also to the third of the image-forming optical instruments—the microscope.

At this stage we shall have to take what some may think a serious liberty with the recognised nomenclature of photographic optics, and try and assign a place to the well-defined photographic image. For reasons which will be adduced we are unable to give it a higher than a third place.

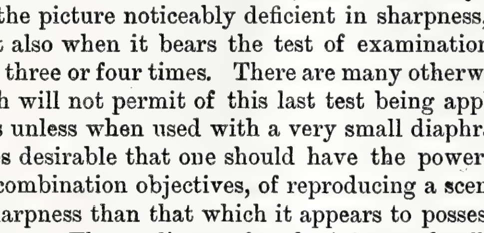
Definition of the first order is ideal, existing only in imagination. It is that kind of definition which presupposes perfection in mathematical principles, in mechanics, and in atmospheric conditions. It is tolerant of things as they exist merely because they cannot be helped. Optical transcendentalism when indulged in by the photographer demands a lens which shall define so perfectly that the application of unlimited magnifying power will only serve as a means of unlimited penetration into nature's arcana; a lens having an aperture so great in proportion to its focus as to permit of exposures being made in the fractional part of a second; a range of lateral definition so extensive as to include a panorama; and a penetrative depth sufficient to embrace everything from within a few feet to infinity. This is the ideal or hypothetic lens. Optical conservatives say that such a lens cannot possibly exist save in the brain of some enthusiast. For its productions, however, when they come, we reserve the first place in our classification.

The second order of definition is that which we find existing in a well-constructed telescope. The image formed by a telescope object-glass is never examined by the unaided eye, but invariably through powerful magnifying glasses, technically known as "eyepieces." This demands a perfection of definition altogether unknown and unrequired in artistic photography.

Definition of the third order is of a lower grade than that just described. Photographic definition may be considered as fulfilling every requirement of our art-science, when not only is there no portion of the picture noticeably deficient in sharpness, even at its margin, but also when it bears the test of examination by a glass magnifying three or four times. There are many otherwise excellent lenses which will not permit of this last test being applied to their productions unless when used with a very small diaphragm, and it is sometimes desirable that one should have the power, both with single and combination objectives, of reproducing a scene or subject with less sharpness than that which it appears to possess to the eye of the observer. The appliances for obtaining such effects will be considered in a subsequent chapter.

We have seen in *fig.* 1, Chapter I., in what manner a ray of light becomes decomposed when it is transmitted through a prism. Now a lens may be considered a series of prisms formed by a single piece of glass, its faces being spherical instead of an unlimited number of flat surfaces. The property possessed by a wedge-shaped piece of glass of bending and decomposing a ray of light applies equally to the glass, whether it be purely prismatic or lenticular in form, and no single lens formed of one piece of glass can possibly bring the rays transmitted through it to one focus; for, as we have shown, the violet rays, being bent so much more strongly than the red and all the others, are brought to a focus nearer to the lens than these. This defect is entitled "chromatic aberration," from *chroma* (colour) and *aberro* (I wander from). Its nature is shown in the diagram *fig.* 2, which represents rays *a a*, incident upon a

FIG. 2.

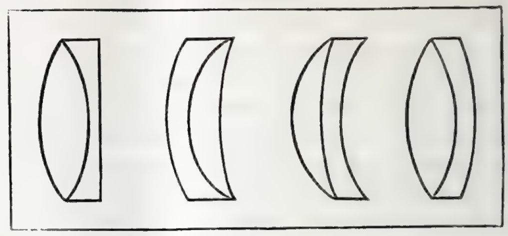


double-convex lens L. These rays are not only bent or refracted but are also decomposed, which is what we have to do with at present. The violet rays, in consequence of their greater refrangibility, are brought to a focus at V, the red rays finding a focus at R. By the term "focus" is here meant that place where rays cross the axis *c* of the lens. This definition is only strictly accurate when applied to direct rays; a more comprehensive one will be given when we come to treat of oblique pencils.

Chromatic aberration is avoided by the employment of an achromatic (without colour) lens. The construction of an achromatic lens is based upon the fact that flint glass effects a much greater separation of the elementary colours of a ray of light than crown glass. A convex lens of the latter material would, undoubtedly, cause the rays to be decomposed, as shown in *fig.* 2, but by being placed in juxtaposition with a concave lens formed of flint glass, the refracting power of which is exerted in a contrary direction while its power for dispersion is greater, the inward dispersive tendency of the crown is opposed by the outward dispersive proclivity of the flint, the result being that the ray is transmitted intact, or without colour, to its focus.

In *fig.* 3 are shown in outline various forms of achromatic lenses

FIG 3.

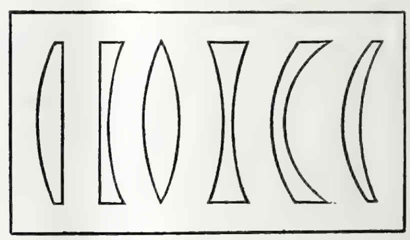


employed in photography, the principles of chromatic correction—namely, a concave flint united to a convex crown—being alike in all of them, however dissimilar they may appear to be.

We close this chapter by giving the names of the various forms of lens, these names having reference to the external configuration of the lens, no matter of how many elementary parts of other forms it may be composed:—

FIG. 4.

1 2 3 4 5 6



In this diagram 1 and 2 are respectively plano-convex and plano-concave lenses; 3 and 4 are double-convex and double-concave; 5 is a concavo-convex; and 6 a periscopic or meniscus lens.

In another column will be found a report of a somewhat important copyright action, in which it was sought to recover damages for the infringement of the copyright in certain photographs. As the case is not yet finally settled it is not for us at the present stage to enter into any elaborate comments upon the facts as brought out in evidence; but we may at least point to an important and, we think, just decision arrived at by Mr. Justice Field. It was urged in defence that the copyright was defective, on the ground that the terms of the Act had not been complied with, inasmuch as the correct name and address or residence of the actual producer of the pictures had not been registered. It was shown that the pictures were produced by Mr. Reynolds for the Stereoscopic Company and registered in the name of that firm, the contention of the defence being that the registration should, according to the Act, have been in the name of Mr. Reynolds. If such were the laws as intended by the Act we fear that few existing copyrights—in connection with photography at least—would possess much value, and we can cordially agree with Mr. Justice Field in describing the argument as ridiculous.

Instead of confining ourselves to plain silver bromide in emulsion, the tendency seems to be in the direction of more complex preparation. So far as the admixture of chloride and iodide are concerned there are distinct benefits to be derived; but as to the recommenda-

on to add also fluoride and cyanide of silver the same cannot be id. In the first place, silver fluoride is an extremely soluble—ven deliquescent—salt and cannot, therefore, exist in a properly ashed emulsion; and, secondly, the cyanide is so easily reducible hat it is more than doubtful whether it will stand the application f a developer without producing fog. There may, however, be ome benefit derivable from the presence of these salts in the early tages of emulsification.

Mr. Cecil V. Shadbolt, writing on Wednesday last, the 9th inst., ays:—"I made an ascent with Mr. W. Dale from Lillie Bridge Grounds, on Saturday last, at 4.30 p.m., in the 'Sunbeam'—a fine, new balloon which was then used for the first time—for the purpose of experimenting in photography. The day was unfavourable for success, however, being rather misty. We rose rapidly into the clouds, and in a-quarter of an hour to twenty minutes had attained an altitude of 7,450 feet, having pierced right through the clouds and risen into the sunshine above, when all traces of the earth were completely hidden from our view, and we could see nothing but clouds beneath us. Here we were accompanied for a long time by a very fine 'spectral balloon,' caused by our shadow on the surface of the clouds. This sight was most interesting and I had long wished to witness it, having read of it in books. A safe descent, though a somewhat rapid one, was effected at Hunslow at 5.15. p.m. The course of the balloon was not a straight one, as we encountered different currents at high altitudes. I obtained no success as regards photography, but propose making another ascent on Monday next, as well as on the following day (Tuesday)."

At a meeting of the Chemical Society last month Professor Hartley showed the use of photography as an analyst. By means of a study of a photograph of the spectrum he was able to form an opinion of the true place in a systematic table of the elements of the rare metal, beryllium.

The same *savant*, in conjunction with Captain Abney, presented a paper at the Royal Society (upon the same evening as the above) on *Measurements of the Wave-Lengths of Rays of High Refrangibility in the Spectrum of Elementary Substances.* The communication was the result of great labour and painstaking accuracy, the spectra having been mostly produced with a Rutherfurd grating ruled with 17,460 lines to the inch. Some lines of the spectra—too faint to be seen with the diffraction photographs—were produced by the aid of the prism spectroscope. It is pointed out in the paper that the utmost care was exercised; and that as irregularities in the surface of the plates would lead to inaccurate measurements, gelatine films on specially-selected patent plate were used, the precaution, it was stated, being quite necessary. Further: the photographs were not varnished.

Mr. Glazebrook has recently shown that the curved diffraction gratings of Professor Rowland—which we described some little time ago—do not always give perfect definition, and he has calculated the aberration of the rays.

All the scientific and statistical papers have lately been discussing the question of the value of gold, recently raised by Mr. Goschen in a communication to *The Times.* Less gold is now yearly produced, while more is annually consumed, during the present than in the past decade, therefore, it is argued, gold is dearer; that is to say, more goods have to be given to obtain it, or, in other words, articles offered for sale are cheaper. It would be curious and interesting to know to what extent the gold employed in photography affects the grand annual aggregate of the precious metal wasted or lost.

To no one more than the photographer would the establishing of a standard source of light be of use. Mr. L. Warnerke's elegant mode of making a light-sensitive tablet, though of exceeding usefulness, is, owing to uncertainty in the manufacture of the phosphorescent powder, devoid of that universality of application that such a standard should possess, and hitherto there has been no recognised source of light capable of employment for a standard illumination, the "standard candle" having, as most people are aware, a very indefinite illuminating power. At the Electrical Congress of 1881 M. J. Violle proposed a certain bulk of melting platinum for the purpose; but it is quite evident that the extreme difficulty of preparing a really pure metal must, if other causes did not intervene, seriously affect the uniformity of the light. This same gentleman, however, has now proposed a new standard free from this and other objections appertaining to platinum. It is to employ molten silver. He has found that this metal, when kept in a melted state beyond its temperature of melting, gives off as it cools a light increasing in intensity but varying in power according to the existence of several circumstances; but that, at a certain stage, when solidification begins, a pool of molten silver forms in the middle of the crucible and continues at one uniform and constant high temperature until solidified, thus affording a test of exact value whenever required. Of course such a mode of producing radiation of definite character, could not be made use of by the photographer; but once a radiator unvarying in power is established it will serve as a comparison for any other instrument, such as the Warnerke sensitometer, whose indications could then be reduced to this standard.

A STANDARD OF SENSITIVENESS FOR GELATINE PLATES.

The question of a standard of sensitiveness for gelatine plates is one that must sooner or later be seriously considered; for there can be no doubt as to the unsatisfactory condition of matters in that direction at the present time. It is to be hoped that the recent discussion of the subject may lead to some definite and practically-useful result.

But there are very many difficulties to overcome before a really practical unit of sensitiveness can be adopted, and without a unit our multiples are valueless. We must have a standard light first of all, and then establish a standard system of testing. So far as those who use the plates or prepare them for their own use are concerned then all will be well; but those who merely employ commercial plates without knowing or wishing to know anything of their preparation will still be at the mercy of the manufacturers, and it will rest with these latter to please themselves whether they study the convenience of their customers by adopting any standard that may be chosen. It is, of course, impossible to dictate to the makers of plates what they should do in this, that, or the other way; so long as they supply an article of good quality the purchaser must rest content to use it as best he can. Still I cannot help thinking that they (the manufacturers) would find it to their advantage to give all the assistance they possibly could to their clients by affording reliable information as to the (at least) probable degree of sensitiveness of their films.

If they cannot do this, the better plan would be to say nothing at all, but to leave the purchaser to find out for himself the necessary information. Far better for him would it be to expose a trial plate in order to gain an idea as to the quality of the rest of the batch than to rely upon the brand of "twenty times," when probably the plates are actually only "five times as rapid as wet." The wet plate is far from being a reliable standard of sensitiveness, depending, as it does, for its own qualities upon so many different conditions; so why mislead by giving untrustworthy data upon which to work?

The cry that has been raised by "A Bewildered Amateur" and others is just, in so far as it affects the class I have mentioned—those who use commercial plates and wish to know nothing about any troubles, except those of development. But I should imagine that every intelligent photographer—be he amateur or professional—would prefer to try the qualities of his plates himself rather than trust to the *ipse dixit* of anyone else, especially of the manufacturer, whose interest and inclination it naturally is to paint things *couleur de rose*, and to make his plates show to the best possible advantage. But even granting the justice of the complaint to that extent, I cannot but think the trouble is magnified unnecessarily (except as regards really incorrect descriptions of the quality of plates, as when "10 times" are described as "20 times"), for the latitude, both in exposure and development, is so great that even the first plate of a

new batch need scarcely be lost, and that will give the lead for a different style of development for the subsequent ones.

It is true under-exposure is a difficult fault to cope with, and I have no doubt this is the one more generally met with when dealing with commercial plates; but if the golden rule were universally adopted of giving always, when practicable, a *full* exposure—that is, something more than is considered absolutely necessary, instead of trying to perform impossible feats of rapidity—there would be fewer complaints against makers of plates, and, perhaps, more pictures worth showing. I am not now, of course, referring to instantaneous work or to exposures which must necessarily be short. When such cases occur the operator is prepared to treat them in accordance with their requirements; but there is too great a tendency to go in for short exposures on subjects which will very well bear two or three times as long, and then the result is blamed upon the maker of the plates.

Until a standard is established and manufacturers can be induced to adopt it, it will rest with amateurs and others who wish to know beforehand the exact sensitiveness of their plates to test them for themselves. For this purpose the standard sensitometer appears to be sufficient, though it seems it is too expensive (*vide* Mr. Ellerbeck's letter of April 20th). Then again, in a subsequent letter, the same gentleman calls in question its reliability, and yet we continually see in the Journal many of our leading dry-plate workers alluding to the rapidity of this or that emulsion in terms of Warnerke's sensitometer, as if *they* perfectly understand their meaning and have faith in the instrument. If the phosphorescent material be sufficiently uniform in character for the purpose the cost need not stand in the way, as a small bottle of "Judson's luminous paint" will make a good many "luminous tablets." The graduated screen will, of course, have to be made in addition; but for private use this presents little difficulty. A few superimposed strips of tissue paper or other translucent material will answer all purposes when comparisons with outside results are not required.

But this does not form a "standard." For that we require, first, a standard—that is, a uniform light; and, second, a method of graduating it that shall be entirely independent of filtration through translucent or semi-translucent material of any sort. For the latter I think nothing can be better than a plan—suggested in the first place, I believe, by Captain Abney some years ago—in which a disc of stout cardboard or zinc, with a star or similarly-shaped aperture cut in the centre, is made to revolve rapidly in front of the source of light. The light acts directly through the aperture, and is cut off during a portion of each revolution by the solid portions of the disc, and, according to the shape of the aperture, the relative exposures at different distances from the centre of revolution may be easily determined.

As to the source of light: daylight is, of course, out of the question, and the reliability of the phosphorescent surface impugned. But magnesium burnt at a fixed distance from a white reflecting surface would appear to offer a good chance of uniformity; and a plate exposed for a fixed period in the camera in front of such a revolving sensitometer, with the magnesium-illuminated reflector behind it, would show the sensitiveness of the plate in terms that might be calculated in seconds or fractions of seconds of exposure to the standard light. A numbered scale might be ruled upon the reflector, which would show at a glance the degree of rapidity recorded.

H. Y. E. Cotesworth.

ON THE ACTION OF HALOIDS IN GELATINE.

[A communication to the London and Provincial Photographic Association.]

Noticing in The British Journal of Photography of the 27th ult. a very important communication upon *Iodide of Silver in the Emulsion*, by Herr Schumann, and having experimented upon the same subject myself, although in a different manner, it occurred to me that a brief paper upon the same might be acceptable to our members.

Now, it seems to have been taken for granted that, so long as any bromide, iodide, or chloride of silver was present in the film, it was a matter of indifference how those salts were formed. Many workers, in order to be sure that chloride and iodide of silver were in the film, have made separate emulsions of the bromide, iodide, and chloride of silver, and then mixed them as required. This is, in my opinion, a mistake, as, given the first as a normal emulsion, the addition of the second shows it, and has an injurious action upon the undeveloped image, giving rise to the opinion that bromo-iodide plates will not keep. This mixture of the two separately-formed silver salts will thus explain the discrepancy in the results obtained by different workers, as iodide of silver has an inherent tendency, after exposure to light, to return to its normal state when again in darkness, though slight moisture certainly seems to be necessary for the complete action.

As regards the third (chloride), the addition of this gives a tendency to fog or slight deposit upon the shadows, and a thinness of image in consequence of its being dissolved by the fixing solution. Moreover, it does not increase the rapidity except to the violet ray. But when these three salts are formed in the gelatine emulsion at once in correct proportions the action is very different, a complicated salt being formed in combination with the organic matter which does not fog, has no injurious action upon the latent image and is much more rapid than either salt alone.

As it is now generally acknowledged that an emulsion containing bromide, chloride, and iodide of silver in combination is more sensitive than an emulsion containing either sort alone, I have further to add to my former statement that if fluoride and cyanide of silver be also introduced, so that the emulsion contains the five salts in certain proportions, it is my experience that a still more sensitive emulsion will result, which will also be free from opaque spots and give brilliant, clear negatives. Not only is this the case, but that different compounds are formed according to whether the haloid, the silver, or the organic matter be in excess; for it must be borne in mind that most forms of organic matter are rendered sensitive to light by contact with the vapour of either of the halogens or with nitrate of silver, whilst, on the other hand, the pure haloid salts of silver are practically insensitive until organic matter enters into combination with them.

There certainly appears to be a much more complex action during the formation of the emulsion than the mere uniting of bromine, chlorine, or iodine, as the case may be, with silver, and also at the development and impact of light, which a mere conversion of the bromide and iodide into sub-bromide and sub-iodide and free bromine and iodine does not satisfactorily explain. Pure Ag Br is virtually insensitive to light, and so, practically, is a mixture of pure Ag I with pure Ag Br; but it seems that if the bromo-iodide of silver be formed at once in suitable proportions a double salt is formed which is decidedly susceptible to light. Although certain other forms of matter appear to accelerate or increase this action, it is the nitrogen compounds which are the true sensitisers, and that impart to the haloids sufficient sensitiveness to make photography a useful science.

With reference to the Editors' remarks *re* a scientific basis for photography, it is, perhaps, in the recollection of the members that some three years since I called attention to the necessity for the same, and, as a starting-point, laid down a thesis which, so far as I am aware, no one has yet disputed.

As this paper is already sufficiently lengthy I must defer any further remarks until some future occasion, and trust that, although hurriedly written, this will be thought worthy of acceptance by the members.

J. Barker.

ASTRONOMICAL PHOTOGRAPHY

Part II.

The idea that photography would enable astronomers to solve some of the mysteries of the moon has never been realised. It was fondly imagined that a perfect daguerreotype, when viewed under the microscope, would reveal details which the telescope failed to show. It was claimed for the perfection of the daguerreotype that a picture in which a gooseberry bush was shown at some distance (I think half-a-mile, but it is many years since I saw the statement) showed also, when placed under the microscope, a *cobweb* within its branches. We may get fairly-perfect pictures of the moon, but it is more than doubtful whether any amount of magnifying power will ever show a bush or even a tree, if such should exist there.

Let us see what has actually been done. Negatives of good quality have been made of one inch diameter (Rutherfurd's are rather larger, and others still larger, but not better). This (say) is enlarged as a transparency to three inches, and then, by the aid of the optical lantern, we may get a further enlargement up to thirty or forty feet. If the latter, we see the picture of the moon as the telescope, with which the original negative was taken, would show it with an eyepiece giving magnifying power of about 480 diameters—that is, 480 times nearer than we see her with the unassisted eye, or as if at a distance of about 500 miles—the more we magnify our picture the less satisfactory it becomes. In fact, with a good telescope we may apply a power of 1000 diameters, making the moon appear as if only about 240 miles distant, and the direct view of the object in the telescope is better than any picture yet obtained

of it. Still it is an object worth much labour to depict skilfully on our prepared plates, and it is not improbable that when pictures have been taken at high altitudes, so as to be above the denser atmosphere, we may expect to see more perfect results than we have at present, good as they undoubtedly are.

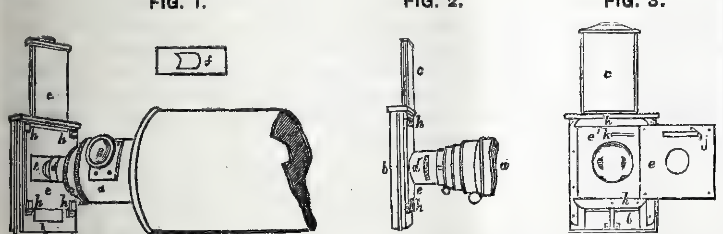
Photographing the moon is a sort of *ignis fatuus* to the astro-photographer. He is always getting something nearly approaching what he wants, and the hope is ever present that the next attempt will be better. As I have already said, so much depends on the state of the atmosphere; but this difficulty is lessened since the introduction of the gelatine method, the shorter exposure eliminating some of the atmospheric defects.

If the photographs of the moon are to be taken with a reflecting telescope we at once get rid of a tormenting difficulty—that of the actinic focus—as the image merely requires to be accurately focussed, and the photographer will then proceed with his work just as if he were photographing a landscape or copying any other object. The additional apparatus required will be the same as when a telescope of the ordinary kind is used—that is, the achromatic.

From one of my papers, published by the Manchester Literary and Philosophical Society some years since, I take the following description of the method I have always used, and, with the apparatus shown in the accompanying diagrams, I have taken many hundreds of pictures of the sun, moon, and planets, and I see no reason for making any alterations in my plan of working here described. The cost of the adapter for the dark slide and the necessary brasswork is a mere trifle, and need scarcely be considered. As the telescope tube itself becomes the camera, nothing more is required than the means of holding and shifting the dark slide.

If the telescope be pointed to the moon, the eyepiece removed, and a piece of ground glass held between the eye and the aperture, the image will be seen on the glass, and we require then the means of holding the sensitive plate steadily near the same place. All that is needed is a brass tube about four or five inches long, of the size exactly fitting the tube of the telescope in the place of the eyepiece. In some cases the sliding tube of the eyepiece may be unscrewed and used for this purpose. At one end of this tube a thread is cut and is made to screw into a piece of metal plate (in the centre of which is a circular aperture of the same size as the tube) of the same dimensions as the dark frame. Attached to the plate-holder are clips accurately fitting the brass plate, but so that the frame will easily slide off and on without disturbing the telescope. This is all the additional apparatus required to enable photographs of the moon or any other celestial object to be taken. A separate frame for the ground glass is not necessary; it must be cut to fit the dark frame, and while in use can be held by slight springs fixed inside the frame at the sides.

FIG. 1. FIG. 2. FIG. 3.



Apparatus for Taking Astronomical Photographs.
a Draw-tube of telescope. *b* Dark frame. *c* Slide. *d* Brass tube sliding into place of eyepiece. *e* Outer metal plate screwed to *d*. *é* Inner metal plate. *f* Diaphragm. *h* Clips to hold plate *e*. *i* Spring to hold frame in first position. *k* Groove in the plate *e* in which the spring-pin *j* slides.

The diagram shows the arrangement of the apparatus when in its place for taking a negative, and renders little further description necessary. The method for ascertaining the actinic focus may be stated in a few words. With the rack motion adjust the focus for distinct vision on the ground glass, and then mark the tube *d* and also the sliding part of the telescope. Although very unlikely to be of the slightest use, unless taken with a reflecting telescope, a picture may now be taken; it will at least serve to give some idea of the proper exposure. If the chemical and visual foci are not coincident the image will have a blurred appearance. Before exposing the next plate turn the adjusting screw so as to lengthen the tube about the sixteenth of an inch, and so proceed until by the greater distinctness of the image it is seen that the chemical focus is found. At every change of the focus a slight mark should be made on the tube, and when the true focus is satisfactorily determined the marks should be made distinctly visible; and in all future experiments with the same instrument the focus will be always at or very near the same place. Should it be found that the indistinctness increases, it will of course be necessary to try in the other direction.

Fig. 3 shows that four images of the moon can be taken on the same plate. This is effected by making the frame so that it will slide in both directions, and the four views are taken in order; and, as different exposures can be given to each, we have the means of trying on one plate the correct time of exposure and correction of focus.

Pictures of the moon taken about the seventh or eighth day are, perhaps, the most effective, but it will be found that the side turned towards the sun is much brighter than the parts just coming into view, so that an exposure which will be ample for the bright part is insufficient for the "terminator," as the darker side is termed. With care this difficulty can be overcome by using the diaphragm, which is kept in gentle motion; the light may be equalised to some extent by covering up the bright edge so as to give a longer exposure to the terminator. This, of course, must be carefully done so as not to disturb the telescope, and a sharp edge must be avoided by keeping the diaphragm in motion. But, as the parts well in view and just coming into view are the interesting features, the bright edge may be disregarded; it will, of course, be solarised if the exposure be made sufficient for the less-illuminated parts.

The moon is not always the same distance from the earth, and it will be found that the photographs will vary in size accordingly. This difference can be rectified when making enlarged copies. The time required for the half-moon phaze will, of course, depend on the instrument used, the state of the atmosphere, and the process employed. The size of the image also is governed by the length of the telescope. A telescope of six feet focal length will show the moon in the photograph taken at the principal focus about seven-tenths of an inch in diameter, and with such an instrument very pretty results may be obtained. It may be thought—Why not get the image direct of a larger diameter? By interposing some kind of lens or eyepiece the image could be made larger, no doubt, but I question the practicability of the plan for various reasons, the principal being the great loss of light and consequent lengthening of the exposure. The objection does not appear to me to be removed, even if the quickest gelatine plates be used; but, of course, there is no reason why anyone who has time and patience should not make the attempt, and I am not aware that anything of the kind has yet been done, excepting that I have used the Barlow lens—not, however, with very good results.

It will be understood that when the exposure is prolonged there must be some mechanical contrivance attached to the telescope so as to follow the moon with the greatest regularity. Any attempt to keep any part of the image of the moom bisected by cross wires in the finder of the telescope by hand will prove ineffectual; therefore I should say it would be waste of time to experiment with any other than equatorially-mounted instruments. These remarks do not apply to the full moon. The light from our satellite on a clear night in the winter months, when she attains her greatest altitude in this latitude, is sufficient to impress her image on a collodion plate in a single second or less; and with a good gelatine plate I have no doubt an almost instantaneous exposure would be sufficient, and that telescopes not provided with a driving clock could be utilised.

As to the process to be employed, that must be left to the decision of the photographer. What is required is a film with as little structure and granulation as possible. My experience, in the ordinary practice of photography, is that gelatine plates are not to be preferred for enlarging purposes, and the few photographs of the moon done on gelatine plates which I have seen confirm me in this opinion. A. Brothers, F.R.A.S.

LENSES, CAMERAS, AND STANDS FOR SMALL WORK.

[A communication to the South London Photographic Society.]

A question often asked is—"What is the best outfit for taking quarter plates?" and, although on matters of detail possibly many may differ, there can be little doubt that, with a camera expanding from two and a-half to eleven or twelve inches, by Meagher or Hare, three or four lenses of various focal lengths, by Ross and Dallmeyer, and a light, firm stand, the most fastidious ought to be satisfied. Of course, a lens might be provided for every inch the camera will expand; but this might be looked upon by many as not only luxurious but unnecessary. As the title of my short paper runs, *Lenses, Cameras, and Stands for Small Work*, we will begin with the lenses.

Now, I must confess that for outdoor work I have a great partiality or two "families" of lenses, viz., the portable symmetrical of Ross, and

the rapid rectilinear of Dallmeyer. I am quite aware of the advantages of what are called "single" lenses, and for some subjects they undoubtedly possess many desirable qualities. The two kinds of lenses I have mentioned have always given me unqualified satisfaction; and, as I do not happen to have much experience with single lenses, I will leave others to speak in their favour if they think I have not given them all the glory they deserve. One little advantage is worth noting: as you all probably know, the first five or six portable symmetricals and the first three rapid rectilinears can be used in the same flange. Many persons, however, object to the *expense* of an outfit such as I have spoken of, and mainly for their benefit I have tried a few experiments. Through the kindness of several manufacturers and friends a variety of apparatus has been placed at my disposal, and I may as well at once show you the results of my labour.

Now I have already mentioned several manufacturers by name, and before I get to the end I may also make some quotations from price lists. This may seem, perhaps, a mild form of advertising; but as I have no possible interest in the sale of the articles I shall allude to I trust you will exonerate me from any bias on this score.

I thought that if I took some pictures with a variety of lenses with the same exposures, the same development, and of the same subject from the same standpoint a good idea might be formed of the capacity of several instruments, some of which many of us only know by name. I originally intended to select some pretty spot worthy of the occasion, but the difficulty of fronts, flanges, and dark slides being very nearly but not quite the same size, proved so annoying, and the time at my disposal so limited, I was obliged to content myself with a view of some houses and gardens from the back of my studio. This may be equally effective, but, of course, there is a little too much of what is often called "Pantile Park" to be picturesque. The pictures I show you were taken by ten lenses, varying in focus from two and a-half to about seven inches. The exposure was one second.

At first I thought I would mount the prints according to value of the lenses, which extends from £4 10s. to 5s., but at last decided to arrange them according to their focal lengths:—No. 1. Ross's stereo. doublet. No. 2. Photographic Artists' Co-Operative Supply Association's true view. No. 3. Ross's No. 1 portable symmetrical. No. 4. Lancaster's wide-angle view lens. No. 5. Dallmeyer's new rapid rectilinear for lantern slides. No. 6. Lancaster's instantaneous lens. No. 7. Lancaster's *merveilleaux.* No. 8. Lancaster's *méritoire.* No. 9. Dallmeyer's 5 by 4 rapid rectilinear. No. 10. Imitation Dallmeyer's rapid rectilinear. I unfortunately used a box of slow plates I have had by me about twelve months, and that have evidently not improved by keeping. The result photographically, therefore, is a long way from what I could wish. At anyrate they will, to a tolerably-fair extent, show the speed and definition, and I think you will agree that, although the best results are of course obtained with the best instruments, still you will see that it is quite possible to get fairly-good pictures with lenses costing only a few shillings. Had time allowed I should have liked to have gone over the ground again with some good plates; but I could not begin until I had obtained all the lenses, and this I was unable to do until Tuesday last. The prints might also have been better if more time had been available.

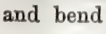
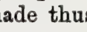
I shall be very pleased to show any of these lenses after the meeting, if any members wish to examine them. Among them I have Dallmeyer's new rapid rectilinear for lantern slides—a very welcome addition.

We will now go to cameras. The best I am acquainted with (although in this form a little heavier than some) has just been made for me by Mr. G. Hare. It has all his recently-introduced improvements, will focus from two and a-half to twelve inches, and is the most perfect camera I ever saw; the workmanship and finish could not certainly be surpassed. I have also here a quarter-plate camera with extending front by Meagher, kindly lent by Mr. Wilson. This camera has many advantages which will at once be apparent to you, and I need scarcely say that, like all Mr. Meagher's work, is of the best quality.

After this—to those "going in" for lantern slide negatives—comes Mr. Smith's new camera for $3\frac{1}{4} \times 3\frac{1}{4}$ plates. It was shown to a few members at our last meeting, but time did not allow of much attention being given to it. It has a long range of focus, a "swing-anyway" back, and, with four double slides, weighs very little indeed.

There are, of course, many others in the market. I am, however, only able to introduce to you three or four by Messrs. Lancaster and Co., of Birmingham; and when we consider the marvellously-low price at which they are advertised the only wonder is that such excellent work can be supplied for the money. These have been on the tables of many societies in London, and many may be already familiar with them; if not, I shall be happy to explain them further after the meeting. The pictures marked 6, 7, and 8 were taken with these instruments.

Whether a quarter-plate camera should or should not have a swing-back may be a question of opinion. To my mind a swing-back is as necessary to a small camera as to a large one. To the uninitiated a swing-back may also prove a drawback. I remember hearing of a gentleman who began with a rigid camera and succeeded pretty well; when he "went in" for a swing-back camera, however, his troubles commenced, and he could not then get one picture sharp out of a dozen. Whether this was the fault of the camera or operator we need not stay to inquire. With many the idea seems to be that swing-backs are like friends—it is no use having them if you do not use them—and this may account for many eccentricities we see in pictures.

To those who wish to use three and a-quarter square plates in quarter-plate cameras I would recommend the following little "dodge." Get a piece of thin zinc and bend it thus:—  This will not only prevent the plate slipping out of the centre but also act as a spring to keep it close to the rabbet. If preferred, it may be made thus:—  or one piece may be bent so as to hold the two plates:—  With this arrangement and a lantern slide mask on the focussing-screen there is no gain in using quarter-plates.

Now with regard to stands I do not very much mind what kind of stand I use, so long as it is rigid and high. Many persons say—"Oh! that's quite tall enough for a small camera!" but that is not my opinion; as a matter of fact the smaller the camera the higher should be the stand. I have a preference for a stand that does not fold; but if you can get a good folding stand it has its advantages. I have only one objection to sliding legs, and that is that they slide very often when you do not want them to do so. Besides the excellent stands belonging to these cameras of Messrs. Lancaster and Co., I have four others, viz., Mr. G. Smith's "brattice," two by Mr. Wilson, and one by Mr. Hussey, Jun.

With regard to the "brattice," I must say it is one of the firmest I ever tried. Mr. Smith says it will bear the weight of any ordinary camera; but perhaps he is not aware that the little parcel I have stood on it weighs fifty-six pounds, namely, an ordinary half hundredweight.

Mr. Wilson's stands I will ask him to explain, as he is better acquainted with their merits than I am. Mr. Hussey's, you will see, is like a theodolite stand. I expected to have been able to have shown you two others designed by one of our members, whom I regret to say died rather suddenly yesterday morning—Mr. Collins, of the Photographic Artists' Co-Operative Supply Association. One of them was very light and effective. It is useless, however, my alluding to them without being able to show them; and I am sure all our members will regret with me the cause which places it out of my power to do this.

Before I finish, I would just say that the easiest way always to remember your camera screw is to attach it by a piece of chain to the tripod. The screws to all my cameras are the same size, and I have one attached to each outdoor stand.

I will not take up your time by saying anything about shutters, as it was not included in my title. I cannot hope to have told many of you anything new; but, if I have only given a useful hint to a few, the paper will have gained the object for which it was written.

I have to thank Messrs. Dallmeyer, Ross, Lancaster, Hare, Hussey, Smith, and Wilson for kindly helping me by lending their apparatus, and will now make room for my friend Mr. Cobb. F. A. Bridge.

NOTES ON PHOTOGRAPHY.

Lecture XXI.—The Carbon Process.*

Mungo Ponton noticed that bichromate of potash spread upon paper and dried turned brown on exposure to light, and did not then dissolve out in water. M. E. Becquerel, a celebrated French chemist, further found that this browning and subsequent insolubility was intimately connected with the sizing of the coated paper. These two facts constitute the foundation of the carbon process. Porous paper is first coated with a mixture such as the following—

Nelson's flake gelatine	4 ounces,
Sugar	½ ounce,
Glycerine	1 to 2 ounces,
Water	1 pint,

with which is thoroughly incorporated some finely-ground pigment of a suitable colour. It is then dried in a warm room and preserved for use. Such paper is known in commerce as "carbon tissue." To sensitise the tissue a solution is made—

Potassium bichromate	1 ounce.
Water	30 to 100 ounces.

The exact strength of this solution is regulated by the weather and the kind of negative used. In hot weather the solution is made weak and in cold weather strong; also, for hard negatives a strong bath is employed, and for soft negatives a weak bath. The tissue is immersed in this for one or two minutes and then again dried. White light can be employed while the sensitised tissue is wet, as it is then very insensitive; but as soon as it begins to get dry white light must be carefully excluded. Very great care is required in drying, the sensitiveness and quality of the tissue greatly depending on this operatien.

In printing, a black edging is given to the negative and a gutta-percha pad employed to keep the tissue dry, and as no image is seen on the exposed print (due to the pigment) an actinometer must be used to judge the right exposure. During exposure the light renders the gelatine insoluble (by oxidising it at the expense of the bichromate), and if the print be then placed in warm water the unoxidised (soluble) gelatine dissolves off, leaving an image, consisting of the insoluble gelatine and its imprisoned pigment, on the paper. By this method of

* Read a *Treatise on Photography*, p. 160.

ocedure, however, the half-tones are not rendered, and for this ason:—In the shadows of the negative the light gets freely through d renders the chromated film underneath insoluble through its whole ickness, while in the lights none gets through and the film remains luble, and on development blacks and whites are produced, as they ould be; but in the half-tones a varying amount of light gets through, d this renders the chromated film insoluble through corresponding grees of its thickness. Thus, the bottom of the film or the portion hich holds it to the paper remains soluble, and on development ssolves, carrying away with it the half-tones.

To remedy this two methods—known respectively as "single" and double" transfer—are employed. In single transfer, paper is coated ith gelatine and chrome alum, and dried so as to obtain an insoluble irface. A piece of this, somewhat larger than the exposed print, is ken, and, together with the print, immersed in cold water until the tter softens or begins to curl. The two are then placed face to face, ken out, and thoroughly squeegeed together. On now placing them water at from 100° to 120° Fahr. the first support of the film can be illed off and the picture developed from the back, leaving the half-ones intact. The picture is then placed in alum for a short time, ashed, and dried. If a picture on opal glass be required the print is ueegeed and developed directly upon it. The objection to this method that a reversed negative is required.

In the double transfer method the print is squeegeed and developed a temporary support, either rigid or flexible, and when dry a piece transfer paper as before, but smaller, is squeegeed to the back, llowed to dry, and the picture stripped off.

The important fact was noticed by Captain Abney that, after exosure, the change which had been produced by light was continued in e dark, so that pictures can be partly printed in the light and allowed remain in the dark for a few hours, when, on development, they will e the same as if they were fully exposed.

Woodbury Process.

In this process a thick film of gelatine and bichromate of potash is repared on one of collodion, and exposed behind a negative, collodion de next the negative; to prevent blurring parallel rays of light are mployed. On development in warm water an image in considerable elief is obtained. This, when dry, is placed on a perfectly-flat metal late, another plate of pure lead placed on the top, and by means of hydraulic press the whole subjected to a pressure of about fifty tons. he metal relief thus procured is placed in a frame, a mixture of gelaine and pigment poured over it, and a sheet of paper of even texture laced on the top. A hinged slab of perfectly-plane glass is then rought down on it and the excess of fluid squeezed out. When the elatine has set the glass is raised, and, the paper bearing the picture aken out, it is finally immersed in alum, washed, and dried.

E. H. Farmer.

PHOTOGRAPHY OF THE VOCAL ORGANS IN THE ACT OF SINGING.

[A communication to the Photographic Society of Great Britain.]

Before commencing my paper I must apologise for leaving the Society in the lurch at the last ordinary meeting. Being unavoidably obliged to postpone my paper at the eleventh hour I have, at the wish of the Secretary, been allowed to bring it forward tonight.

My paper will, no doubt, to many seem rather superfluous after the clear and concise lecture on the same subject given by Mr. Wood, last Friday, before the South London Photographic Society; and, had not my promise been given, I would not have presumed to bring the same subject before your notice this evening.

I may mention that my paper will, practically speaking, be a description of some experiments carried on lately at the laboratory of the Society of Arts by five gentlemen—Herr Emil Behnke, Dr. Lennox Browne, Mr. H. T. Wood, Mr. J. J. Acworth, and myself.

Laryngeal photography is by no means of recent date. As far back as 1860 attempts were made by Professor Johan Czermak, of Prague, and his results laid before the Academy of Sciences in Vienna. I had no opportunity, however, of seeing what he had done until last Wednesday, when I came across a collotype print from one of his negatives in Dr. Stein's work on *Light* (kindly lent to me by Mr. Leon Warnerke). I have made a transparency from this print, which I will presently place in the lantern. I must say that, considering the advantages of gelatine plates were *non est* at the time Professor Czermak made his experiments, his results were very good indeed. The description of his apparatus shows that he thoroughly understood the difficulties he had to encounter. It is a pity that we did not see Dr. Stein's book before, as we should have saved ourselves the trouble of inventing a great deal of the apparatus we have had to use. I consider, in fact, that Professor Czermak has knocked a few feathers out of our caps as far as originality is concerned, and, therefore, we are simply improvers on his work.

Before describing the apparatus we have used it will be as well to explain what is required to be photographed, so as to make easy the comprehension of the requirements and difficulties in photographing the vocal organs. I will, therefore, call on Herr Emil Behnke to explain the representation of a section of the human head now thrown on the screen.

[At this point a representation of a section of the human head was thrown upon the screen and explained by Herr Behnke. He said:—"This is a section of the human head. The mouth, nose, and tongue I need not point out; but this, a section of the soft palate, I wish to draw particular attention to, as it occupies an important position. We have been able to take photographs of this, I think, for the first time. The soft palate plays a more important part in the production and modification of tones than most people imagine; and we have been able to secure photographs of this soft palate in different positions, in order to illustrate a new book about to be published. Had we illustrated the book by drawings people would have doubted their truth; but with photographs there is an end to all cavil, and with photographs we silence all objections. To photograph the soft palate is a very simple matter, because all one has to do is to open the mouth wide enough, keep the tongue under control, and have the light sufficiently strong. But when you come to photograph the vocal cords considerable difficulty presents itself. In this diagram you can only see one half—the right; the left is cut away. In photographing these cords the operator or the person operated upon has to hold a little mirror at the back of his mouth. That mirror receives the light from this direction, and then it has to be reflected all this way upon the vocal ligaments. The tongue, therefore, is an obstacle to securing a view of the lid of the epiglottis, or voice-box, and to overcome this obstacle is very difficult. In the first place, a man must be accustomed to the touch of the mirror, or it will make him retch. He must be able to place his tongue perfectly flat, and have control over the voice-box to send out the tone. The light reflected from the mirror is thrown upon the vocal ligaments, the image of which is in turn received upon the mirror, and thence into the camera placed in the proper position. It is a common objection to laryngoscopy that, whenever the vocal cords are shown by means of the laryngoscope, the tongue is not seen in a natural position, but has to be seized by the fingers and held. Thus, the medical man has often to hold the tongue by means of a napkin in order to use the laryngoscope; but that does not apply to a man like myself, who is able to show all parts of the vocal organs in a natural position. In my case I hold my tongue absolutely in its place. Not only is it kept quite quiet but is absolutely flat, and thus all distortion in the photograph is avoided. This fact will be plainly demonstrated in all the photographs which you will see this evening on the screen."]

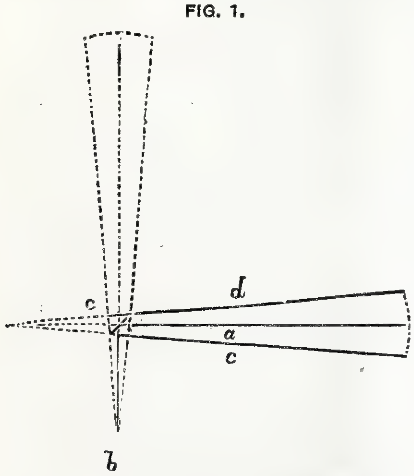
At our first meeting Herr Behnke gave us to understand that he was desirous of obtaining photographs of the vocal organs of two kinds, viz., those showing the position of the soft palate when singing notes of different pitch, and tones vocal and nasal; next, photographs showing the larynx. In this case a small mirror has to be placed at the back of the mouth, as Herr Behnke has just explained. I need scarcely say that photographs showing the larynx present far greater difficulty than those merely showing the various positions of the soft palate, which simply require the interior of the mouth to be carefully illuminated in order to succeed. I may mention that at our first experiments we simply used two large, round flasks, filled with a solution of alum, to absorb heat, and then used them as condensers for two electric lights, in this way throwing two cones of light into Herr Behnke's mouth. This method, though fairly successful, was abandoned for the method we now use, and which I will presently explain. When we come to photographing the larynx we are under very different conditions than when photographing the soft palate. Merely illuminating the mouth does not necessarily illuminate the larynx, even though a mirror be placed at the back of the mouth. Now, if we think for a moment of the part which the little mirror has to play, it is easy to understand this.

The little mirror has not only to bring the hidden parts into view, but to illuminate them as well. I need not tell anyone here that light, under ordinary circumstances, travels in straight lines. It follows, therefore, from this fact, that the axis of illumination must be practically the same as that of observation; or, to put it more plainly, we must illuminate and observe in the same line. I might put the point more plainly still, and I hope I shall be forgiven for mentioning so simple a matter, but there may be some of our visitors who are not scientific. Two or more persons may be looking at the same time at a small piece of glass in the sunshine, and only one person receive the dazzling rays in his eyes; the others do not perceive the rays, though they see the glass, because they are not in the angle of reflection. Similarly, the little mirror at the back of the mouth must be arranged so as to reflect the light on to the larynx. Now, as the mirror is in a certain position, and the angles of incidence and reflection the same, it is clear that the reflection back of the illuminated larynx to the observer must be in the same line as that of illumination. Now, were I not to qualify this statement somewhat, I am afraid that any users of the laryngoscope present this evening would tell me that I was wrong. They would say that they do not always by any means make the axis of illumination and observation the same. I will, therefore, presently endeavour to explain how far deviation from the above statement may be practicable. Hitherto I have supposed that we have taken a point to be photographed—that the little mirror at the back of the throat is a mere point, and that we are dealing with a single ray of light (if it be possible to conceive one). Mere theory of broad principle need not trouble itself about practical difficulties. Of course it would be practically impossible to see or photograph any part of the larynx under the conditions I have just mentioned. We should either have to

look through the source of light, or the light would have to go through our heads. Mere theory of principle would not take into consideration that any person's head would be *too thick* for the ray of light to pass through it; that is, of course, the fault of practice, and practice necessitates new conditions and also new theories. The most perfect instrument (optically considered) for seeing the larynx is the ordinary laryngoscope as used by surgeons [*slide shown*]. In this case the axis of illumination is practically the same as that of observation. The rays of light are received in the concave mirror and thrown in a focus on to the little mirror at the back of the mouth, which is adjusted in position until the larynx is seen by the observer through the small hole in the centre of the concave mirror. The conditions here are very perfect indeed, as, when the larynx is well illuminated by the little mirror, it is in the best position for showing the image of the larynx to the observer. When we come to photographing the larynx, instead of simply looking at it, the conditions under which we have to work are materially altered. In the first place, the camera cannot adjust the little mirror; it must, therefore, be adjusted by the person whose larynx is being photographed, for the simple reason that the camera now takes the place of the observer in the former case. The person operated on cannot see to adjust the little mirror by looking into the illuminating mirror, even though it have a flat surface and not concave, because it cannot make the necessary angle with his eye; he must, therefore, have a separate mirror. It is here, then, that a deviation takes place between the axis of illumination and of observation.

Here we see [*slide shown and described*] how an arrangement is effected so as to permit the person operated on to hold the little mirror himself; and it is clear that some modification of this arrangement must be used when photography is employed. It will be seen that there is considerable difference between the line made by the mirror, in which the person operated on sees himself, and the lines made by the point of observation and the direction of illumination. Now, the effect of this deviation is as follows:—Let the line a (*fig.* 1) show the axis of illumination, the point b a part of the larynx, c the mirror in the mouth; then the effect of moving the camera or point of observation to the right or left of the line a is to displace the appearance of the part we wish to see or photograph from its proper place on the mirror c. If we go on moving the point of observation, we soon get to a position where the part of the larynx disappears at the edge of the mirror. The limit of the angle of movement depends on the size of the mirror and its distance from the larynx. In the slide before you (*fig.* 1) I have shown the limit of angular movement relatively to the size shown of the mirror. It is assumed that a point in the larynx is reflected from the centre of the mirror when observed along the line; at the lines d and c the point in question would just disappear off the edge of the mirror.

FIG. 1.



Now, as in practice we do not deal with a point, but with a considerable surface, it is clearly obvious, without any further explanation, that the limit of angular movement is in practice very much less than shown in *fig.* 1. JAMES CADETT.

(*To be concluded in our next.*)

BALLOON PHOTOGRAPHY.

[A communication to the South London Photographic Society.]

HUMAN nature is a curious compound, and the very widely-different opinion with regard to it which exists between different people proves the fact, some seeming to make it the business of their life to decry it and discount at the lowest possible rate, whilst others can hardly realise the possibility of its being capable of committing a wrong.

It is sometimes difficult to arrive at a satisfactory conclusion, even by the most complete system of analysis, as to what may be the precise motive which actuates a person to engage in a more than ordinarily perilous undertaking, involving danger to life and limb, with the view of attaining a certain object. It is, I imagine, quite within the bounds of possibility that the motive power may be an inherent love of adventure, having no ulterior motive in view whatever, or it may be an acquired love of notoriety, with an incessant craving to be an object of public attention; but we must in all charity believe that in some cases at least it is a laudable desire to achieve the objects aimed at in order that a certain section of the community or humanity generally may be benefited thereby. Now, as I do not intend to submit myself to a rigid cross-examination as to why I essayed another aërial voyage on Easter Monday, I will ask you to be charitable enough—just for the present at least—to believe that it was in the interest of science generally and photography in particular; and with this comfortable feeling between us being established I will at once proceed to give you a brief outline of what took place on that occasion.

Now, I must ask you to banish the idea from your minds that this is to be a paper for instruction. Indeed, the subject hardly admits of that; if it is to be anything at all it must be amusing rather than instructive. Brighton is, perhaps, one of the last places in the world which I should choose where to spend a happy day, and it certainly was not rendered any more attractive (to me at least) by the teeming multitudes by which it was thronged on Easter Monday; but, having some time previously accepted an invitation from Mr. A. L. Henderson, who, conjointly with the *Illustrated London News* Company, had chartered a balloon for the special occasion, thither I went on the Friday previous in company with that gentleman, each of us having provided himself with a small camera and some very carefully-prepared extra rapid leucino-bromo-iodo-ammonio-gelatine plates, with the view of obtaining, if possible, some balloonatic photographs, from whatever height it might please the wind, the aëronaut, and the ropes to allow us to ascend; for it was to be a captive ascent.

I will not attempt to bore you with a recital of the numerous incidents which the soon-to-be-besieged town, with its many thousands of visitors, many of whom, although clothed in uniforms of artistic merit, bore unmistakable signs of their busticity, presented to view. All that has been graphically described and now belongs to the limbo of the past. Considering the enormous influx of visitors we were fortunate in being very composably, although sparingly, accommodated at a boarding-house in the most fashionable part of the town. I say "sparingly," inasmuch as we had to content ourselves with a double-bedded room between us. The aëronaut, Mr. Simmons, also occupied an apartment in the same house and in immediate proximity to our own; and as volunteering was, of course, to be the order of the day, we volunteered to render him what assistance we could during the inflation of the balloon. This was accepted with—"Good-night! Six o'clock in the morning, sharp, mind!" So we retired to rest. Sleep, however, fled from mine eyes, for the wind, always to me a disturbing element, blew with increasing violence until the small hours of the morning, and rocked my imaginings with such realistic forms as to produce in my mind anything but soothing effects.

I fancied myself just about to ascend in a balloon with the elements assuming a most threatening attitude. He who was to be my companion, besides being ponderous in proportion was excitable in temperament, and oftentimes intoxicated with his own ardent love of experiment; and the knife which I knew he carried with him would, I felt sure, in a case of emergency be put into immediate requisition by cutting away this or that rope, or making a hole in the side of the car, with the idea of changing the course of the inflated monster, which might prove the vehicle for our destruction. Shall I run the risk of humiliation and back out? Although conscious of these thoughts passing through my mind it must have been that nature had so far given way as to be gently letting me glide away into dreamland, but I was suddenly brought back to full consciousness by a bouncing noise on the floor of the room. My companion I knew had been sleeping, for I had had an unmistakable evidence of the fact, but I also felt that some disturbing influence was at work, and that his slumbers were not peaceful. It was he who had suddenly sprang out of bed, and, to quote Artemus Ward, "he lit a light," and whilst feeling for something in his pocket he turned his eyes towards me. He thought I slept, but I saw enough to convince me that something was troubling him. He then took a chair, sat himself down by the washing table, and commenced rapidly writing away upon the marble top, and audibly muttering—"Hundreds of thousands; all bosh!" I then said—"Mr. H." "Oh! Cobb," he replied, "I thought you were asleep; I wanted some writing paper. However, this'll do." "What on earth's the matter?" said I. "Oh!" he replied, "I was bothered in my sleep about what So-and-so told us today. Let me see, 800,000 negatives in twenty years makes over a hundred a day. Now what do you think of it? The photographers of Brighton should be millionaires at that rate. Ha! ha! I'm satisfied; I shall sleep now."

Six o'clock in the morning brought Mr. Simmons with a rat-a-tat-tat at our door, with the remark—"Henderson, you and Cobb need not come to the gas works, I think, till nine o'clock; it's snowing hard, and a bitter cold morning. A poor look-out for a balloon ascent. Let's hope it will change soon." Now, I assure you there never was in this world a more genuine volunteer than was I at that moment, for I volunteered (mentally, of course) the most hearty approval and earnest thanks for this very agreeable change in the programme. At nine o'clock there were signs of an improvement in the state of the weather, and the operation of inflating forthwith commenced. Mr. Simmons had been fortunate to secure the co-operation of the Royal Naval Brigade, under the command of Captain Fry, of the well-known firm of photographers at Brighton, and to whom I had the pleasure of being introduced. Punctual to the moments previously arranged they appeared, and this gave the scene a very animated and, I may also say,

nportant aspect. And one could not but remark how complete was ie discipline, and yet what thorough good feeling existed between ommander and those under his charge. The work of inflating had now een going on some three or four hours, during which time the sun had hrown aside the leaden-looking focus which had concealed his face, and ow smiled approvingly on. Orders were given to attach the car, a hotograph was taken by Mr. Spinks, a photographer at Brighton, and ll is ready for the start. The first thing to be done is for the balloon o be conducted "over the garden wall," or rather the gas-yard wall, his being skilfully done by the Royal Naval Brigade. Here a little ncident occurred of a rather ludicrous nature. During the adjustment f the ballast by Mr. Simmons's assistant, who was being towed along n the car for that purpose, the balloon, as if conscious of the diversion t caused to its followers, performed several rapid ups and downs, just umping the ground, and then darting up again with the swiftness of n eagle. During one of these descents a rustic, who presumably was iot watching it at the moment, was suddenly pounced upon with suffiient force to knock his hat over his eyes, and himself laid sprawling ipon the ground. Fortunately he was not hurt; but the effect was lroll in the extreme to see him striving to release his head from the ight grasp of his now battered best holiday hat, and muttering sundry mprecations upon that "darned thing of a balloon."

After a brisk walk across the Downs for about half-a-mile, the balloon being still in the custody of the Blue Jackets, a halt was called, and we—that is, Mr. Henderson and I—prepared to make the first ascent; but the wind, which had been steadily rising during the last hour, was evidently causing Mr. Simmons some anxiety, whose sympathies were doubtless divided between the safety of his balloon and its occupants. However, amidst the cheers of the crowd which had gradually collected we took our—no, not seats—places in the car, which seemed to me little more than double the size of a baker's basket, and in that, besides ourselves, had to be stowed away ten bags of ballast. I will not say it was through selfishness, or that it could have been otherwise arranged, but my companion certainly had the lion's share of the accommodation, and I am almost afraid that the wish took possession of me that he had had it all.

Before we had time to arrange our cameras we had reached the length of tether, then immediately began a very rapid descent, and before the order to heave out ballast could be executed we had bumped, but fortunately not a hard one, or I might possibly, beneath the Jumboric weight of Mr. Henderson, been made to represent the now fashionable colour of ladies' attire—crushed strawberries. During the next quarter of an hour our plates were all shot off.

I think it will be admitted that, although the results we obtained may lack pictorial interest, they are nevertheless far in advance of anything which has been previously done from a balloon, and are quite sufficient proof in themselves that, under anything like favourable circumstances, balloon photography is not only practicable but comparatively easy. It is, moreover, a settled conviction in my own mind that, notwithstanding gyration, it is far more easy to photograph from a free balloon than from one which is captive. The pitching and tossing of the car in which we conducted our manipulations on Easter Monday will not soon be forgotten by us, and I, for one, have fully made up my mind never again to attempt them under similar circumstances.

It was in one respect a source of regret that we expended our force so rapidly, as, contrary to our expectations and certainly against our inclinations, we were compelled to remain aloft much longer than we anticipated, in consequence of our signals not being understood below. Being several miles distant from where the forces were concentrated every ten minutes' sailing in that direction made more desirable sport for our guns, but having no ammunition left we had nothing to do but reconnoitre.

Now, I cannot help thinking that if ever aërial navigation is to become of any practical value it must be in connection with photography; and, although until some system shall have been discovered which shall render the course and speed of the balloon amenable to the skill of the aëronaut, it must of necessity be attended with more than ordinary danger. And even then, probably, the danger will not be averted; for I hold it to be a well-substantiated fact that the higher we rise in the scale of civilisation and the more we add to our scientific resources the greater and more numerous are the dangers with which we surround ourselves. After all, it is a gratifying fact that in whatever direction science advances the value of photography asserts itself. And it may be truly said that—

"Undaunted by the districasies of Nature's laws,
It solves the subtle mysteries of effects and cause.
In every phase of science it registers its part,
And tutors well the genius in the high domains of art.
It traverses the hidden paths of boundless space,
And holds the planetary system in its own embrace;
Brings the invisible to light, and gives the lie
To falsity of teachings and perverted theory.
No limner's pencil, though with mystic sympathies arrayed,
Which flashing inspiration summons to its aid,
Can prove so much, or such unerring truths supply,
As this noble and ennobling art—photography."

W. Cobb.

Our Editorial Table.

New Lenses. By E. Suter, Basle.

The advent of a new optician, or the appearance in the market of a new lens, is an event of sufficiently rare occurrence to render it of more than merely passing interest to photographers. Some few months ago, in one of his letters from Paris, Professor Stebbing spoke in favourable terms of the aplanatic lenses of Mr. Suter, of Basle—a name until then practically unknown in this country. Since then we have had an opportunity of carefully and thoroughly testing several of the lenses, and have found them in every respect to answer the expectations we had been led to entertain regarding them.

Mr. Suter's speciality is the "aplanatic," of which there are two classes, A and B, outwardly similar in form but differing materially in properties. They are of the ordinary Steinheil type, consisting of two similar lenses with the stop placed midway between them, the correction being performed, as the name implies, with the special object of securing flatness of field with a large aperture. The first is specially adapted to the production of portraits and groups, particularly the latter, for which purpose it forms a most valuable addition to our stock of lenses; and, working as it does with full aperture, it possesses a remarkable degree of rapidity—short, of course, of that of the specially-constructed portrait lens. The No. 1 of this series, to which we paid special attention, is about $6\frac{3}{4}$ inches equivalent focus and $1\frac{3}{8}$ inches in diameter, its full working aperture being a trifle less. With the full aperture it covers readily a 5×4 plate with very even definition, and when stopped down its powers extend to 8×5. Used with full aperture it forms a remarkably good portrait lens, its degree of rapidity being about equal to No. 2 of the standard of the Photographic Society of Great Britain.

The B aplanatic is intended for groups, landscapes, architecture, and instantaneous work—indeed, for any of the multifarious requirements of the outdoor worker. This lens is almost identical in appearance with the one already described, though upon closer examination its diameter and working aperture are found to be smaller. The lens we tried in this class was the No. 4, which is $10\frac{1}{4}$ inches equivalent focus and $1\frac{3}{8}$ inch in diameter, its largest working aperture being as nearly as possible $\frac{f}{7}$. From this it will be seen that, for landscape work, it possesses extraordinary rapidity, and when employed without diaphragms the instrument we mention covers a plate $8\frac{1}{2} \times 6\frac{1}{2}$ with an evenness and quality of definition that are surprising with such an angular aperture. When employed with a smaller stop the same lens covers a 10×8 plate, or probably even a larger. For artists' studies, sketches of life, and instantaneous work generally we anticipate that this lens will be highly appreciated.

In addition to the two aplanatics, Mr. Suter also constructs portrait and landscape lenses of the ordinary forms. The rapid portrait lens is a fine instrument—not so rapid as the lenses of the so-called "baby" type, but giving good definition over a large area. The ordinary portrait lens is so arranged that the front combination may be used for landscape work by screwing it into the place of the back. The agent for this country is Mr. J. R. Gotz, of 19, Buckingham-street, Strand, whose advertisement will be found in another page.

ALLEGED INFRINGEMENT OF COPYRIGHTS.

Court of Queen's Bench, *May* 8, 1883.

Nottage and Another *versus* J. H. Jackson. Before Mr. Justice Field.

This action, brought by the above-named plaintiffs, trading as the London Stereoscopic Company, of Regent-street and Cheapside, was tried on the above date. Counsel for plaintiffs: Mr. Petheram, Q.C., and another; for defendant: Mr. Crump.

The action was brought to recover penalties for copies alleged to be pirated from the original photographs produced by the plaintiffs of the Australian Cricketers and a photograph of Lord Derby, of which the plaintiffs claimed to be the owners and proprietors.

Mr. W. Sandys, examined by Mr. Petheram, said: I am manager of the printing works of the London Stereoscopic Company at New Barnet. The copy of the Australian Cricketers produced and marked No. 1 is a silver print and was first made June 27th, 1882; the one marked No. 2 is a Woodbury print from the same, and was made July 3rd, 1882, and has the names of the Cricketers on it. The silver print has "London Stereoscopic Company, &c., copyright," on it. I cannot say when the names of the Cricketers were put on, but it was after July 3rd. The Woodbury print was not published until the 24th or 25th of August. Some of the silver prints were issued without the names and some with them. The silver prints were issued to the trade about July 11th. The copy marked "D" produced is a copy

issued by the defendant, and is copied from the Woodburytype—one made by the company. The detail is more perfect in the Woodbury than in the silver print and is sharper. The Woodbury is a copy of the silver print taken from the mounted silver one.

Cross-examined by Mr. Crump: The negative was taken by Mr. Reynolds, one of the Stereoscopic Company's operators.

Re-examined by Mr. Petheram: The photograph of Lord Derby produced was taken by the Stereoscopic Company. The copy produced is from the Stereoscopic Company's print. The negative was taken May 4th, 1878, and was issued to the trade within a week.

Cross-examined by Mr. Crump: Copies were made in three or four days after the negative was produced.

Mr. Cox, manager of the Regent-street branch of the Stereoscopic Company, said:—In June, 1882, I called on Mr. Murdoch, one of the Australian Cricketers, and made arrangements for the team to sit. They sat to us at the Oval. The negative was taken on the 24th June. They were issued as silver prints in about a week. The names of the Cricketers were not on the first issue; those with the names were issued about a fortnight later. The negatives were taken by the *employés* of the firm. The photograph of Lord Derby is the one taken by the Company in Regent-street. I spoke to his Lordship when he called, and he was sent up to the studio. The photograph produced is the one taken on the occasion. Neither Lord Derby or the Cricketers paid anything for sitting. The prices retail of Lord Derby's portrait were—cabinet, 2s.; *carte-de-visite*, 1s. Of the Australian Cricketers the cabinets were 1s.

Lord Justice Field here remarked that statesmen were of more marketable value than cricketers.

Cross-examined by Mr. Crump: The negative was taken by Mr. Reynolds. I was to give them copies, but no money payment whatever. It was well understood they were for publication by us.

Mr. Walter Woodbury, examined by Mr. Petheram: I am the inventor of the Woodburytype process. The photograph No. 2 is a Woodburytype, and the pirated copy is a copy of the Woodburytype print.

Mr. Hanning: I am manager for Messrs. Brown, Barnes, and Bell, of Leeds. I know Mr. Jackson's works at Leeds. On the 6th November I went to his house. I saw Mr. Jackson's brother, and also saw negatives, prints, &c., in the office. I saw four or five young ladies making up packages of photographs. I asked Mr. Jackson for an estimate for making copies of photographs, which, he said, if they were not copyright, he would give. I produced a negative of the Archbishop of Canterbury and asked if I could have copies, and he replied "certainly," and gave me a memorandum of prices. I asked for specimens, and he showed me specimens of the portraits of Lord Derby, Cricketers, &c. He offered to sell me any quantity I wished. He gave me a list, and I called a second time and asked for a reduction of the previous estimate. While I was in the room I took an impression of an india-rubber stamp. Looking round I thought I saw a copy of one of our own publications. Mr. Jackson then showed me samples of the Cricketers, and said I could have one as a specimen.

Cross-examined by Mr. Crump: I went to Mr. Johnson Jackson by order of my employer. I was not told that any proceedings were in contemplation by the Stereoscopic Company. I had seen the photographs, and was told by my employers to go and find them out, with a view to assist in stopping these piracies.

The learned Counsel here remarked that he treated every photographer as a pirate. [We may be pardoned if we enter a protest against this remark of the learned Counsel. That there are pirates and black sheep in every profession there is no question of doubt, and we cannot give a better instance than the previous case decided by Lord Justice Field, who told the Counsel in the most emphatic terms that he was a party to the dishonourable transaction which he defended. We may, however, take these remarks as the expression of opinion of Counsel—opinions often costing the receivers large sums, and often of little value or great as the client finds it.]

Mr. Green, Leeds, examined by Mr. Petheram: I went in October to Mr. Jackson's, of Leeds. I was shown a list of photographs and I purchased a quantity—about £2 worth, the cost of each being 1d. I bought six copies of the Australian Cricketers, and produce the receipt for the whole.

Mr. Crump, for the defence, contended—1. That the plaintiffs were not the authors. 2. That the registration was defective. 3. That according to the evidence plaintiffs had given consideration; that there was no evidence of any copies being printed by the defendant, or that he ever sold any copies knowing them to be copyright. 4. That no proof has been traced that he had ever in his possession a copy with the words "London Stereoscopic Company. Copyright."

Frederick Jackson, examined by Mr. Petheram: I am sixteen years of age, and reside in the same house as my brother. I sell and pack up photographs. I have seen the photographs of the Cricketers at my brother's. We bought them from a firm in Germany—H. Samuel, Berlin. The principal business we do is in "private" copies. We have had portraits copied. The copy of the Cricketers he purchased in Leeds and sent it to Berlin to be copied, and the ones sold were the ones copied in Berlin. If we get a portrait marked "copyright" we send it to Berlin. The portrait of Lord Derby we purchased from Erdmann and Schanz, of London. We have had them for some years. We deal in photographs issued by other houses and by the Stereoscopic Company; but I never saw the copy of Lord Derby except on cigar boxes. We have sent glass pictures to be copied to Mr. Percy, of London, and some years ago to Messrs. Millen Brothers, of London. Mr. Green ordered some copies of the Cricketers and sent a small boy for them. [Much amusement was caused by this witness of sixteen saying the "small boy," in which the learned judge heartily joined.] I said the negative was destroyed or broken. We gave up the sale of the Cricketers as soon as there was a doubt of copyright and destroyed the copies we had in stock. We send the prints to Berlin to be copied.

Mr. J. H. Jackson, the defendant, examined by Mr. Petteram: I have dealt in pictures. The list produced is the one we sold from. We buy from Samuel, of Berlin, and Erdmann and Schanz, of London. We have at times bought mounted photographs and sent them to Berlin to be copied. I believe my brother purchased the copy of the Cricketers at Watson's, of Leeds.

Lord Justice Field did not consider there was any guilty knowledge of fraud. He admitted he did make or cause to be made a copy, and that there was sufficient evidence of the same.

Mr. Crump, for the defendant, contended that the Stereoscopic Company could be the authors of the photograph, but that the real author was Mr. Reynolds, who took the negative; also, that they had not kept the requirements of the Act in stating the place of abode, and that the residence of each was necessary—not the address of a firm.

Lord Justice Field considered it was not necessary to put place of abode, but that place of business is considered to all intents and purposes as a place of abode, and that it is quite sufficient. It would be straining the Act of Parliament to a greater extent than contemplated to put any other construction on it. As to the authorship as contended by Counsel, he considered it absurd to suppose such to be the case. The infringement on the Cricketers he considered proved—not that of Lord Derby.

Mr. Petheram, for the plaintiffs, then claimed £10 each penalty for the copies proved of the Cricketers, and stated that the next action to follow was of a similar character, viz.:—Elliott and Fry *versus* J. H. Jackson, and as to whether it should go on for hearing. It was decided that Counsel should consult together on both sides and try if possible to arrange terms. In the meantime the action to stand over as part heard.

[We are indebted to the courtesy of our correspondent, Mr. H. N. King, for this report].

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 17	London and Provincial	Mason's Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE ordinary monthly meeting of this Society was held at 5A, Pall Mall East, on Tuesday evening, the 8th instant,—Captain Abney, F.R.S., Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. B. H. Buckstone was elected a member of the Society.

The CHAIRMAN read a telegram received from Mr. James Glaisher, F.R.S., the President of the Society, regretting his inability to be present at the meeting through indisposition. He (the Chairman) expressed his conviction that all the members would share the regret which he himself felt at the President's absence, remarking that it was the first time during nearly four years that Mr. Glaisher had not been with them.

Mr. J. R. SAWYER then read a paper, entitled *Photography in Relation to Colour*, in which he commenced by saying he was not sanguine enough to imagine there was much which was new in his paper to an audience so thoroughly well up in all branches of photographic art as were his hearers, and that the novelty would arise more from the point of view from which he regarded his subject. The position of photography, he said, was a little difficult to define, being allied on the one hand to science and on the other to art, and on analysing its operations it was found that anyone could scarcely take high rank as a photographer without possessing artistic faculty and the knowledge requisite to see the operations by which a photographer works. His object was to bring before their notice the weak points in the reproduction by photography of the ordinary colours seen and used in everyday life, with a view to discovering that kind of chemical sensitive surface which will give in monotone the same results of power, depth, and brilliancy they present to the naked eye. Probably, he said, it is generally supposed that it will never be possible to photograph in colours; but the question arose—Could they present in monotone the effect of coloured surfaces in the same manner as they appear to the naked eye? He (Mr. Sawyer) then exhibited a screen of colour bands imposed upon black velvet and arranged upon a convex surface in the same order as they appear in the solar spectrum, which he had photographed in such a manner as to give the relative value of each colour in light and shade, and he distributed amongst the members copies of a photographic chart by the collotype process, illustrating the results of his experiments with wet collodion and gelatine plates respectively. One point on which he sought information was as to the relative sensibility of iodide and bromide with respect to colour. From the results of his experiments he was of opinion that no modification of the collodion process would give the brilliancy and softness of a gelatine plate. Mr. Sawyer then called attention to a difficult colour subject which he had been working upon—an oleograph representing the interior of a village school—and which he had chosen for its very unlikely capabilities for photographic rendering. This he had photographed with collodion wet plates and also with gelatine dry plates—the former with thirty minutes' exposure and the latter ninety seconds'. He handed round for inspection the negatives, calling attention to the absolute invisibility of the deeper portions in the collodion negative, while quite apparent in the gelatine one; also to the fact that in the collodion plate the black-board came out lighter than the schoolmaster's coat of light green, whilst in the gelatine plate the proper gradations were observed. He remarked that there was much more softness in the dry plate, and there could be no doubt that gelatine plates provide the best means of photographing colours. Mr. Sawyer concluded by expressing his conviction that a discussion of the subject amongst the members would be a valuable contribution to the proceedings of the Society.

Mr. LEON WARNERKE thought Mr. Sawyer's paper was an exceedingly valuable one. One point which would be patent to everyone was that the colours were arranged semicircularly, giving the screen the appearance of

cylinder, and in the gelatine plate they would notice that the line forming he cylinder was unbroken. It would also be observed that there were wo salts used—iodide and bromide. About seven or eight years ago he had made some very careful experiments with regard to the action of lifferent bromides on gelatine emulsion, and had been struck by the influence of different salts in the representation of colour. He had found that different bromides used in exactly the same proportion produced marked differences, and the non-actinic yellow, orange, &c., were best represented by using sodium bromide, which he had found to be the most sensitive with these non-actinic colours.

Mr. W. Bedford thought it was necessary to bear in mind which gave the best gradations—wet or dry plates. In examining Mr. Sawyer's chart he noticed there was a much better gradation of shades in the dry plates, but the gradation of lights was better in the wet plates. What was required, he thought, was a combination of the two, and he believed this would serve to explain some of the different results produced on dry plates in photographing landscapes, in which it was most important to get gradations of lights as well as shades.

Mr. W. E. Debenham held that the colour gradations of iodide and bromide of silver had been very much exaggerated. He thought the gradation of tone in the different examples with respect to each individual colour was not the same. This might be caused by the negative itself being exposed under brighter conditions of light in one case than in the other, thus giving greater rotundity of cylinder.

Mr. Payne Jennings thought everyone would admit, looking at the colours as a whole, that the gelatine plate only had the advantage in point of rapidity, and that the wet collodion plate gave decidedly finer results.

The Chairman drew attention to the pale yellow colour in the screen, which gave a blacker band in the chart in nearly every case than the orange, which, he remarked, came out lighter than might be expected, the reason of which he thought was that it was a dye which is fluorescent, and these rays made the colour photographable, which otherwise it would not be. The same observation would apply to the scarlet. With regard to what Mr. Warnerke had said about the different bromides, he (the Chairman) thought the great distinction between them lay in the fact as to whether the bromide was formed from a monatomic or a diatomic metal. Concerning gradation in the high lights, he was of opinion that with gelatine plates a very great range of gradations were to be got which were not obtainable with wet plates.

Mr. V. Blanchard suggested that, in making further experiments, Mr. Sawyer should try the wonderfully-strong baths used by the Americans, and thought he would find a difference in the scale of gradations.

Mr. Sawyer (in response to an invitation from the Chairman to offer some remarks on the discussion which had taken place), said that with regard to bromide of sodium, as mentioned by Mr. Warnerke, he had not tried it, but should have much pleasure in doing so. He was certainly astonished at the behaviour of ammonium iodide, and thought he would yet be able to demonstrate that it will produce as good an effect as a wet plate with any combination whatever. He thanked the meeting for the patience with which they had listened to his paper, and hoped the subject would be taken up.

The Chairman called for a vote of thanks to Mr. Sawyer, which was carried with acclamation.

It was announced that the Society's exhibition of pictures would open with a *soirée* on Saturday, October 6th, further details of which would be announced next month. Also, that the next technical meeting will take place on the 22nd instant.

The meeting was then adjourned till Tuesday, 12th June.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The ordinary monthly meeting of this Society was held at the House of the Society of Arts, John-street, Adelphi, W.C., on Thursday evening, the 3rd instant,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. John H. Knight was elected a member of the Society.

The Chairman announced that for the artistic competition this month only three examples had again been sent in, all of which were in competition for the "landscape" subject, "A Shady Nook," no one having attempted the "figure" competition of "Dignity and Impudence."

The members then adjudged the relative merits of these three pictures in the usual way, and Mr. E. Dunmore was announced as the successful competitor for the month. The subjects for the present month's competition were then balloted for, with the following results:—Landscape, "An Open View, with Good Clouds;" and figure, "Cattle."

The Chairman said it had been suggested that members should bear in mind, when proposing subjects for each month's competition, the appropriateness of the season to the subject proposed, and cited, as an illustration of the unsuitability of some of the proposals drawn from the hat, an instance in one of the early months of this year where "Cattle in Water" had been suggested as the landscape subject at a time when the weather was so cold that it was scarcely likely that cattle would be accommodating enough to stand in the water for the benefit of a photographer. He (the Chairman) also announced that the pleasant duty now devolved upon him of presenting the silver medal of the Society to the successful competitor in last year's artistic competitions, Mr. E. Dunmore. In handing to that gentleman the medal he (the Chairman) remarked that this was the second year in which Mr. Dunmore had gained it, and he thought it had been well earned and deserved.

Mr. Dunmore briefly thanked the Chairman for his remarks, and said that perhaps if more of the members had exerted themselves to compete someone would have been found more worthy than himself to receive the medal.

The Society's diplomas were also presented to the following gentlemen, whose pictures had been adjudged to possess the greatest merit amongst those sent in for competition this year:—Mr. W. Cobb, *The Gardener;* Mr. John Nesbit, *A Rural Spot;* and Mr. W. Brooks, *Sunshine.*

Mr. F. A. Bridge then read a paper, entitled *Lenses, Cameras, and Stands for Small Work* [see page 265], in which he commenced by expressing a partiality for two "families" of lenses, namely, Ross's portable symmetrical and Dallmeyer's rapid rectilinear, and pointed out that the first five or six of the former and the first three of the latter could be used with the same flange. With a view, however, of showing what might be done with less expensive instruments than the above, Mr. Bridge passed round for inspection a frame of prints taken by cheaper lenses, varying in price from £4 10s. to 5s., and with focal lengths varying from two and a-half to seven inches, which he thought would show the possibility of getting fairly good pictures even with lenses costing only a few shillings. With regard to cameras, he (Mr. Bridge) showed one made for him by Mr. G. Hare, with swing-back and focussing capacity from two and a-half to twelve inches, which he considered the most perfect he ever saw. He also exhibited a new quarter-plate camera, with extending front, by Mr. P. Meagher, a lantern-slide camera, by Mr. G. Smith, for $3\frac{1}{4} \times 3\frac{1}{4}$ plates, with a "swing-anyway" back and long-range focus, and three or four by Messrs. Lancaster, of Birmingham. He considered a swing-back as necessary to a quarter-plate camera as to a larger one. With respect to stands, Mr. Bridge did not care much what kind he used, if *rigid* and *high*, and he thought the smaller the camera the higher should be the stand. He preferred a non-folding stand, and his only objection to those with sliding legs was that they sometimes slide when they were not required to do so. Mr. Bridge exhibited, besides two or three stands by Lancaster, Mr. G. Smith's "brattice" stand (on which he placed a fifty-six-pound weight to show its strength), two by Mr. Wilson, and one by Mr. C. Hussey, Jun., like a theodolite stand. He had hoped to have been able to show two others, designed by Mr. Collins, of the Photographic Artists' Co-Operative Supply Association, but he felt quite sure all the members would regret to hear that Mr. Collins had died suddenly on the previous morning, which put it out of his power to exhibit these. In concluding his paper Mr. Bridge showed an easy way for photographers always to remember their camera-screw, by attaching it by a piece of chain to the tripod. The screws of his cameras were all of the same size, and he had one attached to each outdoor stand.

The Chairman, in proposing a vote of thanks to Mr. Bridge, expressed his pleasure at hearing another paper read of a character with which they had been familiar in the earlier stages of the Society, namely, those which brought before them the practical experience of its members.

The vote of thanks having been accorded,

Mr. Leon Warnerke thought the camera shown possessed some considerable advantages over most others. Alluding to Mr. Bridge having said he used screws of the same thread to all his cameras, he thought photographers should agitate to induce all manufacturers of cameras to make their screws and flanges of the same size.

Mr. W. Brooks expressed a preference for three "families" of lenses, namely, Ross's portable symmetrical, Dallmeyer's wide-angle landscape, and Dallmeyer's rapid rectilinear. With regard to swing-backs, he agreed with Mr. Bridge that all cameras, whether large or small, ought to have them. Amongst stands, he preferred straight-legged ones, not folding, and said he had never possessed a sliding stand that did not get out of order with the slightest damp.

Mr. W. Cobb then read a paper, entitled *Balloon Photography* [see page 268], in which he gave a very humorous account of an ascent made by Mr. A. L. Henderson and himself in a captive balloon on Easter Monday, at Brighton, for the purpose of exposing a few plates. Mr. Cobb thought that, although the results they had obtained might not be all that could be desired as pictures, they were still in advance of anything which had hitherto been done from a balloon, and that they afforded ample proof of what might be done under anything like favourable conditions. He thought balloon photography was not only practicable but comparatively easy. He felt assured in his own mind that, notwithstanding gyration, it is easier to photograph from a free balloon than a captive one, on account of the pitching and tossing of the latter. He could not help thinking that if ever aërial navigation was to become of any practical value it must be in connection with photography.

Mr. Lefevre (President of the Balloon Society) said he had had a number of balloon photographs sent to him from the French Academy and the Berlin Aëronauting Society, which were very indifferent and not to be compared with those taken by Messrs. Cobb and Henderson. The most successful balloon photograph, however, which he had ever seen, and which he now handed round for inspection, was taken by Mr. Cecil V. Shadbolt, an amateur, and, he believed, a member of the South London Photographic Society. The photograph was a very accurate one. He was glad to state that aëronauts were coming back to the old hot-air balloons, which he believed to be capable of being kept much steadier and more under control, and therefore better adapted for purposes in connection with photography. He (Mr. Lefevre) was of opinion that photographers might with advantage turn their attention to electricity in connection with ballooning. He also referred to the great strides which were being made in ballooning everywhere, especially in France, and expressed his opinion that ten years hence aërial navigation would be an accomplished success. Referring to a remark of Mr. Cobb's, to the effect that in his opinion the only practical value of aërial navigation would be arrived at in connection with photography, he (Mr. Lefevre) thought that this would prove to be incorrect, and he believed that it would become of inestimable value in other directions.

Mr. Joseph Simmons thought Mr. Cobb's pictures taken from the balloon were the most successful of any hitherto produced because the most distinct, and he drew attention to the fact that even the strands of the rope could be traced in the picture right down to the ground, which, he considered, proved that there was no difficulty in focussing. He quite agreed with Mr. Lefevre in regard to the hot-air balloon being preferable to the gas balloon, and he had himself advocated its use as far back as 1874. It could be inflated anywhere, and at about one-tenth part of the cost of gas. He thought that if a balloon could attain an altitude of 1000 feet that was

quite sufficient for all general purposes, such as reconnoitering, &c., and the hot-air balloon could easily do that and remain aloft for an hour without replenishing the fire. He knew of an instance in which one had remained up for an hour and a-half. This he considered to be a very great advantage over the use of gas for inflating the balloon—a process attended with so much more difficulty, and which, in lonely and desolate places, was sometimes impossible.

Mr. Lefevre announced that, in connection with hot-air balloons, an ascent would be made on Saturday, the 5th instant, from Lillie Bridge, in one of these balloons constructed of asbestos, which, being a non-inflammable material, enabled them to get over the danger that had formerly attended ascents in hot-air balloons.

Mr. A. L. Henderson exhibited and described Mr. Walter B. Woodbury's apparatus for taking photographs by means of a captive balloon, the operator remaining on the ground. This consisted of a small balloon, to which the camera was hung in place of the car. A small battery was attached to the camera, and the exposures were made by means of an electric current sent up along a cord from the ground.

The Chairman thought that the great difficulty to contend with in connection with balloon photography was the gyration. He was glad to hear of the employment of asbestos for the construction of hot-air balloons, as this did away with the great danger which had previously been attendant upon ascents made in them. He was sure that the members must all feel much gratification at the communications made to them by Messrs. Lefevre, Simmons, Cobb, and Henderson, and he called for a cordial vote of thanks to these gentlemen. This being heartily accorded, he announced that Mr. Lefevre had kindly placed at the disposal of the members a number of tickets for the garden party in connection with the balloon ascent, to take place at Lillie Bridge, on Saturday afternoon, at three o'clock, and any member desiring to be present could obtain a ticket on application at the close of the meeting.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 3rd instant, the chair was taken by Mr. A. Haddon.

Mr. J. B. B. Wellington exhibited a double dark slide.

Mr. E. J. Golding said he had made some slides on the principle of the American paper slide shown at a previous meeting. Instead of paper for the sliding shutter itself he had used "glazing boards" from a printing-office. These, having been in use in the press for some time, had become blackened by the setting-off of the ink, and proved very suitable for the purpose.

Mr. A. J. Brown detailed some experiments he had made with the object of using bromide of silver precipitated from solution in excess of alkaline bromide. The results were by no means encouraging. An enormous quantity of bromide was required to dissolve the silver, and, although a very little water added to this solution sufficed to throw down the silver bromide, when a moderate quantity of gelatine solution was used instead of water no precipitation took place. On large dilution the bromide of silver came down, but in a coarse condition, while the setting power of the gelatine was entirely destroyed.

The Chairman observed that in the manufacture of emulsion free bromide acted as a carrier of bromide of silver, dissolving from a less sensitive, and throwing it down in a more sensitive, condition. Ammonia acted in a similar manner.

Mr. Brown would try the addition of a little hypo. for the same purpose.

Mr. J. Barker then read a paper *On the Action of Haloids in Gelatine.* [See page 264.]

Mr. W. E. Debenham asked if Mr. Barker was prepared to furnish a formula containing fluoride and cyanide of silver, so that the statement that these additions conferred sensitiveness unattainable by the use of bromide, chloride, and iodide only could be put to the test of experiment. He also observed that Mr. Barker spoke of the different effects obtainable by excess of silver, haloid salt, and gelatine respectively. He wished to know whether Mr. Barker had succeeded in finding a definite combining equivalent for gelatine, and, if so, what that was.

Mr. Barker had purposely not given a formula for the present, as he wished experimenters to work it out for themselves. As to the second question, he proposed to make it the subject of a future paper.

A question was read from the box—When one has only two or three dark slides, and wishes to expose away from home a dozen or more plates, what is the best means of proceeding?

Mr. Debenham said that he had when available obtained the use of some perfectly-dark closet or cellar, and changed the plates in darkness. This was made more easy and certain if the plates had each a label on the back projecting a little over the end. There was then no danger of placing them with the faces the wrong way in the slides, and by tearing off the projecting end of the label it could be told which plates had been in the slides and which were still unexposed. For use, when no dark shelter was to be had, he had a bag with sleeves made of four thicknesses of black twill.

Mr. W. Coles considered black shoddy a good material for keeping out all light.

Mr. Golding used plates in a flat box with the faces all one way, and a piece of paper under each. He had not found that there was any danger of exposing the wrong side. He lifted the plates with a pneumatic holder, and found that it acted perfectly through the paper which was lying on the back of the plate.

Mr. Wellington showed a negative taken on a chloride plate. The exposure of an open-air subject had been ten minutes. The size of the diaphragm was $\frac{f}{64}$, or number 64 on the universal system. With a bromide plate he would have exposed for ten seconds.

Mr. A. Mackie inquired whether it was generally recognised, as he had found it to be, that a print left for much beyond the usual time—several days, in fact—in the water became warmer in tone.

Mr. Debenham said that prints in fading lost first their purplish colour, and that leaving prints very long in the water seemed to start fading. They were generally not nearly so rich as those which had been washed only the usual time, and he believed that this was due to decomposition of the organic matter in the paper producing an unfavourable effect upon the silver image.

The death of one of the members (Mr. C. G. Collins) was announced. A vote of condolence with the family was passed, and it was directed that a letter in accordance therewith should be written.

HALIFAX PHOTOGRAPHIC CLUB.

The usual monthly meeting of this Club was held on Tuesday, the 1st instant, at the *Courier* office,—Major Holroyde, President, in the chair.

The Secretary read the minutes of the last meeting, which were confirmed. He also read a letter of apology from Mr. F. Smith, who stated he was suffering from a severe nervous headache, and wished the reading of his paper—*On a Tour to Austria*—illustrated by photographs he had secured, to be postponed. The members present were very much disappointed, several having come to hear the paper at great inconvenience.

The Chairman then read a long communication from Captain F. Turton, of Florence, Italy, who had observed in the Club's report of last month in the photographic journals that the subject of gelatine plates had received their attention, more especially with regard to the makers of dry plates and supplied by London firms, many of the plates having proved to be very inferior in quality. Captain Turton had travelled great distances to take views at great expense. He thanked the members for taking the subject in hand, and thought the makers ought to be responsible for the plates they sent out.

The next business was to decide about the outdoor excursion. It was proposed to take place on the 25th June. Several places were named, but it was decided to go to Bolton Abbey and Woods, and that the photographs taken be exhibited at the following meeting. Mr. Birtwhistle, Mr. Mossman, Mr. Caw, and the Secretary were appointed to carry out the arrangements.

The meeting was then adjourned.

Correspondence.

May Meeting of the Photographic Society of France.—Presentations by M. Enjalbert: Photographic Revolver and Film Carrier.—An Excellent Dodge for Exposing Films in the Camera, by M. Léon Vidal.—MM. Clayton and Tailfer's Silver Bromide Modification.—Discussion on Fixing Solutions.—Cherry Fabric.—Photo-Electric Apparatus.—On Films.—Professor Stebbing's New Modification of Films.

The usual monthly meeting of the Photographic Society of France was held on Friday last, the 4th instant,—M. Peligot in the chair.

M. Enjalbert presented his new photographic revolver and his new carrier for films in the dark slide. His photographic revolver is a very well-made instrument, representing a revolver. The drum of the revolver, instead of containing the deadly preparation, holds a dozen dry plates two centimetres square. The drum is divided into two parts, each containing a separate cavity or room. The top is intended to carry the dark slides holding the sensitised surface; the lower cavity to receive the sensitised dry plate after exposure. In fact, the drum acts both as a camera and as a changing-box. Between the barrel of the revolver and the drum or camera is placed a revolving disc, with a triangular hole performing the office of an instantaneous shutter. The barrel holds the lens. To set it at work the drum is turned round once, twice, thrice, according to the power of light upon the view to be reproduced. This revolving motion of the drum winds up the spring of the disc or instantaneous shutter. When the required tension of the spring is attained the revolver is pointed towards the object, the trigger touched, and the image is caught by the sensitised preparation, as in an ordinary camera. Another plate is now required to take the place of the exposed one, or, more correctly speaking, the exposed plate must be got rid of to let a new one take its place. The drum now acts as a changing-box. In order to transfer the plate from the top cavity to the lower one the drum is turned half way round, and the exposed plate, held by its metal frame, slides into the changing-box. The drum is now turned round half way again and a new plate is let loose, and the operation of exposure can be repeated. The cock of the revolver acts to keep the drum in its proper place during the exposure or in changing the plate.

Much hilarity, play on words, &c., was caused by this peaceful and pretty little instrument, in supposing, one of these days, a photographer being mistaken for a would-be assassin or an assassin to be taken for a photographer. Whether or not this instrument will render service to travellers, detectives, amateurs, or photographers time will show. Many inventors have done their best to perfect such an apparatus without success. M. Enjalbert has solved the difficulty. It remains to put it to a practical test. The inventor employs the lens of the

evolver screwed upon another optical arrangement in order to make he enlargement.

The second presentation of this fertile inventor was an ebonite carrier or the dark slide, into which a thin frame is inserted, which serves as a tretcher for films or paper negatives. We all know the difficulty we have in exposing transparent films or sensitised paper in the camera. I have always placed my transparent films between two glass plates in order to maintain the film in a perfectly-flat condition. This succeeds, but the weight of the two glass plates, be they ever so thin, frightens the traveller, and he hesitates to take them with him and adheres to his glass dry plates, with all their risk of breakage, weight, &c. M. Enjalbert has endeavoured to get us out of the difficulty with his dark slide frame. The frame or carrier is laid upon the table and the film placed upon it; the thin frame serving as a stretcher is then pushed in and fixed by means of four small hooks. The film or paper is now supposed to be stretched sufficiently to be exposed in the camera without any other aid.

M. Léon Vidal had also thought of a "dodge" to fix films, and he came with the intention of communicating it to the Society that evening. This "dodge" is simple, practical, and will do away with all elaborate apparatus; in fact, it is so simple that the wonder is that it had not been thought of before. M. Vidal takes a piece of thin ebonite of the size of the film to be employed. He goes to a druggist's shop and purchases a sheet of diachylon, which he cuts to the size of his ebonite plate; the diachylon is glued to the latter, and the simple apparatus is ready for use. The film is laid upon the sticky surface, with care, to avoid air-bells; a piece of paper is laid upon the film, and the hand is then rubbed over this in order to make the film adhere firmly to the diachylon. M. Vidal presented some of my films treated in this manner. He took them off and put them on again with the greatest ease. The idea is excellent and, I am certain, will be taken up by many.

A discussion took place upon the new form of silver bromide, by the aid of which colours could be obtained in the camera as they are seen by the eye; that is to say, a beautiful red colour will no longer give a dark black tint in the positive, neither will a dark blue, as seen by the eye, give a brilliant white upon the finished proof. This change is obtained by the addition of a small quantity of colour, called "éosine," to an emulsion. MM. Clayton and Tailfer have patented this process, which, by-the-bye, has been patented several times by others. They base their patent upon the fact that they use ammonia as a solvent of the éosine. For many years I have prepared plates tinted with éosine for M. Ducos du Hauron and several other clients, and I consider the use of ammonia hurtful rather than bèneficial. This has been confirmed by several members of the Society, who, in experimenting with plates prepared by this formula, obtained nothing but fog.

M. le Marquis de la Ferrounays was present at the meeting. He highly recommended the use of alum with the hyposulphite of soda bath.

A long discussion upon the best solvent for silver bromide took place. The opinion was unanimous that sulphocyanide of potassium must be abandoned for that purpose, as it has a dissolving action upon the gelatine. It was recommended to clean plates with.

Pure cyanide was recommended, as it works well; but I am of opinion that such a dangerous product should be banished from all photographic establishments. Hypo. does the work as well if care be taken in the washing. This product is harmless, and much cheaper than the other.

Cherry fabric had been experimented upon and found wanting. The numerous minute holes in it prevents it from becoming a safe medium; nevertheless it may be used upon certain occasions, such as changing plates and developing when travelling, on account of its light weight.

M. Londe presented a new photo-electric apparatus intended to make proofs in regular and mathematical order for medical investigations. A doctor desiring to study the different phases of an epileptic attack takes a dozen portraits of the patient, each portrait having the same lapse of time. This is obtained by means of an ordinary metronome, such as is used by students in music to measure time correctly. A steel bar is placed at the axis of the pendulum, to which is attached two needles which dip into a mercury bath at every oscillation, thus allowing the current to pass slowly or rapidly according to the wish of the manipulator. The current turns a disc in the camera, which contains nine lenses, and each lens is uncovered and exposed in a regular manner. Films replacing glass have proved very successful; but in the present day, now that thousands of proofs are required for illustrating books, &c., the transparent films are found too thick to print from on either side, which is necessary for fatty-ink printing. *Le cliché retourné* have been wanting in photographic manipulations, and many "dodges" have been resorted to in order to get it with ease. The system I generally employ is the following:—After having well French-chalked a glass plate I cover it with collodion containing either a little castor oil or glycerine, and when the ether and alcohol have evaporated I coat the collodion with a gelatino-bromide of silver solution. The plate when dry is exposed and developed in the usual way, and when dry is coated with collodion. If the point of a penknife be run round the edge of the plate the image will leave the glass plate as a very thin film, which can be printed from on either side, according to the desire of the manipulator. This system is the best for studio work. I have endeavoured to reduce the thickness of my transparent films in order to secure the same end, but without attaining the desired result, as they doubled up in the different solutions. I then fixed them to a paper support, and in this manner they could be handled. Last year I thought of a plan by which films could be much more easily made than by the method I had hitherto employed.

A paper is prepared in such a way that, if covered over by a gelatino-bromide solution, the sensitive silver composition will adhere firmly to the paper when the latter is wet, but when dry the film of sensitised gelatine will leave the paper support with ease. I should not have mentioned this yet had I not seen, in THE BRITISH JOURNAL OF PHOTOGRAPHY, that my friend Mr. A. L. Henderson had mentioned the subject at the meeting of the London and Provincial Photographic Association. In deference to that gentleman, and in the interest of the numerous readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, I will give a full and precise account of the process in my next communication, so that every amateur can make his own sensitive film. Indisposition prevents me from doing so today. Suffice it to say that the paper after exposure in the camera is developed in a dish or tray, either by floating it upon the surface of the solution or by immersion. After fixing and washing the image is laid upon a film of collodion in the same manner as positive prints on paper are enamelled. A glass plate is French-chalked and covered with collodion, and when dry it is plunged into a hot solution of gelatine. The paper bearing the film negative is now laid upon it, and the excess of gelatine is pressed out by passing a squeegee softly over the back. The plate is set up to dry spontaneously, and I allow it to stand all night. The next morning I find the paper support on the floor and the film adhering to the collodion. In order to maintain the film flat and, above all, sheltered or protected from atmospheric influences, I coat the film with collodion. By this means the film is imprisoned between two coatings of collodion which protect it thoroughly. This last coating is not indispensable, but if omitted the film is liable to roll up; whereas by this simple manipulation it remains quite flat, and can be handled without fear. E. STEBBING, *Prof.*

25, *Rue des Apennins, Paris, May* 8, 1883.

MR. FURNELL'S NEW LENS.

To the EDITORS.

GENTLEMEN,—I notice the editorial remark in the last issue respecting my lens. I am not surprised at your correspondents fancying a resemblance in it to others, but if any such exist I am not aware of it. I, of course, allude to the back parts of it, as the front lens is not new except in the sharpness of radius, which does away with the internal curves.

As to the lens of Mr. Grubb, which you mention, I never saw or heard of it before. My diagram is entirely the result of my own experiments, which have taken me some time to carry out. It is very easy to calculate to suit any focus required, for by a rule I have made to suit it the whole thing is got at by a very few figures.

I should not be surprised if it become *the* lens of the future.—I am, yours, &c., THOS. FURNELL.

May 7, 1883.

THE KEEPING QUALITIES OF GELATINE PLATES.

To the EDITORS.

GENTLEMEN,—Last week I took the liberty of sending you a print from a plate which had been kept twenty-six months before it was exposed. Herewith I send you prints from two negatives which were exposed on the 26th of April, 1882, and not developed till the 30th of April, 1883.

They do not appear to have lost in density; in fact, I think that either they must have increased or I must now be using more potent pyro. than when I developed part of the same batch a year ago.—I am, yours, &c., EDWIN DODDS.

Low Fell, Gateshead, May 7, 1883.

[The prints sent by Mr. Dodds certainly speak well for the keeping qualities of the plates both before and after exposure. Their crispness and vigour, combined with the finest gradations from light to shadow, sufficiently attest that gelatine plates do not necessarily deteriorate by keeping, as has been alleged.—EDS.]

ON THE ELIMINATION OF HYPO. FROM THE GELATINE NEGATIVE AND INTENSIFICATION WITH SILVER.

To the EDITORS.

GENTLEMEN,—The thousands of once-valuable negatives now utterly useless through the presence of hypo. left in the film must be my excuse for troubling you with this communication, in which I have little new to make known. Still I believe that, in calling the attention of the profession and amateurs to one or two old things, I shall at least be doing some one a service.

One of the most severe tests for hypo. in the gelatine film is silver. Take a negative after several hours' washing and apply the old pyro. and silver intensifier, and the result will be red stains. Take another and, after fixing, place it in the alum bath for a few minutes; now rinse well in rain water, and place it in the following stock solution for fifteen minutes:—

Acetate of lead .... 1 ounce.
Hot distilled or rain water .... 4 ounces.

Put one drachm of the above stock solution in twenty ounces of rain water; after fifteen minutes' immersion in this bath the negative must be well rinsed in rain water and afterwards under the tap.

Next take pyro. and silver in the same proportions as for a collodion negative, flow over while the negative is still wet, and you will find that you have a beautiful intensifier which may be used either generally or locally, and which also gives a permanent negative.

When it is necessary to intensify a negative the operation ought to be performed in the dark room, and the negative should be again fixed, treated with alum and lead, and washed as before.—I am, yours, &c.,

6, *Queen-street, Coventry, May* 7, 1883. THOMAS BAYNTON.

THE RAPIDITY OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—Dr. Henderson, in the last number of the Journal, states the desirability of manufacturers of dry plates adopting the same standard of sensitiveness of dry plates, and that only two makers—Mr. J. Cadett and Professor Stebbing—had adopted Warnerke's scale. Will you permit me to say all packets of dry plates sent out by me since my commencement have been so marked and on a formula enclosed. The calculation made by Mr. Warnerke of the exposure is relative to a wet plate.—I am, yours, &c., J. D. ENGLAND.

Notting Hill, W., May 9, 1883.

EXCHANGE COLUMN.

Wanted to exchange, for any kind of burnisher, a *carte* rolling-press, two rollers; part cash will be given.—Address, J. GOSBY, Royal Arcade Studio, Clifton.

Wanted, a whole-plate and quarter-plate camera, with two or more double backs, in exchange for fishing tackle. List sent.—Address, T. COUPE, 39, Banktop, Blackburn, Lancashire.

I will exchange a cabinet rolling-press, bottom roller nickel plated, for a Cadett's pneumatic flap shutter to suit a No. 2B lens, or offers.—Address, W. DAKIN, photographer, Nether-edge, Sheffield.

I will exchange one of Harrison's head-rests and a show-case (suitable for railway stations), for a whole-plate camera in fair condition.—Address, H. M. OSBORNE, Comberton-hill, Kidderminster.

Wanted, a Rouch's 10 × 8 camera or good doublet lens, in exchange for a sciopticon lantern with latest improvements; difference in cash.—Address, COUCH, 3, The Grove, Vauxhall-bridge-road, S.W.

I will exchange an oxygen gas holder, of improved construction, for large printing frames or a small symmetrical or rectilinear lens. See advertisement.—Address, F. A. BRIDGE, 9, Norfolk-road, Dalston, London.

I will exchange a 12 × 10 developing-dish with well, three porcelain dishes and two glass funnels, for a rising-front camera, the sliding-body must measure 8 × 7 outside.—Address, ALFRED BISHOP, 20, Stork's-road, S.E.

What offers in exchange for ferrotype goods, cards, cases, plates, &c., *carte* lens and cabinet ditto, show-cases, backgrounds, ormolu frames, &c.? Wanted, see advertisement.—Address, SYNTAX, 126, Bold-street, Liverpool.

Wanted, good whole-plate or 10 × 8 camera, with three double backs, also a carved table for studio, in exchange for a whole-plate camera, single and double back, background, &c.—Address, D. BORDLEY, Newport-road, Stafford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

William Hart, Regent-street, New Swindon.—*Photograph of Introduction to Album.*

Joseph Steven Brown, High-street, Bridgewater.—*Photograph of the "Flying Dutchman."*

C. H. F.—A thirty-per-cent. solution is meant. If you read the formula as that it will be correct.

A. Z.—The lens is of too short a focus for the size of plate; hence the dark corners of which you justly complain.

H. B. C.—Yes, if you finish up with several changes of river water, but not without taking that precaution.

A NOVICE.—The lens is under-corrected; hence its chemical and visual focus are not coincident, as you surmise.

ROYAL ACADEMY.—Our first notice of the Exhibition of Paintings, now open at the Royal Academy, unavoidably stands over until next week.

IOLANTHE.—Possibly a wooden bed with an iron or, rather, steel plate will give an even pressure; but it will be impossible to use a press so fitted up for hot pressure.

THOS. B. S.—Any dealer in printers' materials will supply all you require. You will find it far cheaper in the end to purchase the articles than attempt to make them for yourself.

S. J. WILLIAMS.—Evidently the silver bath is too weak for the sample of paper No. 1, and at the same time it is too strong for No. 2, as is proved by the excessive bronzing of the shadows.

WILSON AND MCCORMACK.—We do not know the address of any one who now makes that branch of photography a speciality. We believe that such pictures are only produced on the continent at the present time.

F. J. GARRISON.—If the facts be as you state we should say that something is wrong with the sample of paper you are employing. Possibly, however, the hyposulphite of soda may be in fault. Try another sample of that before finally condemning the paper.

B. S. J. W.—From what we can judge, without making an assay, the sample of residue you enclose contains principally kaolin, and very little chloride of silver. You must not expect a very large return for it from the refiner, if what you sent us is a sample of the whole.

THOS. WATSON.—As the fading has been so very rapid, and the fixing and washing, as you say, so carefully performed, it would point to the cardboard mounts being in fault, as you suspect. The iodide of starch test, as you propose to employ it, will be quite reliable.

ARABI.—If the prints be copyright you will certainly render yourself liable to a penalty of ten pounds for every copy you sell. We have no means of knowing whether they are copyright or not; you had better make application at Stationers' Hall before you run any risk in the matter.

E. SHORT.—As the law at present is somewhat uncertain it will not be safe for you to copy the illustrations without permission of the publisher, notwithstanding they may only be intended for slides for the magic lantern. Under the circumstances, we have little doubt you can easily obtain the necessary permission.

MAJOR GUBBINS.—We certainly cannot account for the darkness of which you complain. Possibly, if we saw the lens you are employing we might be enabled to enlighten you. The illumination should be fairly equal all over the picture when using such a small negative, as its size is well within the capabilities of such an instrument.

OMEGA.—If the examples you enclose are a fair sample of your work as an operator and retoucher, we certainly think you will not be justified in asking so high a salary for your services. Half the amount would be more in accord with the merits of the work, which is far below the standard of first-class London establishments.

FERRO.—For negatives from which only a few impressions are required the ordinary white, hard varnish (which may be procured at any oil shop), diluted with methylated spirit, will answer quite well. But if a large number of impressions are required you had better employ one of the hard varnishes specially prepared for negatives. There are many such in the market.

FILM.—The best solution for waxing glass plates, from which the collodion film has to be removed, is made by dissolving one and a-half drachm of yellow bees'-wax in a pint of benzole. Be sure that you get bees'-wax, as much that is sold under the name of "pure bees'-wax" is largely adulterated. Your best plan will be to procure a small quantity from some one who keeps bees in your neighbourhood.

ECLIPSE OF THE SUN.—The sky was overcast at Lima on the 7th instant, thus preventing any observations being made.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday, the 16th instant, the subject for discussion will be—*On the Means of Drying Gelatine Plate.*

LONDON GAZETTE, *Tuesday, May* 8, 1883.

PARTNERSHIP DISSOLVED.

ESAU WILLIAMSON AND ROBERT SMALLEY, trading as Williamson and Smalley, 34, Regent-street, Haslingden, Lancashire, picture-frame makers and photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending May 9, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

May	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
3	29·15	W	49	43	94	54	39	Cloudy.
4	29·87	W	42	38	91	51	33	Cloudy.
5	29·87	NE	40	36	95	61	32	Cloudy.
7	29·70	NE	50	48	80	60	43	Overcast.
8	29·58	S	49	47	—	50	44	Overcast.
9	29·48	NE	47	45	—	48	44	Cloudy.

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AMATEUR PORTRAITURE.

It may be remembered that last week, in concluding our article on the above subject, we mentioned that in taking groups it was, in some instances, advantageous to sacrifice a certain amount of definition in order to obtain rapidity in exposure. Before going further it may be advisable to make a few remarks on this question.

When speaking of lenses of the "rapid" type it was mentioned that many of them—unless stopped down to a considerable extent—would not give good definition over the full size of plate they were supposed to cover, and the only advantage of the large aperture in such cases was that the lens could be employed for taking a smaller picture with its full opening. By reference to the price lists of our leading opticians we find each of their lenses of this form catalogued to take two sizes of picture according to the subject—landscape or group—the former being a size larger than the latter. Thus, a lens stated to cover with a landscape seven and a-half by five inches is only calculated to take a group about five by four, and for a group six by five the whole plate (landscape) is mentioned. If this be all that can be accomplished with the lenses by the best opticians, what can be expected from some of those with which the cheaper forms of apparatus are fitted?

In order to render this portion of the subject clear to the novice in portraiture, we may explain wherein consists the difference in the covering powers of a lens when employed for a landscape or for a group. All who have worked with lenses of the type referred to well know that, when focussed with the full opening, only a comparatively small portion in the centre of the picture can be obtained sharp, and it is only by the employment of diaphragms—and sometimes very small ones, too—that good definition can be secured at the margin of the plate. Now, the stopping down of the lens to the requisite extent to make it cover may, and often does, entail ten or fifteen times the exposure that would have been required were we content with a picture of the dimensions that could be obtained sharp when the lens was focussed with its full opening.

By the size of group that a certain lens of the rapid series will take is meant the size of plate the lens will cover with its full, or nearly full, aperture. It is clear that any lens which will take a landscape of a given size will also take a group of figures of the same dimension, provided it be employed under identical conditions as regards aperture—that is to say, if an equally-small stop be employed; but a correspondingly-long exposure is thus entailed.

It may be well to mention here that there are circumstances under which a lens of the rapid type may be worked for groups with its open aperture on the full size of plate and still yield pleasing as well as artistic results. Supposing the group consists of five or six persons only, that they are arranged out of doors in a garden or on a lawn in front of a house, and that the camera is placed at such a distance from them that the group itself comes of a size that it is fairly within the capabilities of the lens when used with the full aperture. In this manner the figures will be secured quite sharp, while the surrounding objects will be more or less indistinct. This, in many cases, will prove no disadvantage whatever from an artistic point of view, as the indistinctness of the margin or insignificant portion of the picture will instinctively lead the eye to the centre—the most important part, which *is* sharply defined.

Presuming the lens we are about to use is a single instead of a compound one, if it be by a good maker it will doubtless work fairly well with a larger aperture than that with which it is fitted. In saying this it must not be inferred that it will then yield such sharp and crisp definition as may be desirable for some subjects. But, if the aperture—and we have done this with several lenses in our possession—be enlarged to one-twelfth or even one-tenth of its focal length, fair pictorial definition may be obtained over a large surface. The aperture may easily be enlarged with a half-round file or by broaching it out with an old chisel worked diagonally in the hole. By this alteration no injury will be done either to the lens or its mount, as an extra stop may easily be provided with an opening the same size as that of the fixed one before it was enlarged. It has just been mentioned that a lens thus treated will not yield crisp definition—neither will it; but, unless the aperture be made unduly large or the lens itself be an inferior one, sufficient sharpness will be obtained for an artistic picture, and one which is often far better, on the whole, than that obtained when the lens is stopped down in order to secure crispness.

Let us consider the matter from a practical point of view. Supposing a group—say of twenty persons, and, possibly, some of them children—has to be taken. Now, it is clear that if the lens, whether single or compound, be worked with a small aperture, there will be considerable risk of some of the figures moving during the prolonged exposure which becomes imperative to secure a good printing negative. Although the movement may be very slight, the blurring of the image caused thereby will be rendered more conspicuous by the extreme sharpness of those figures which have remained still; while the moved ones which are in juxtaposition, and also the microscopic definition of the surroundings, will add to the effect. But if the lens employed be a single one with a large aperture, no portion of the picture will be absolutely sharp, yet no part will appear conspicuously blurred by comparison with others in juxtaposition which are microscopically defined, as they would be if a compound lens were used with a small stop. For the same reason a slight movement in one or more figures, should such by chance occur with the brief exposure, will be scarcely noticeable.

Hence it will be seen that, by sacrificing the microscopic sharpness obtained by stopping down the lens, we may reduce the time of exposure often to one-eighth or even one-tenth of what would be required in using such a lens, while we gain an immense advantage in practice. But this power, valuable though it may be, must always be utilised with discretion.

ALBUMENISED PAPER AND RESIDUES.

We have recently been shown some extracts from correspondence that has passed between a photographer with an extensive business and another equally well-known gentleman, who makes a point of permitting no silver to be wasted in his establishment that can by any economic possibility be saved. There is, or should be, nothing unusual in the latter plan of working; but the correspondence in

question indicates that such a rule is not universal, and it further brings into relief a subject which has not received the attention that, perhaps, it might be considered to warrant.

We should imagine that we were within the mark in stating that nine-tenths of the photographs sent out from the various studios in the kingdom are produced upon albumenised paper; yet that most important material receives but the scantiest of notice from experimentalists or, at anyrate, from those whose experience is given to the public through the photographic journals. It is rather singular that it should be so, but the fact remains. It was the same with the manufacture of pyroxyline, and with a few other substances of minor importance. The cause, after all, may not be far to seek. The manufacture of albumenised paper is now, and has been for years, practically entirely in the hands of special manufacturers, and is likely to be so from the greater certainty and economy with which it can be prepared on a large scale compared with its demands in time and money when made in small quantity. The consequence is that photographers are dependent entirely upon the manufacturer, and have to do the best they can with the paper they are supplied with. Fortunately there is a remedy against any possible failure to obtain good material to work upon in the great competition that exists among dealers in this commodity.

Albumenised paper cheap, albumenised paper dear, sweet and foul-smelling, glossy and extra glossy, all are to be had, and all are recommended as being the best; in fact, *embarras de richesses* would rather appear to be the difficulty. If, however, we put these papers to the test, we shall find they are by no means alike in quality, in working, or in the results they give, even when those with a surface of apparent similarity are compared. A large quantity of foreign paper is imported, and some of it is of excellent quality; but the majority is so offensive to the nasal organs that some operators decline to use it on sanitary grounds alone, irrespective of any question as to the greater or less permanency of pictures produced by its aid.

We have compared the working qualities of a large number of papers, and we must confess to a feeling of surprise at the great differences to be seen in the results from different brands, when every precaution, both to follow the manufacturers' formulæ and to vary them so as to obtain altered results, was taken. Some papers would not tone to a purplish shade; others were not effective unless toned to that hue. Some gave prints of great vigour; others comparatively tame and flat results from the same negative. We tried a brand of paper which worked very well to a rich purple; while our note in an old note-book showed that some years ago the same manufacturer (we knew him to make large quantities) sent out paper which would not tone up satisfactorily to anything beyond a rich brown, no matter what toning bath was used. One sample of paper we tried had a tendency to produce "harder" pictures than any of the others we experimented with. This was rather a drawback with a negative of fine quality, but a decided gain where a tendency to flatness existed.

The change of working quality we describe cannot but indicate a change in the manufacturer's formula, which, we are inclined to believe, has taken place in more instances than one. This, however, is merely our opinion. We have not had an opportunity of putting the matter to the test, and we must say that one manufacturer of whom we asked the question informed us that he used the same formula then that he had done from the beginning of his commencing to make albumenised paper, twenty or thirty years ago.

It will be remembered by many of our readers that some fifteen or more years ago a great cry was raised about the economy of a weak printing bath, and many producers of albumenised paper advertised that a bath so low almost as twenty grains to the ounce toned their paper equally well as, if not better than, the more familiar sixty- or seventy-grain bath. This change, it will be observed, was almost synchronous with a change in the quality of the negatives made at that period. The old, thick, long-printing negative gave place to a more delicate quick-printing plate, and we suppose the paper makers felt a change in their paper might be made also, the more especially on account of the clamour for an economical printing bath which was being raised.

We would now call attention to the fact that, so far as our judgment goes, a change has again for some little time been taking place in some manufacturers' formulæ—a change that is also coincident with a radical alteration in the type of negative now usually made by the large proportion of professionals or amateurs. The bearing that this change has in one or two directions will be both interesting and profitable to discuss, and this we propose to do in the succeeding number.

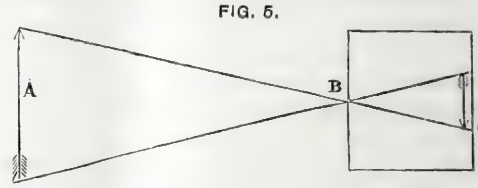
THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter III.—The Cause of an Inverted Image.—Spherical Aberration.

Having spoken of the nature of lenses we next advert to their properties, particularly to that special characteristic upon which depends the formation of an image.

If a double convex lens formed of one piece of glass, such as a hand magnifier of the simplest kind, be held up so as to allow the sun's rays to be transmitted on to a sheet of paper held at a certain distance behind where the rays come to a point, the brightness at the apex of the cone is owing to the formation of a minute image of the sun there, its intensity either for luminousness or burning being dependent upon the dimensions of the lens. This applies also to the formation of an image of any terrestrial object to which the lens may in like manner be directed. In every case in which an image is produced in this way it will be seen to be inverted, or upside down. Why this is so we shall explain by the aid of the following diagram (*fig.* 5), in which the dart A may be considered as

FIG. 5.



representing anything in external nature, such as a church, a house, a landscape, or a figure. The rays of light from this pass in straight lines everywhere, and hence through the small hole B in the opaque sheet, which may be assumed to be the front of a box. These proceed straight on until interrupted by the screen C, on which they fall, forming an inverted image of the object in front. The smaller the aperture B is the sharper will be the image It is, therefore, quite possible to take a photograph without any lens whatever; but, owing to the attenuation of the light by transmission through a pinhole aperture, a protracted exposure is required in order to obtain a picture.

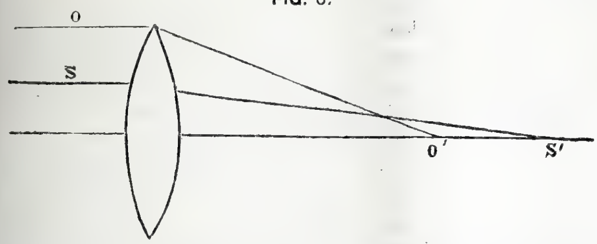
By greatly enlarging the aperture and inserting a lens, however, it will be found that, while the dimensions of the image formed by the pinhole aperture are not sensibly altered, there is at once a great increase in both the brightness and sharpness of such image. It may here be remarked that the size of the image is determined by the distance at which the receiving screen upon which the image is depicted is situated from the aperture or lens by which it is formed —a fact that will be self-evident on inspecting the foregoing diagram, and imagining the situation by the screen C to be only half the distance from the pinhole at which it is now represented.

From what has been said it will be seen that the longer the focus of a lens by which an image is to be formed the larger will be that image. If a lens of ten inches focus be employed in the production of a picture of a scene, such as a house and its surroundings, and another picture of the same scene be taken by a lens of five inches focus, when both are examined side by side it will be observed that the house produced by the lens of the shorter focus will only be one-half the dimensions of that obtained by the lens of longer focus; but, as a set-off against this, there will be twice as much of the subject depicted on a plate the same number of inches in dimensions. From this it will be correctly inferred that a wide-angle lens—that is, a lens intended to include a wide angle or large amount of the

ubject to be photographed—must be of short focus relatively to ther lenses. Another deduction from this is that dimension or ize of image depends exclusively upon the focus of the lens, and is ntirely unconnected with its diameter. If we have a lens of ten nches focus and only one inch diameter, and another lens the same ocus and four inches in diameter, the images formed by them will e precisely alike in dimensions. The influence of the diameter of he lens is confined to giving greater or less brightness to the image, nd we shall consider this more fully when treating of the requirenents of quick-acting lenses.

But a single lens of the class of which we have been hitherto reating does not give an image possessing more than a very low legree of sharpness, even to the unaided eye. This arises from *pherical aberration*, which we may define as an inability in a lens aving a spherical surface to bring to one focus all the rays which re transmitted through it. A ray transmitted by the margin of a ens (*fig.* 6) is more deflected or refracted than one which is trans-

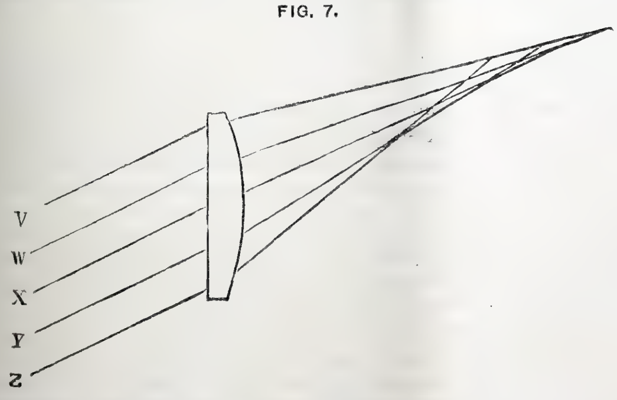
FIG. 6.



mitted nearer the centre. Observe in what manner the representative rays O and S are refracted by the lens. The former, being bent in a greater degree than the latter, comes to a focus at O′, the focus of S being carried farther to S′; and the absolute focus of such a lens will be nowhere in particular, but anywhere between O′ and where the rays which are more nearly central cross the axial line. Now, this has no connection whatever with the aberration of colour, but is true of a lens even if achromatised. It is possible to correct a single achromatic lens so that it shall with its full aperture bring direct rays to a focus, which is the case with telescope lenses; but for oblique rays it would be quite worthless. Photographic correction of lenses, therefore, partakes of the nature of a compromise; it is content with an inferior order of axial definition in order to secure an equal degree of oblique sharpness.

A plano-convex lens, or one of a slightly-meniscus form, if directed, convex side out, to an object will give a fairly well-defined image of what is directly in front; but those objects not axially situated will be very imperfectly rendered indeed. Now, by reversing the position of the lens—that is, placing its flat side outwards—quite a different aspect is presented; for the central sharpness now gives place to a certain kind of indistinctness of image inferior in this respect to the former crispness of delineation, but this inferior distinctness is distributed over a larger area of the plate. The reason for this will be seen from an inspection of the diagram (*fig.* 7),

FIG. 7.



in which a few oblique rays are represented before and after transmission. It will be perceived that V and W suffer less refraction than Y and Z, and this being the case there is a great degree of confusion at the focus, which, as in the former instance adduced with the axial rays (*fig.* 6), is really "nowhere."

We may here observe, once for all, that we have purposely slightly exaggerated the degrees of refraction undergone by the rays when transmitted, in order the better to explain the principle. In the next chapter we shall show the beautiful and simple system by which spherical aberration is cured.

English photographic literature is evidently well studied on the continent, and one rather amusing outcome of a recently-suggested developing adjunct is the recommendation to employ marking-ink with the aid of hypophosphite of soda as a reducing agent. This class of ink, as perhaps all our readers may not be aware, is usually an ammoniacal solution of oxide of silver or of some such salt as tartrate, &c., thickened with gum; but the new recommendation is to prepare the substance to be marked upon by steeping it with hypophosphite solution, and then writing with solution of nitrate of silver. We certainly think the soda salt here is matter in the wrong place, and that, though it may be of use in a developer, it is absurd to employ it in this newly-recommended manner. As the marking of the various cloths, &c., used in a large photographic establishment would be a somewhat expensive matter, our readers will find it economical to make their own ink on the lines we suggest. About a drachm of nitrate of silver would be needed for an ounce of ink.

While considerable interest centres in the doings of the British Association in the distant future, the question of Canada *versus* home being a burning one, it necessarily must give way to the claims of the immediate future upon the attention of members and others. The preliminary announcement of the meeting in September next, which, as our readers are aware, takes place in Southport, has been issued. The Friday evening discourse will be *Recent Researches in the Distance of the Sun*, by Professor R. S. Ball. Without being in the lecturer's confidence it will not be difficult to predict that the results of photographic aid to astronomy will form an important part of his argument.

Yesterday Captain Abney delivered a lecture before the Chemical Society at Burlington House upon *Photographic Action Studied Spectroscopically*, the subject matter of which will be brought before our readers at the earliest opportunity.

It is sometimes said that animals with eyes of different structure from those of human beings may be able to see rays, such as the ultra-violet, which are entirely invisible to us, though having such important action in photographic processes; just as sounds as they increase in shrillness beyond a certain point become inaudible, but are supposed to be heard by other organisms than ours. M. Chardonnet's researches, however, rather negative this idea—at least in such animals as have the transparent portions of the eye of similar arrangement to our own. This experimenter has shown that in the human eye these rays do not reach the retina at all, and hence could not be seen by any modification whatever of the retina. He made his observations by the aid of two persons from whose eyes the crystalline lens had been thoroughly successfully removed by a surgical operation. Seating them in front of an electric arc, of whose existence they were unaware, first interposing a sheet of glass coated with silver, he obtained from them descriptions of the form and movements of the light, from which it was conclusively proved that they perceived ultra-violet rays. It is thus seen that the crystalline lens must be absolutely opaque to these rays, M. Chardonnet having already shown that the retina in the ordinary subject cannot perceive them.

Professor Tyndall has a paper of singular interest in the current number of the *Contemporary Review* upon radiation of rays at the opposite end of the scale, and he shows in it, in his usual lucid manner, the effect of atmospheric vapour in arresting terrestrial radiation. A very important question may be put here:—If, when the air is laden with moisture, the radiation is checked so much,

how do the more photographically-active rays near the violet act? or, how are they acted upon? For, as all our readers know, before and after rain, when the atmosphere might be supposed to be full of moisture, the light often acquires a most remarkable rapidity—a rapidity which is not merely due to the presence of white clouds. One of our correspondents informs us that during the present week he has been completely taken by surprise by the sudden necessity for shortening his exposures in the studio. It will be noted that this observation follows upon a change in the character of the wind, which for some time has been from the east, but in the early part of the week changed to the opposite quarter.

Rules and regulations for the prevention of fire risks arising from electric lighting have been issued under the recommendation of the Council of the Society of Telegraph Engineers. They are published in most of the papers, and those of our readers who make use of electricity for business purposes cannot do better than obtain them, keep a copy close at hand, and attend to the recommendations. The rules are not very long, and are divided under four heads:—1. The dynamo-machine.—2. The wires.—3. Lamps.—4. Danger to person.

THE ROYAL ACADEMY.

The one hundred and fifteenth exhibition of pictures and sculpture of the Royal Academy of Arts opened to the public rather later than usual this year, owing to the first Monday in May falling upon the 7th. Though fully up to the average in point of numbers, the works exhibited do not, as a whole, at first sight compare favourably with former collections, though possibly a more careful scrutiny may reveal beauties which escape the first hurried inspection. Certain it is that the present exhibition is singularly devoid of anything that can lay claim to the title of the "sensational" picture of the year.

If the charge of general mediocrity be applicable to the collection as a whole, it is even more so when we turn to the class of portraiture. This is not because there is any paucity in the number of portraits exhibited, for both "literates" and "outsiders" have in this respect done their duty. It is remarkable, however, that of the former class the new R.A. elect—Mr. Frank Holl—is the only one who has exercised his full right as regards number of exhibits. Mr. George Richmond, R.A., is the single portrait painter of note who is not represented this year.

The best of Mr. Frank Holl's portraits is, we think, that of *Lord Winmarleigh* (No. 514), the treatment of which, both artistically and mechanically (if we may apply such a term), is most masterly. The likeness is good, while the pose, though free and easy to a degree, is graceful throughout. The painting of the face is especially bold and vigorous. The same artist's *Lord Wolseley* (No. 240) and *H.R.H. The Duke of Cambridge* (No. 250) form a remarkable contrast in style. Both are well painted, the former being a half-length or, rather, bust in undress; the latter a somewhat imposing full-length life-size portrait in full uniform. *General Sir Lintorn Simmons* (No. 885) is too highly coloured. A small portrait of *Canon Carter* (No. 442) exhibits considerable power, the effect being obtained without the aid of the bright colouring which a military uniform lends. Of the three remaining works by this artist the only one requiring notice is No. 278, which gives one the idea that it has been painted from one of the popular photographs of the well-known statesman. The same remark applies to a picture by another academician, *A Portrait of Mr. Gladstone* (No. 299), by Mr. J. R. Herbert, R.A. It is difficult to believe that this does not owe more of its inspiration to one of the right honourable gentleman's recent photographs than to actual sittings.

Mr. J. E. Millais, R.A., does not this year exhibit the marvellous delicacy and finish with which we are accustomed to connect his name, both in portraiture and *genre* subjects. His portrait of *T. H. Ismay, Esq.* (No. 709) shows this change remarkably, while *Forget-Me-Not* (No. 323) is another example which scarcely comes within the range of pure portraiture. Mr. Millais' best work this year is undoubtedly his *J. C. Hook, Esq., R.A.* (No. 29), which is a magnificent piece of painting. The face exhibits all the vigour of the artist's new style with much of the delicacy of the old; the pose is at the same time free and unconstrained. The *Marquis of Salisbury* (No. 270) is too florid for the original, though otherwise a fine portrait. In *The Grey Lady* (No. 58) the artist has essayed, and not unsuccessfully, a feat in monochrome after the style of Gainsborough's famous *Blue Boy*. Here we have everything—the face, the drapery the details of the architecture, and even the light admitted by a distant doorway to illuminate the narrow passage—of the coldes grey tints; and though the *tout ensemble* is not of the most cheerfu it is by no means unpleasing.

Mr. Hubert Herkomer this year confines himself solely to portraiture. His portrait of *Sir R. A. Cross* (No. 523) is a particularl happy effort—likeness, pose, and execution being equally good *Bernard Samuelson, Esq.* (No. 759) is another characteristic portrai by the same artist, whose list of exhibits closes with *Hans Richte* (No. 362)—a simple but vigorous piece of face-painting.

Mr. Walter W. Ouless scarcely shows to advantage on thi occasion. We are accustomed to expect from this master some o the finest combinations of vigour and delicacy in the exhibition but we have this year the vigour with but little of the delicacy Of the six pictures exhibited the best is *W. Bromley Davenport Esq.* (No. 874). *The Late Bishop of Llandaff* (No. 280) is severe i the extreme—a remark which applies with nearly equal force t Nos. 476 and 506, the *Bishop of Norwich* and the *Master of Pembroke* respectively.

Mr. H. T. Wells, R.A., is represented by three portraits, the bes of which is *Mrs. Wilberforce and her Daughter Dorothy* (No. 353 This is particularly well grouped and forms a most pleasing composition, the delicate rendering of the pale grey and blue of th draperies being especially noticeable. *Mrs. Arthur Street* (No. 375 looks as if she were sitting before the camera.

Mr. James Sant also shows three pictures. The first in the catalogue is *An Impromptu Toilet* (No. 111)—a pretty portrait of a child masquerading in a "toilet" hastily improvised from some chance materials that have come to hand. The remaining two portraits of ladies present no features of note.

Mr. Edwin Long, R.A., has two fine portraits—*Samuel Cousins, R.A.* (No. 470), who is represented at work with his engraving tools, and *The Baroness Burdett-Coutts* (No. 667); the latter is a remarkably good likeness.

The remainder of the academicians and associates content themselves with one portrait each. Mr. Edward Armitage's *Real Centenarian* (No. 60), a lady in her 102nd year, can scarcely be termed a pleasing picture in any sense. Mr. Frith's *Portrait of Mrs. William Lee* (No. 24) is remarkable for the tender treatment of the delicate grey drapery. Mr. Val Prinsep's *Mrs. W. H. Kendal* (No. 143) in character owes much of its attractiveness to the subject. Mr. G. F. Watts contributes a careful study in red and green, which he calls *Katie* (No. 286). Mr. W. F. Yeames' *Tender Thoughts* (No. 314) is a figure study charming alike in conception and execution. Of a similar character is Mr. P. H. Calderon's *Dymphna*, chiefly noticeable for the wonderful painting of a sweetly-pretty face. In No. 788, by Mr. E. J. Gregory, A.R.A., we have a result which causes one to wonder who is most to blame—the subject or the artist—for the exhibition of a picture which would scarcely have been hung had it been the work of an "outsider."

Still worse in taste, however, is No. 87, by G. Grenville Manton, and in this case the committee have not even the excuse of compulsion for accepting the picture. However truthful a likeness and however technically good as a painting, the portrait of *John Collins, Esq., Senior Past Master and Father of the Court*, &c., &c., would have been better on the walls of the "Worshipful Company of Butchers," for whom it was intended, than in Burlington House, where it appeals to an unappreciating public.

Of the remaining portraits we have only space to notice a few. *Mrs. Rodolph Hankey* (No. 89), by Mr. Lowes Dickenson, exhibits the namby-pambyism of the old "Keepsake" style of portrait—a style which, though "pretty," has long gone out of fashion. J. de Lalaing, a Belgian artist, shows to advantage in his *Portrait of Madame Dubois*, in which the trammels of ordinary portraiture are cast on one side and the subject posed in a natural manner by the fireside—a style of picture much more common on the continent than in this country. *L'Etude* (No. 156), by H. Fantin, is another example of unconventionalism in portraiture, while Horace Fisher's treatment of *Mrs. W. Macnamara* (No. 245) is thoroughly French in style. The effect of black lace and dark crimson dress is wonderfully rendered. Carolus Duran's *Portrait of the Countess of Dalhousie* (No. 308) is also in the French style, both in pose and expression, the *ensemble* being very pleasing. Mr. G. P. A. Healey follows with a *Portrait of Miss L———*, which is subject to the same criticism.

One of the most attractive portraits in the exhibition (No. 259) is by a comparatively unknown artist, Mr. N. Hughes J. Baird. In pose, expression, and in the careful rendering of the flesh tints it will bear comparison with the work of many artists of greater note, its only fault, if there be one, lying in the lighting of the face. Mr.

[Joh]n Collier has two portraits—*The Hon. and Rev. E. Carr Glynn* [(N]o. 304) and *Professor Huxley* (No. 334). The first is wanting in [bri]ghtness, the only gleam of colour that relieves it being the scrap [of] blue ribbon the reverend gentleman wears. Professor Huxley's [is] a lifelike and truthful portrait, well and carefully painted. Two [ve]ry noticeable works are Nos. 360 and 900, by Rudolph Lehman [an]d Gustave Græfe. These are thoroughly foreign in their style and [tre]atment, reminding one forcibly of the old Flemish and Dutch [ma]sters. The first, *Plaiting her Golden Hair*, is a specially-fine [st]udy.

With this brief review of the portraits we must bring our notice [of] the exhibition to a close for this week. We shall resume in [ot]her classes next week.

READY TEST FOR SULPHITE OF SODA.

[P]HOTOGRAPHERS who use sulph*ite* of soda, and who wish to know [i]f its freedom from sulph*ate* or otherwise, will find the following [r]eady test useful and conclusive :—From an oil shop or chemist's [g]et one pennyworth of spirits of salts (hydrochloric acid) and dilute [i]t with two parts of water. Also, procure a little *chloride* of barium [a]nd make a ten-per-cent. solution of it in water. In a wine glass [p]ut first about twenty drops of a saturated solution of the sulphite; [t]o this add about one teaspoonful of the diluted acid, and then drop [i]n a few drops of the barium solution. If the sulphite be perfectly [f]ree from sulphate the liquid in the glass will remain clear; but if [s]ulphate be present the liquid becomes more or less milky according [t]o the amount of sulphate present.

Sulphite of soda *perfectly* free from sulphate is very difficult to [o]btain or preserve, but a good sample should not show more than traces enough to make the liquid opalescent.

The following is the *rationale* of the above reaction :—If a soluble barium salt be added to a solution of a sulphite or sulphate it is precipitated as sulphite or sulphate of barium. But sulphite of barium is soluble in dilute hydrochloric acid, whilst sulphate is insoluble; hence in the above reaction the sulphite of barium formed is kept in solution by the acid, whilst the insoluble sulphate is at once precipitated as a white powder, and gives the milkiness to the liquid.

When the hydrochloric acid is added to the solution of sulphite of soda a powerful smell of burning sulphur is evolved. This is free sulphurous acid, liberated by the hydrochloric acid decomposing the sulphite with formation of chloride of sodium (common salt); but it in no way interferes with the action or delicacy of the test, as the hydrochloric acid does not attack the sulphate that may be present.

If great delicacy be required it will be necessary to add some solution of barium to the dilute acid (especially if the common kind be used), as that sometimes contains traces of sulphates. It is also necessary that the *chloride* of barium should be used and not the *nitrate*, as the latter would at once oxidise a portion of the sulphite into sulphate. The above quantities will suffice for many dozen testings.

GEO. H. SEWARD, A.P.S.

MEASURING THE SENSITIVENESS OF DRY PLATES.

THE able leading article upon this subject in THE BRITISH JOURNAL OF PHOTOGRAPHY of May 11th, and Mr. H. Y. E. Cotesworth's interesting communication in the same number, are both of them very valuable contributions to the elucidation of this vexed and difficult question.

It is surely high time to get rid of the misleading formula of so many "times as rapid as wet collodion;" this should certainly now be knocked on the head and buried out of sight. Never was any indication so utterly vague and useless as a comparison of a certain make of plate with "wet collodion." What collodion? How sensitised? Employed how long after sensitising? What strength of bath? What sort of development? Under what circumstances has the comparison been made? For this mode of stating relative sensibility all the above terms should be set out. The last condition is the most important of all. It is perfectly well known that the relative sensibility of a gelatine plate in a dull light is very much greater than its sensibility in a bright light. In a bright, strong light "wet collodion" is not much below the standard of the best gelatine plate.

It seems to have been forgotten that instantaneous pictures were made long before gelatine plates came into the world. Are the lovely things done by Mr. G. W. Wilson utterly forgotten—his fine examples of moving objects in most picturesque scenery, pictures of water fowl, a man firing a gun, steamer in motion, and many others? Then, again: who can forget the admirable series of Paris views published years ago, giving the streets of that fair city crowded with the ever-moving population; the Boulevards with their great concourse of humanity; the Place de la Concorde, with horses and carriages and the full ebb and flow of the tide of human life? Surely these instances are enough to show that when gelatine plates are registered as twenty, thirty, nay even sixty, times as rapid as wet collodion (meaning that if a wet collodion plate take twenty, thirty, or sixty seconds to produce a given result the dry plate in question will produce the same or a better result in *one* second), it is certainly necessary to set forth some understandable conditions if such statements are to be believed and acted upon.

There is no doubt that the pressing need at the present moment is a reliable standard of comparison, and it is just this that does not seem to be forthcoming. But why should it not be forthcoming? The Sensitometer Committee sat for months, and the outcome of their deliberations was that the Warnerke sensitometer was the nearest approach to a standard measurer of sensitiveness placed before them. Now this either is or is not suitable to be taken as the sensitometer standard. It is no secret that the Warnerke sensitometers do not all tell the same tale. Whether it be a minute difference in the colour or the thickness of the screen, or whether it be in the luminosity of the tablet, it is certain that there *are* variations; but there are variations in almost everything. Nothing is absolutely perfect, and the question is this—Cannot some plan be devised for testing and comparing the Warnerke sensitometers and sending out only those which agree in their readings with a selected one to be preserved as a standard?

Take the case of a barometer: nobody thinks of purchasing a purchasing a barometer for scientific purposes unless it has been tried and verified at Kew, and the purchaser looks to have a properly-signed document giving him the assurance that this has been done. Take the case of that most important instrument, the chronometer: no commander of a vessel will have anything to do with an instrument that has not been thoroughly tested and its rate of going accurately noted.

The sensitometer may not, perhaps, be so important an instrument as a chronometer, or even a barometer; but it is of great importance to makers of dry plates to have the means of assuring themselves and convincing their clients that the plates they send to them have a certain sensibility which can be expressed in a clear and unmistakable manner. Why should not the Parent Society take up this matter? They are the "Photographic Society of Great Britain," and a glance at the names of the Council will show that there is abundance of scientific power and large experience. Is it not possible to deposit with them a sensitometer that shall be considered the *standard*, and to which all the sensitomers of that kind shall be referred? Let those who desire to purchase a sensitometer have one that has been carefully tested with the standard, and let the purchaser be assured that this is the case by receiving a written paper signed by some competent person who may be selected by the Council to perform this work. If Mr. Warnerke's sensitometer be the best known form, let *it* be considered the standard, and only let those go out as *standard* that have been verified with the one deposited with the Council of the Parent Society. Doubtless this means an increased charge upon each instrument. If work has to be done it must be paid for. A fee is paid for verifying a chronometer or a barometer —why not for a sensitometer?

Possibly a sensitometer is not considered necessary by the professional photographer. The professional photographer, as a rule, sticks to the plates to which he has got used, and knows that if he deals with a good maker there is very little difference in the batches he receives. A little more or less of accelerator, a trifle more or less of restrainer, will show him exactly where he is; but with amateurs, who rove amongst dry-plate makers like bees from flower to flower, it is of importance that they should find on their packages a number honestly placed there by the maker, and which may be safely taken as giving a real indication of the sensibility of the plates in reference to a proper standard.

Of course sensibility is only *one* quality in a dry plate. A plate may be very sensitive and yet be a very poor sort of article—the sort of thing with which the utmost care and skill can barely produce passable results; but judging from the practices of many photographers, who seem to fancy a picture worthless unless it can be produced in the fraction of a second, one would imagine that sensibility was everything and quality nowhere. The *quality* of a plate the worker must find out for himself; but if there could be some plan of fixing a standard of sensibility something would be gained, and the statements of the relative sensibility of dry plates

with reference to wet collodion would be relegated to the limbo of absurdities.

After all is said and done, is it quite certain that sensitometer trials do really indicate the results that may be expected in the camera? Does the monochromatic light of the luminous tablet impress the plate in the same manner that colour radiations from objects passed through the lens with the camera do? This is a point that is by no means assured, and persons of great experience have their doubts upon the subject. Pending the solution of these problems, every one who wishes can easily assure himself of the relative sensibility of plates that are not known by exposing, at a cost of twopence, a quarter-plate side by side with another of which the sensibility *is* known. Develope the two together in the same dish, and this simple operation should settle the question for the whole of that batch, at anyrate. And, when so simple and easy a means of procuring the necessary information exists, amateurs can certainly afford to wait until this sensitometer question has been so far settled as to enable makers to put upon their boxes indications of sensitiveness that can be relied upon. J. R. Sawyer.

PHOTOGRAPHY FOR BEGINNERS.

IN SIX CHAPTERS.

Chapter I.—Selection of Apparatus.

In the selection of apparatus regard must be had to the amount of expenditure to be devoted to such purpose, and to the intention of the incipient artist. A camera, with its appropriate outfit, adapted for taking negatives on a plate five by four inches, and constructed so as to fold or pack up in small compass, will, in all probability, prove more convenient than any other to a tourist who wishes to secure pictorial reminiscences of his travels without being encumbered with bulky parcels. A 5 × 4 picture is suitable for transparencies for the lantern, for book illustration, and for mounting in an album.

But in cases where mere tourist work is not the limit to the aspirations of the prospective photographer, it will prove more satisfactory if a camera of twice the dimensions given be selected. A plate 8 × 5, 7½ × 5, or near to these standard sizes, is more desirable on account of the larger scale on which the picture may be obtained and the ability to take binocular or stereoscopic pictures of such subjects as are best depicted by that mode of representation. An argument in favour of this larger size is to be found in the fact that, in nearly the majority of instances in which operations have been commenced with a 5 × 4 camera, the photographer has rarely remained contented until he obtained one of larger dimensions.

Guided by the advertisements of any respectable dealer a camera, with its various appurtenances, are supposed to have been procured. While it is not at all objectionable that the lens belonging to the outfit be a quick-acting portrait instrument, it will better conduce to ultimate success if the camera be fitted with a landscape lens which, although slower in its action than a portrait lens, is much more manageable. It is not so slow, however, as to prevent charming groups and portraits, as well as landscapes, from being obtained through its instrumentality when the light is good. Portability in the camera-stand is highly desirable, but absolute steadiness is indispensable.

Chapter II.—Taking the Negative.

Previous to commencing to take a negative it is well to devote an hour to becoming acquainted with the mechanism of the camera, and acquiring proficiency in focussing. If the lens have several stops or diaphragms, as will probably be the case, practise focussing with the largest stop. Having placed the camera on its stand, let the lens be directed to any object not less than from fifteen to twenty feet distant. Now throw over the camera a large square of black velvet, which must hang over behind, and be sufficiently capacious to permit the operator to place his head underneath, thus enabling him to see the image on the ground glass focussing-screen, which could not be done unless the light from behind were prevented from having access to the screen. On account of its pliancy velvet forms the most suitable fabric for a focussing-cloth. The ground surface of the focussing-screen must be nearest to the lens.

In focussing it is well to have recourse to the services of a magnifying glass to aid in securing sharpness. All cameras have a sliding adjustment to permit of the distance between the lens and the ground glass being lengthened or shortened to such an extent as to enable the image to be depicted with the utmost clearness. For optical reasons, unnecessary to be now explained, the image is inverted, the sky of a landscape or head of a sitter being lowest. The most convenient form of magnifying-glass for focussing is that in a cylindrical horn case, with a bell-shaped mouth, made for watchmakers and engravers, sold at about a shilling, and which may be procured everywhere. This, after a little practice, can be retained in position by the muscles surrounding the eye, leaving both hands clear. When a plate the full dimensions of the focussing-screen is to be used, it must be borne in mind that just so much of the exterior world, whether landscape or figures, as appears on the focussing-screen will be reproduced on the sensitive plate.

We assume that our young photographer is to use sensitive dry plates of some one of the numerous brands to be met with in every locality. These should be purchased from some reputable dealer, for it will prove extremely unwise policy to attempt their preparation until the tyro has acquired sufficient experience to take thoroughly good negatives on commercial plates. *Then* he may make his own plates, but not at an earlier period of his novitiate.

The package of plates must be opened in a room from which all white light is scrupulously excluded. It is best at first to do this after nightfall by the light of a lantern glazed with glass of a deep ruby colour. If the faintest streak of white light from an unprotected or naked candle be allowed to fall upon the plate, if only for an instant, it will be impossible to obtain upon the plate thus damaged a negative worthy of the name, as the details will be shrouded in fog. Hence the necessity for exercising the greatest care to prevent stray light from reaching the plate until, at a subsequent stage, the image has been developed. On opening the parcel of plates it will not be difficult to ascertain, after a slight examination by the red light of the lantern, which of the two sides of the glass is that coated with the sensitised gelatine. If, owing to any special gloss of the coated surface, this discrimination be rendered difficult—although it will only be so in the case of the first two or three plates handled—certainty on this point will be ensured by scratching a corner of the surface. The plate must be laid down in the holder, face down, so that when it is afterwards placed in the camera the glass shall not intervene between the sensitive film and the lens.

The dark slide or plate-holders having been charged with plates, must be carefully stowed away in a dark place until it is convenient to expose them in the camera. This retaining of the slides in a place from which light has been excluded is a safe precaution; for, in even the finest slides, there may be a minute chink through which a feeble beam of light might penetrate and thus spoil the plate. An envelope or bag of opaque paper or black calico forms a safe and convenient receptacle for dark slides when "charged." There should be one for each slide, and the number of the slide should be marked in a prominent place on the outside.

The time having arrived when the first picture is to be taken—which we shall imagine to be a landscape of any kind, having some portions in deep shadow—proceed as follows:—Having focussed the image sharply, cap the lens, which should, on this occasion, be used with a very small diaphragm; next remove the ground glass, insert a plate-holder in its place, and withdraw the dark shutter immediately in front of the sensitive surface. To prevent the possibility of extraneous light reaching the plate during this operation, the focussing-cloth should be thrown quite over the camera, leaving a small space in front for the lens to peep through. Now, without shaking the camera, dexterously remove the cap from the lens for a period of time which may vary from half-a-second to several seconds. This is the one part of the whole operation in which no definite instructions can be given, seeing that the brightness of the day and the light or dark colour of the subject to be taken as well as the sensitiveness of the plates—neither of these being constant factors—have all to be considered in determining the duration of exposure. But if we cannot state the precise time requisite for exposing, it is fortunate that we can put it in the power of the young photographer to determine this for himself. Let the plate receive an exposure of one second, the subject being a landscape containing, as before described, some very dark shadows as well as high lights. Cap the lens and carefully push in the shutter of the dark slide, inserting, for this purpose, the hand under the focussing-cloth. Remove the slide from the camera and transfer it to its case, and all the outdoor operations connected with taking such picture are completed.

It is only during the next stage—that of developing—that we shall learn whether the exposure given in the camera was too long, too short, or quite correct. Among the innumerable formulæ for developers that have been published that which we recommend to the beginner with which to make his first attempts is composed as follows:—Provide two bottles, each holding a quart. Into one put

hree and a-half ounces of common washing soda and fill up with water; placing in the second bottle—

Pyrogallic acid	64 grains,
Oxalic acid	96 „
Bromide of ammonium	32 „

and then filling it, too, up with water. These solutions will retain their good working properties up to the last.

To use them: lay the exposed plate in a little water (in a dish), face up, and when this has been done pour out from the soda solution bottle one ounce into a graduated glass, pouring also from the pyrogallic acid solution an ounce into a separate graduated glass. Decant the water from the tray, and then, having previously mixed the two solutions by pouring one into the other two or three times, pour them into the developing dish, the two ounces being considered sufficient to flow easily over the surface of the plate. All this must be done in the dark room by the red light of the lantern. Now keep a sharp eye upon the white surface of the sensitive plate and soon an image will be seen gradually forming. First the sky and the high lights appear. These are slowly followed by the middle tints, the high lights going on increasing in darkness. Lastly the details appear in the deepest shadows, and when these seem to be fully out the operation must be stopped by the application of water from a jug.

After washing the negative it is placed in a second tray containing a solution of hyposulphite of soda, four ounces to the pint, in which it must remain till all the original white colour of the film has been completely dissolved out. This is best ascertained by lifting the plate occasionally and examining its under surface. When quite "fixed" by the removal of the white material the plate is rinsed and immersed for a few minutes in a saturated solution of alum, to which has been added one ounce of hydrochloric acid per pint of solution, after which it is well washed in several changes of water and placed in a current of air to dry. In our next we shall speak of over- and under-exposure.

THE RELATIVE ACTION OF CARBONATES AND AMMONIAS IN CONJUNCTION WITH PYROGALLOL DEVELOPERS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

Up to the present time, with one or two exceptions, ammonia seems to be the only accelerator accepted to act in conjunction with pyrogallol for the reduction of images formed on gelatino-bromide of silver films, though I am somewhat at a loss to understand why this alkali should have had the almost sole preference for so long a period.

I may state that, after about a month's practical everyday working, using carbonate disodic side by side with ammonia, I find two advantages in working the former which appear to me to be of great importance, namely—(1) increased rapidity of exposure; and (2) more force in the minor lights and general middle grade of the image, where unquestionably the weakness of bromide of silver lies when distinguished from collodio iodide films.

With regard to reduction of exposures: if the action of the alkali ceased when it had rendered the pyrogallol alkaline, then we might be right in supposing the work of each accelerator as equal; but it is found that these substances do further chemical work. The developing action of pyrogallol alone is expressed in symbols as:—

$$2\,Ag_2\,Br + H_2\,O + C_6\,H_6\,O_3 = Ag_4\,2\,H\,Br + C_6\,H_6\,O_3\,6\,O.$$

When ammonia is added the developing action becomes much more energetic, owing to the pyrogallol's avidity for oxygen when in an alkaline state; and in addition to this the chemical equation is changed:—

$$2\,Ag_2\,Br + 2\,NH_4\,HO + C_6\,H_6\,O\,3 = Ag_4 + 2\,NH_4\,Br + H_2\,O + C_6\,H_6\,O_3\,6\,O.$$

Now, in the case of replacing the ammonia by carbonate disodic, when the latter is present, the reaction will be, to commence with, still the same as in the first equation quoted above, because the carbonate of soda does not combine with silver sub-bromide. It, however, decomposes hydrobromic acid, which will be:—

$$2\,H\,Br + Na_2\,CO_3 = 2\,Na\,Br + H_2\,O + CO_2$$

unless there still remains sub-bromide to continue combining with the liberated hydrogen and pyrogallol in excess to absorb the oxygen instead of these two substances forming water; then, in the latter case, the equation would probably stand—

$$2\,H\,Br + Na_2\,CO_3 + 2\,Ag_2\,Br + C_6\,H_6\,O_3 = Ag_4 + 2\,H\,Br\ \text{(freshly formed)} + 2\,Na\,Br + CO_2 + C_6\,H_6\,O_3\ \text{and O.}$$

This is only conjecture on my part and I may be wrong, but it is the only manner in which I can account for the accession of rapidity apparently obtained by using the carbonate developers.

Another cause of the increased energy, which may be considered as beyond conjecture, is that carbonate of soda may be used without any restrainer, yet it being of sufficient strength to give full density to the image without fogging.

I believe that the extra strength of middle gradation produced with carbonate is due to physical causes, this developer appearing to give brighter pictures by producing the image more directly on the surface of the film, instead of being imbedded so far into the gelatine, and some of the more tender details depreciating in power from lateral and angular placement.

Most of the images which I have developed, while possessing sufficient density, have yet in their unfixed state shown little or nothing from the back of the plate, what small amount was visible being sometimes of actually a positive character, through the unaltered bromide film forming the shadows being tinged darker with the absorbed oxide stain, while the reduced portions representing the top lights had resisted the stain more, and thus appeared white from the back.

The fact of the deposit being comparatively on the surface of the film would suggest the possibility of using thinner coatings of emulsion, although that is a project which I have little sympathy with, my impression being that our negatives are greatly impoverished by the present thinness of commercial films.

I have noticed that when using the carbonate accelerator the image seems to develope all its details first, and their intensity to gradually accumulate afterwards. When contrasted with the ammonia treatment this effect is very noticeable, and it must be more advantageous in bringing up the minor lights in their true relationship than with ammonia. It has some appearance, too, suggestive of the intensity being gained rather from the solution than the film, as though some of the silver bromide was dissolved and then deposited by the power of crystalline attraction, as in the collodion wet process.

There seems to be total immunity from green fog with the use of the carbonate developer, even when in its most concentrated form; although grey fog, due to the metallic reduction of the silver throughout the film, may be readily produced—in strong solutions especially—when the carbonate is in proportionate excess to the pyrogallol.

I find carbonate disodic to be soluble in about its own weight of boiling water, and in about twice its weight of cold water, using fluid measurement for the water. This latter combination is equal to fifty per cent. of soda, and I have found it possible to develope images with this actual saturated strength—a matter which appears surprising to me when it is remembered that very little more than one per cent. of ammonia can be ordinarily used, and even that has to be restrained with bromide. The new quarter plates here shown are developed with this excessively strong, unrestrained mixture; and, while they are palpably fogged, yet it may be acknowledged that their printing qualities are surprisingly good.

I have obtained negatives quite free from fog with one to four, or twenty-five per cent. of carbonate solution; while, again, in other cases I have found films heavily veiled with this same strength. Indeed, there are some fluctuating influences connected with the process that I am not in a position so far to account for. As, for instance, in the yellow discolouration of the film from oxide staining, I have found the resulting image in one case perfectly clear from those effects, and in the next plate, with the same strength and conditions of the developing solution, this film has been sufficiently impregnated with the discolouration to form a positive image on the back of the plate, as I before mentioned. Then, when the stain has been removed after fixing—as it can be with the ordinary alum or acid treatment—the discolouration has again occurred in a lighter form, even during the subsequent washing necessary to remove the decolourising agent. I suspect that the different thicknesses of the gelatine films have much to do with the cause of this variation, the thinner films encouraging the staining effects.

I can discover very little difference of rapidity between one to four and one to ten strength of carbonate in solution; while with the latter proportion immunity from fog is easily obtained under reasonable circumstances.

All things considered, I have little hesitation in recommending the following formula for simplicity, efficiency, and cheapness:—Make a saturated solution of ordinary washing soda by simply throwing an excess of the crystals into a jar of hot water, and stirring well; when cold, this will yield a stock solution in the proportion of two of water to one of soda.

For developing, use—

Saturated solution of carbonate of soda	1 part,
Water	5 parts,

and to each ounce of this diluted solution add twenty minims of a ten-per-cent. alcoholic solution of pyrogallol immediately before using. This gives carbonate disodic forty grains, and pyrogallol two grains, to the ounce.

By-the-way, I cannot too thoroughly express the advantage I think there is in quoting formula whenever possible, as in the proportion of the substance in question to the ounce of the vehicle or solvent, or else to quote it as so much per cent.—it is so comprehensive and the proportion is so easily grasped by comparison with other familiar compounds of recognised strength; and in this particular it contrasts very favourably with the variable quantities of substance often quoted, the force of their relative strength being ofttimes lost in ordinary reading, through the difficulty of readily comparing the proportions.

But to return to the matter of developing. In addition to the normal proportion above recommended, the judicious use of the concentrated

solution of carbonate of soda is an important auxiliary in cases of under-exposure; a (say) twenty per-cent. solution of soluble bromide should also be kept at hand, and a few drops added on the first indication of the image developing too rapidly.

I heard lately of one photographer trying carbonate of soda in his developer, and then giving it up because, although the result was good, it took some three hours to develope the negative. I cannot imagine what he had been doing, as in my little experience I find the time of developing with ammonia and the carbonate very much the same—in the latter case probably a little longer period being necessary to obtain the requisite density.

In conclusion: I may state that the two cabinet negatives which I have with me were developed—one with carbonate and the other with ammonia, all else being quickly equal. It may be noticed that the carbonate-developed plate shows a decided increase of detail over that treated with ammonia. They were exposed for only one second in a not very quick-working studio at about half-past four o'clock on an April afternoon, with an intensity ratio of $\frac{f}{4\frac{2}{3}}$—a state of affairs in respect to rapidity which I regard as very satisfactory.

LYDDELL SAWYER.

NOTES FROM ITALY.

THE little time I have for making experiments in photography has delayed my completing those on transferring gelatine negatives, and it is only recently that I have attained tolerable certitude in lifting the gelatine film from the glass. The process, as I have thus far reduced it, is as follows:—

The negative, when fixed and washed, should be put away to dry without passing through the alum bath, unless frilling be imminent. The alum makes the operation more difficult and less certain, but does not prevent it in most cases. When the transfer is to be made, the negative should be laid in a water bath until the film is well wet. A sheet of paper (I find the tough, thin bank-post the best) should be prepared by saturating with a good spirit varnish (negative or plain shellac), and then the negative is to be laid on a slab of some substance which will bear a moderate heat—enough to keep gelatine from setting. Give it a thin coat of gelatine as soft as it can be applied rapidly and without lines. The paper is coated similarly, let down carefully on the negative—gelatinised sides in contact—and while still kept warm the two are pressed together so as to have the thinnest possible film of gelatine between them, and free from bubbles. Let this combination dry hard, and then lay it in the alum bath for ten minutes or more; after which wash in two changes of water, and leave it to soak in another for twenty-four hours, more or less, the time depending on the fitness of the gelatine to leave the glass. I find twenty-four hours always enough, but something may depend on the gelatine. Let the two dry together until the paper is surface dry only and resists tolerably well; then pass a penknife round the edge, lifting the gelatine to the width of a quarter of an inch, when, taking it by one corner and drawing it back slowly, watching the edges to see that no points adhere still, the whole film may be lifted without harm. If adhesion at any point occur it is probably due to a bubble in the film of gelatine connecting the two together, or insufficient time in the alum bath. If general adhesion exist the soaking is insufficient. There need be no kind of apprehension of frilling after the paper is attached; in fact, frilling on the large scale is what we want.

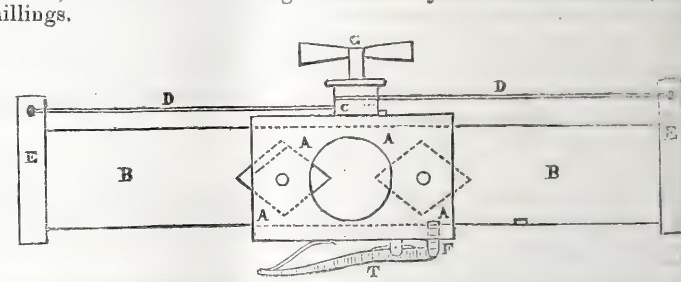
The negative thus lifted may be hid away in a book to await future operations, or may be mounted at once. This, whenever done, will be completed as follows:—Take a glass half-an-inch smaller than the film as lifted, and, having cleaned it with French chalk, coat it with good transfer collodion; put it in a bath of clean water as for enamelling positives, and in the same bath put the gelatine film on its paper mount until the former is no longer "greasy" and the latter quite flat. Float the film on the glass, turn the little margin over and glue it down to the back of the glass with a strong alcoholic solution of glue, as recommended for mounting prints, and let it dry perfectly. The next operation must be carefully performed, or the negative will leave the glass with the paper. Wet the paper over its whole extent except the narrowest margin along the face, and the border turned back with strongest alcohol, and when the varnish is softened scratch the paper away from the film at one corner carefully, so as to lift it from the plate without disturbing the gelatine film. Once started it goes easily enough; but care must be taken not to tear away the folded edge. Then with a little cotton-wool and alcohol wash off the varnish which remains on the gelatine, coat it with transfer collodion, and let it dry. It then leaves the glass perfectly protected on both sides, and ready to be printed from reversed or direct. The operation may be simplified by further experiment, which is neither long nor laborious.

I have received divers samples of gelatine plates variously packed, and in general with little breakage; but I find that the plates which come with paper laid between, so as to be supported over the whole surface, are none the worse for this method of packing, and there is no breakage at all. They are, however, generally packed in boxes much too thin and unsubstantial for foreign custom-house treatment or transportation.

A hint about cutting down gelatine plates after coating:—Use a good diamond and cut from the gelatine side, as if cut on the other side the film tears up when the glass is dulled off, or separates and starts a frill.

I have been doing some instantaneous work, and find the market filled with shutters which I should have liked to try on or, at least, see, but which have not reached here; and, as to order a lot of shutters at £3 (more or less) each to see which is best is an unprofitable way of learning, I have been obliged to study out my own shutter, which I present to your readers, premising that if it interfere with any patent they may drop it as instantaneously as they like. I charge nothing for it.

I used originally a simple drop, but found that for animals in motion it was far too slow; the horses going past my window resembled equine comets—all tails. The rubber band required to quicken the motion to the required point was so powerful as to make a perceptible recoil in the camera and consequent blur in the image, though I find that the artists liked the photographs all the better for it. I did not. I therefore added another shutter to the one I had, to work in the opposite direction and take off the thrust from the lens and camera. To secure equality I turned it, so that the motion became horizontal. To effect simultaneousness in the passage of the two openings before the lens I put the spring on the box which goes on the lens, and to make the whole as light as possible I made all the woodwork out of a cigar box. I made it with a jack knife, finishing it with sandpaper and shellac, and got a clock-spring mounted in a barrel, as for a watch of the old fashion, which cost me, made to my model, four shillings. Then I had a trigger made which goes as easily as the trigger of a gun, and I have a shutter which will work as quickly as wanted or as slowly (approximate, however, to "instantaneous"), by the addition to the barrel of a fan like that in the musical boxes. The whole is shown in the annexed diagram, and cost me, the metal work being made here by an Italian workman, eight shillings.



A A, Box fitting on the lens front. B B, The horizontal shutters shown extended ready for exposure. C, Barrel containing a spiral spring, which is wound up by the cords connected with the upright bars terminating the shutters. T, A trigger acting on the catch F. G, Fan for moderating the movement. O O, Openings, one being hidden.

The openings O O are made lozenge-shape, so that as they meet the exposure begins in the centre and ends in the centre, or they may be so levelled as to open wider for the foreground than for the sky; or they may be made with movable discs fitting into the opening, and of varied shapes. There is a stop for the focussing at which the openings coincide, and another at the full extension. The ends of the box A A are fitted with india-rubber buffers to receive E E and prevent breakage. Any range of rapidity may be obtained by varying the spring, by a longer or shorter opening, or by the fan employed in music-boxes, &c.

The whole, including fan, ought not to cost over 15s. The pneumatic opener may be employed in the place of the lever and trigger, though I do not see the use of it. The use of an india-rubber band as motive power is not admissible where any exactitude of timing is requisite. It is never to be depended on in varying conditions of atmosphere, breaks easily, is difficult to replace by one of the same force, and, in short, is unscientific.

As to the timing of short exposures: I do not believe there is any practical certainty in the formula worked out by mathematical calculations. In company with an eminent professor of mathematics I once worked out the time of exposure of a common drop shutter; but when we tried to make the compensations for resistance of the atmosphere, friction, &c., we found the calculations almost useless. I have seen many thousands of pounds wasted on machines that were correct in theory but which practically did not do what they were expected to do.

There is a very easy and exact method of ascertaining the time of exposure, requiring no high mathematics and no theory. Borrow the services of a friend and pose him against a dark background in strong sunlight. Give him a ball—a croquet ball painted white answers very well—fastened at the end of a strong cord about a yard long, and ask him to swing it round in a plane at right angles to the axis of the lens, and time him to see how rapidly the revolutions are made. With a little care he can adjust the motion to a turn in a second, and if then you expose a plate you will find the movement of the ball indicated by a streak, which can be timed by a simple sum in division. This circle will be sufficiently large in circumference to measure readily in the negative, and the 360 degrees of the circle, divided by the number of degrees occupied by the mark made by the ball in its motion, will give the fraction of a second of exposure. The actual error here will be very small; and, if the mark of the ball on the plate be (say) ten degrees,

e movement takes the thirty-sixth part of a second, with less error ıan any mathematical formula will give when resistence and friction ·e provided for. W. J. Stillman.

Florence, April 23, 1883.

SIMPLE METHOD OF RECOVERING SILVER FROM WASTE GELATINE EMULSION PLATES OR PAPER.

ı communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

'HE subject matter of this paper was written some months ago, but ıublication was deferred because I had at the time some thought of urning my idea to business account. From one cause or another—ıressure of other matters and so on—nothing was done in this way. \bout three weeks ago, however, I noticed in one of the photographic ournals a statement to the effect that a German chemist practised ı certain method so nearly akin to my own that I decided to bring the ;ubject before this association in the form of a short paper, and at as ;arly a date as possible.

I found myself some six or eight months ago, after a variety of ;xperiments with gelatine emulsion making, with some accumulations of waste. Even the most experienced manufacturer of gelatine dry plates must have occasionally a bad lot, and the question is forced upon one—What is to be done with it? And not only waste emulsions but waste plates. Now, I do not wish anyone to suppose I was guilty of such an absurdity as to coat plates with an emulsion I knew to be bad. Such was not the case. The fact is my drying cupboard was faulty, and I had occasionally batches of plates altogether unreliable from the fact that desiccation proceeded so unevenly as to make the plates practically useless. I suppose in the ordinary way these would be cleaned off and the silver bromide allowed to run down the sink. The usual methods then recommended for the recovery of silver residues did not appear to make any allowance for waste *plates*, and the practice advocated of boiling the waste *emulsion* with the acids left in pyroxyline manufacture or with sulphuric acid was not one I cared to adopt.

The plan I pursued then and have followed since with success is briefly as follows, and the operations are all such as you are familiar with:—Supposing that you have a pint or so of fogged or defective emulsion, melt this and pour into one or two shallow porcelain dishes. Allow it to set, and then pour on a solution of hyposulphite of soda (four ounces to the pint) sufficient to cover. In a short time the film, previously opaque, will be found quite clear and transparent; the film has become, in fact, what photographers call "fixed." The hypo. solution has dissolved out all the bromide, iodide, or chloride of silver in the emulsion. The waste plates are treated much in the same way. I have a box capable of holding about two dozen plates. I fill it, and pour on sufficient hypo. solution to cover. Very soon the plates are all quite clear, and they may then be removed and cleaned; if not allowed to dry they will be cleaned very easily. It is quite unnecessary to throw away any particle of emulsion or any piece of coated glass or paper. All articles, such as bottles, dishes, funnels, &c., used in the process of manipulation are easily and rapidly cleaned with warm hypo. solution, and I can say that if done soon after use the effect is magical. Any amateur who makes his own plates will know and appreciate the value of all this.

All these hypo. solutions and washings are mixed together in a large bottle, and when of sufficient a bulk solution of ammonium or potassium sulphide is added until the whole smells strongly, precipitation of the silver as sulphide proceeds at once, and when quite settled at the bottom of the vessel the supernatant fluid may be poured off, but not necessarily thrown away. The remaining thick liquid should be poured into a filter, the precipitate drained, washed, and dried, and it may now be mixed with half its weight of carbonate of soda and fused in a crucible. If sufficient heat be applied a button of silver will be the result; if not, the silver will be found as oxide contaminated with soda. The brownish-coloured mass may be powdered, washed with water to free it from soda salt, and dissolved in dilute nitric acid. This solution is boiled to get rid of excess of acid, and then allowed to cool and crystallise. Personally, I prefer to keep the nitrate of silver in solution, test with the argentometer for strength, then convert into bromide with ammonium bromide, and emulsify.

It has been suggested to me that the gelatine recovered from the waste *emulsion* is not worth saving. I do not agree with this. If properly treated I see no reason why, provided the sample be a good one, it may not be used for a fresh batch; if not, there are other uses to which it could be put.

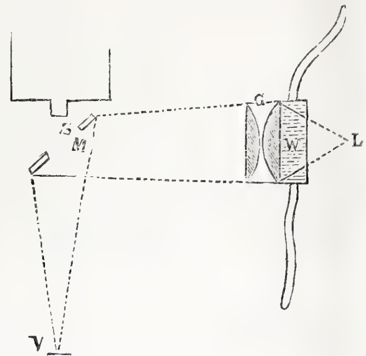
Those who may object to a few even simple operations may keep their silver waste as sulphide until they have sufficient to send to a refiner. In any case I consider, as matters are, the waste of even a single plate inexcusable.

Other solutions used in the various processes of our art are also worth saving. For instance: the waste pyrogallic developer, to which a small quantity of saturated sulphate of iron solution has been added, makes a capital writing ink, as the fact that this paper is written with such ink proves. It may be a little thin, but that is a fault easily remedied. J. Pike.

PHOTOGRAPHY OF THE VOCAL ORGANS IN THE ACT OF SINGING.*

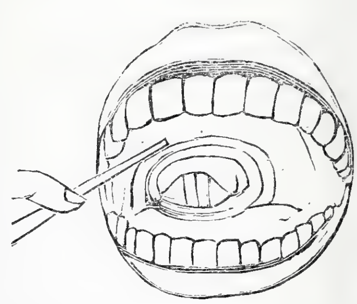
The apparatus we have recently used consists mainly of the arrangement shown in *fig.* 2 [*the apparatus itself was shown and explained during the reading of the paper*].

FIG. 2.



L, the position of the electric light (about 10,000 candle-power); W, a water-chamber through which a current of water is constantly flowing during the use of the light, in order to absorb as much as possible of the heat-rays, and to keep the condenser cool; C, a condenser, six inches diameter, consisting of two plano-convex lenses; M is a mirror, with a plane surface and a hole cut in the centre; V, a laryngoscopic mirror, for placing at the back of the mouth. The lens of the camera has a shutter at S, on which is a small plane mirror in which the person operated on can see to adjust the mirror V in its proper position, it, of course, being necessary to look through the hole in the mirror in order to do so. The lens at S should, of course, be of the single-objective type, so that the diaphragm can be near to the hole in the mirror M, thus enabling the hole to be as small as possible. This is of importance, so as not to lose too much light. I may mention that at our early experiments we had not our apparatus quite so perfect as above described, as we could not get our arrangements completed in time for the appointed days for experiment; and, indeed, some fairly good results were obtained by placing the mirror M a little above the lens at S (this being, of course, before the hole was made in M), and using lenses of the rapid rectilinear kind. Our exposures averaged about a quarter of a second. I have no doubt that our results would have been much better had the exposures been very much shorter, but, with the plates at our disposal at the time, shorter exposures could not very easily be made. Some may ask why portrait lenses were not employed; but, though they answer fairly well for photographs of the soft palate only, they do not give sufficient depth of focus for photographing the larynx. It does not do to gain relative depth of focus by placing the camera further from the observer, as, after a certain distance, it is difficult for the observer or person operated on to see to adjust the laryngoscopic mirror, at V, in the mirror at S. It must be borne in mind that the apparent distance at which V is seen in S is, of course, twice the distance from V to S.

FIG. 3.



I will now show on the screen some of our results, also the transparency made from the print by Professor Czermak, and will again call on Herr Emil Behnke to explain the physiological points. *Fig.* 3 shows a cut from one of our laryngoscopic results.

[Herr Behnke, in explaining the second illustration, that of Czermak, said:—"You will recollect that, in the first diagram, I pointed out to you the lid, or the epiglottis. You saw it then sideways; you now see it from above. In the former it was widely separated; here it is all in a plane, or nearly so. We have here the back of the tongue, and also the upper free rim of the epiglottis or lid. Down below, but very indistinctly, may be seen some little cartilages, a description of which I will not trouble you with. One appears to be enormously enlarged, either by disease or else it is distorted by the mirror. Again: we have the two white vocal ligaments or cords; in one of the cords is a dark line, which indicates a slit. On the right are two other ligaments, called the "pocket ligaments;" and between the pocket ligaments and the vocal ligaments there is a pocket or pouch, the entrance to which you see indicated by a dark line. On the other side it is not so well shown. I have never seen this photograph myself, and I quite agree with Mr. Cadett that, considering there were no gelatine plates in 1860, it is really wonderful. However, I think we have produced better things, as we shall have the pleasure of showing you presently."

Herr Behnke then explained the next illustration. He said:—"This photograph shows the position of the soft palate in the production of the nasal tone. I may say that those who are singers and speakers ought to have the power of elevating or lowering this palate. If we raise it, the tone does not get a fair chance of escaping from the mouth, but finds its way behind the soft palate into the nose, and thus we see here photographed the position of the palate in what is known as 'nasal tone.' In the next illustration you have the position of the soft palate in the production of the pure vocal tone. I am not quite certain, but I think the note which this represents is A. We have taken F, A, and C. The position of the soft palate shown just now is C. In A the cords are absolutely arched: the higher the tone the narrower the arch becomes. In singing the uvula should contract, and in the higher notes it disappears. In this example of the note C you see how much higher the arch is, and how little you see of the uvula.

* Concluded from page 268.

In the next illustration are to be seen the mouth, the tongue, and the teeth pretty plainly. The mirror, and this stem by means of which it is held in the hand, are also prominent features in the photograph. Again: we have the little cartilages and the vocal ligaments, and the slit that extends from one end to the other."]

I cannot conclude my paper without expressing my admiration of Herr Behnke's skill in using the laryngoscope. The credit of what success we have had is entirely due to him. Without his marvellous facility for properly showing his vocal organs no successful photographs could possibly have been taken. Only those who witnessed the experiments can appreciate the endurance and perseverance necessary to stand the fierce heat and light, for hours at a time, of a cone of electric light of 10,000 candles. He has been nearly blinded several times by the light being accidentally shot into his eyes instead of his mouth. I have often wondered what the muscles of his jaws must have felt like after six hours' hard work, stretched open like those of the feline tribe in the act of yawning. Indeed, I am forced to conclude that nothing but the greatest scientific enthusiasm could have sustained him through what he has done.

In conclusion: I beg to state that we are all much indebted to Mr. H. Trueman Wood for his great kindness in placing the laboratory and dynamo-electric machinery of the Society of Arts at our disposal.

James Cadett.

MICROPHOTOGRAPHY.

[A communication to the Edinburgh Photographic Society.]

The production of photographs of microscopic objects may be taken to be the most difficult subject which a photographer can attempt, and yet at the same time one of the simplest. It is simple in this respect—that when the object to be photographed has been properly prepared and the apparatus all in order the mere taking of the photograph is as easy and simple as taking that of any other negative. The difficulty—what there is of difficulty—consists in the proper arrangement of the apparatus, the selection of a carefully-mounted object, the proper arrangement of the light, the selection of the proper objective to be used, and, what is of more consequence perhaps than all the rest, obtaining a sharp and fine focus upon the screen of the camera.

It will be well to go over these details as they are mentioned above, and when they have been considered *seriatim*, followed by the practical exhibition of the apparatus and the taking of a negative, there cannot be much difficulty in understanding what is necessary to be done and how to do it.

The best way to proceed is to get a straight, flat pine board about the width of the camera to be used, and at one end of it to fix the camera at such a height that the tube of the microscope to be employed (which is fixed at the other end) shall project into the front of the camera as near as may be opposite to the centre of the focussing-screen. This may be done, as you can see on the board on the table, by placing pieces of wood below the camera transverse to the length of the board, and fixing the camera firmly on these by a screw from beneath. Any camera will serve the purpose, either short or long. The microscope is fixed to the board in front of the camera, and with the eyepiece taken out the tube is put about an inch inside the camera, in the hole into which the camera lens is usually screwed. The tube of the microscope requires to have placed inside it either a diaphragm at the end next the camera, to cut off any false light which would be reflected from the side of the tube, or, what serves the purpose equally well, a piece of stiff paper blackened with lampblack and lacquer, wrapped round like a tube and pushed into the tube of the microscope, such as I show you now.

The microscope may be a very simple one if only low powers are used, but it is essential that it should be made to *incline*. It is also necessary, if good results are to be expected, that the very best lenses should be employed. You will notice that the one on the table is a very simple instrument, but very steady. It has no fine adjustment. Indeed that is not necessary with all powers less than a half-inch object-glass. You will see that the eyepiece is taken out; with the eyepiece in a much larger image is obtained, but at a considerable sacrifice in the definition and much loss of light, the light having four other surfaces in the eyepiece to pass through. The object-glass in the microscope on the table is a two-inch by Mr. Wray, and you can see the object on the camera focussing-screen has an abundance of light and would allow a quick exposure. The lamp is placed a little to the left-hand side of the mirror of the microscope, and the light is thrown upon the object by inclining the mirror. With such an object-glass as a two-inch of this kind no condenser or any other apparatus is required. The mirror used is simply a flat piece of silver and not particularly well polished, and yet there is plenty of light. The piece of silver was originally a florin. It is necessary to point out here that very much depends upon the way in which the object is lighted. In almost every published description I have seen of methods of taking microphotographs one is told to use a large bull's-eye condenser to make the rays parallel, and then another one is interposed to bring them to a focus on the object. Now, I would ask—Does any microscopist, when sitting quietly examining objects with his microscope, ever throw such a quantity of light on any object? Why, in every case we modify the light, and try to examine the object with as little of it as possible. The sensitive plate in the camera shoul[d] be treated in the same way as we use our own eyes. Give the plate th[e] necessary quantity of light, but no more. Every one who can us[e] a microscope knows that too much light drowns out the details o[f] an object. These remarks are, of course, not applicable to the highe[r] powers of the microscope, where the lenses are so small that it i[s] absolutely necessary to employ the strongest possible light.

The object to be photographed should be carefully and cleanly mounted. Every particle of dirt in the preparation is, of course magnified as well as the object, and clean slides should always b[e] chosen. The object must be as transparent as possible, and have n[o] colour impervious to light. A great many preparations in Canada balsam are of a deep brown colour, and, of course, when these are photographed nothing but an outline of the object is obtained.

The objective to be employed should with low powers be such as to include the whole of the object in the field. An object-glass of nearly two inches solar focus is about the best for photographing sections of wood, whole insects, &c. Mr. Wray makes a very perfect single lens of that kind at the price of 17s. It is one of the very best I have seen. It has a wide aperture, and gives a great deal of light with a very flat field. The apparatus with a lens of this kind is not expensive. Almost every object, however, requires one particular object-glass to bring out its beauties; and, although a single low-power glass may do very well to begin with, a larger number is required as you proceed to work upon finer objects, which require glasses of greater separating power. A good deal has been said and written as to object-glasses requiring correction so as to make the chemical and visual foci coincide. I believe it will be found that in a great many object-glasses they are coincident, or nearly so. When they are not coincident they may be made so by fitting in behind the object-glass an ordinary spectacle lens of from five to ten inches focus. Experiment only can tell which is the correct one to use; but if it can be dispensed with so much the better, as it introduces another element for destroying the perfection of the image.

The most particular care is necessary in order to get a sharp image on the focussing-screen. This is a more difficult matter than is generally supposed, and the evidence of this is the extreme rarity of very good photographs of microscope objects. One hardly ever sees a good microphotograph—at least one which satisfies the eye of a trained microscopist. Whatever be the cause—whether there has been a want of attention in the sharp focussing, a want of correct register in the camera, a want of coincidence in the visual and actinic foci of the objective employed, or an error in lighting the object—microphotographs, as a rule, are not good. Some give nothing but outline and a black patch. Take, for instance, photographs of parasites: some give a little detail, but only hint at the beauty which lies in the object, such as photographs of the proboscis of the blow-fly; others, such as photographs of the coarser-striated diatomaceæ, certainly give the details pretty well, but when minutely examined it is seen that there is a great want of sharpness. Of course all defects in the manipulation may be remedied, but the utmost care is requisite to produce good work. The ordinary camera focussing-screen is too coarsely ground, and should be substituted by something very much finer. Various substitutes have been proposed for ground glass. I find that the best I can get is an ordinary quarter-plate covered with a very thin film of wax.

Some operators use a very long camera so as to obtain an image at once of the proper size for a transparency. By this means the intensity of the light on the sensitive plate is very much weakened, and the exposure required much longer. I prefer a short camera and a smaller image, which is better lighted and requires a shorter exposure. This is no drawback, because if one get a good negative the necessary size for a transparency can be readily got when copying.

I need not enter upon the kind of sensitive film to be employed; that is a matter of taste and convenience.

Microphotography has always been the hobby of a select few. Microscopes are plentiful nowadays; but photography and microscopy do not seem to take kindly to each other, else we should have very much more about it in the literature of these subjects. It requires great and lengthened experience to become an accomplished microscopist, but the photographic art is much more easily acquired. I have shown you that simple apparatus, if good, may produce excellent results with the lower powers. The higher powers of the microscope when used in photography require special apparatus, which none of the members of this Society, so far as I know, possess. With very high powers a heliostat is necessary. Colonel Dr. Woodward, of the United States Medical Museum, has produced accurate and fine photographs of *Amphipleura pellucida*, showing the striation, the lines on which are only the 100,000th of an inch apart. These are feats of manipulation, however, which none of us can expect to rival. But they should make us do our very best with the apparatus we have got; and it will be a great end gained if, after what you have heard and seen tonight, however imperfectly performed our efforts have been, a number of the members of this Society who have microscopes and are skilled in photography should take kindly to the subject, and be able to show at our meetings in the beginning of next session a plentiful supply of good lantern transparencies of microscopic objects, so as to enable the Society to devote a special evening to their exhibition.

William Forgan.

FOREIGN NOTES AND NEWS.

DINE IN THE DEVELOPER.—AN UNSUSPECTED MODE OF ENTRANCE FOR DUST INTO THE DRYING-BOX.—NEW COLLODION PROCESS.—A NEW YORK COMEDY.—HERR SUCK'S CONVEX FLEXIBLE BACKGROUNDS.

a communication to the Vienna Photographic Society, Herr Franz 'ilde says he uses a solution of iodine instead of bromide of potassium the ferrous oxalate developer when developing gelatino-bromide of lver dry-plate negatives. (He dissolves one gramme of sublimated dine in 200 grammes of alcohol, and, when the solution is accomplished, e adds very gradually 200 grammes of water, the mixture being aken up during this operation.) Herr Wilde thinks this substitution considerable improvement, and that by prolonged development he ecures more powerful negatives without the hardness which is apt to ccompany any increase of power when a bromide of potassium solution is used. The shadows are also richer in detail without the clearness f the depths suffering. Intensification may altogether be avoided by roperly regulating the development. In colour and appearance the lates are said to resemble wet plates. The quantity of the above odine solution used varies with the requirements of the plate. For ortrait or landscape negatives Herr Wilde uses five to ten drops to every fifty grammes of ferrous oxalate developer. For reproductions, specially of linear drawings, he takes four or five times as much. In he last instance, in order to increase the powerfulness of the negative, e also adds half the number of drops of a one-to-ten solution of citric cid. The appearance of the image is somewhat delayed thereby (a minute and a-half to two minutes may elapse before the first traces ppear), but the picture comes up in about the usual time. When making direct enlargements from negatives with the sciopticon upon linen, panel, cardboard, or paper, sensitised with gelatino-bromide of silver and intended to be painted upon, he uses bromide of potassium and citric acid solution with the ferrous oxalate mixture, because they remain white through the lights.

A correspondent of the *Archiv* who prepared his own plates was much troubled by specks and fog on his dry plates. The editor of the *Archiv* expressed the opinion that the specks were due to dust. His correspondent thought that was impossible, as his drying-box was in a separate room constructed for the purpose, and he did not see where the dust could come from. The drying-box was a wooden chest with a sheet-iron warm box depending from it, and the whole of the drying-box was carefully lined with paper. At either end a bent tube introduced fresh air entering from below the chest, and at the top a similar tube conducted the heated air into the chimney flue. A minute examination of the circumstances led the distracted photographer to think that this last might be at fault, and eventually he found that extremely-fine soot, and possibly also deleterious vapours, came into the drying-box through it and caused the fog; and since he closed the communication with the flue, and allowed the heated air to escape in the room, his plates have been perfectly clean.

The two following small items of news are culled from a recent number of the *Archiv.* It is said that the well-known firm of photographic publishers, MM. Goupil and Co., have bought a new wet collodion process, by which they hope to be able to produce even more perfect reproductions of oil paintings than those for which they are already so famous.

A play, by Solomon, is presently being played at New York, in which the principal representatives of photography in New York—Kurtz, Sarony, Mora, and Flack—are made to figure. The editor of the *Archiv* also recollects that some twenty-five years ago he saw a piece at a theatre in Paris in which the late M. Disdéri was represented as the principal character of the piece.

Herr Suck has recently patented a background which may be used either flat, or bent so as to be concave. The frame of the background consists of a row of parallel wooden laths, which are fixed at the top and bottom to two flexible steel bands. A wooden crosspiece, which is fixed at one end and turns upon the pin as on a pivot, keeps the cloth background evenly stretched out flat. If it be desired to bend the background into a concave shape the crosspiece is first unfixed, then the desired curvature is obtained by pulling two cords fixed at the top and bottom. The cords are fixed above and below to the external lath at one side, and at the other side they run over rollers. The background may be fixed at any degree of curvature desired, up to a semicircle, by tying the cords round hooks fixed at the side of the lath beside which the ends of the cord hang down. The background as above described is highly recommended by Captain Pizzighelli, who points out that it usually occupies no more space than an ordinary flat background, yet that by the many degrees of curvature obtainable with it, it affords great scope for the production of artistic portraits, and is, therefore, a most desirable adjunct to the glass house. It seems, however, as far as can be judged of such a thing without having seen the actual object, that the edges of the laths would be apt to show their outline through the cloth or velvet, whichever may be used, and would also soon become creased and wrinkled, which would be a very serious drawback; still, it cannot be denied that some very pretty effects in portraiture might be obtained with a concave background.

SOCIABILITY IN PHOTOGRAPHIC SOCIETIES.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

THE best means of diffusing a more fraternal feeling amongst the individual members of photographic societies appears to be a question but little appreciated in proportion to the extent of its importance; yet it is one that we must sooner or later submit to our consideration if we intend our Association to further expand in strength and consequence.

In the first place, the fact does not seem to be sufficiently recognised in societies generally that we are human beings—animals whose inclinations invariably in the end overcome the dictates of reason. It is seldom that we do not eventually find ourselves adopting that course most exactly pleasing to our carnal desires, even when this is at variance with the sterner resolves connected with matters of monetary business. Therefore, is it any wonder, in association with an institution where inclination is the principal guide and recreation to a great extent the object sought after, to find a decade in the attendance proportionate to the paling of the interest?

In short, if members become lax in tendering their presence at the periodical meetings, depend upon it there is a reason for it beyond the mere lassitude or inertness of the members' disposition; and I am not sure that these reasons leave the management quite free from at least indirect blame. Members will attend if the mental food be at once nourishing and pleasing to the palate. That it is their desire to be present is evidenced by the payment of their annual subscription; and if there be an inclination to falling off in attendance the purveyors may certainly conclude that the fare is in some respect unpalatable.

I do not in the slightest degree desire to censure our working officials or to insinuate any "sinking-ship" tendencies to our Association; on the contrary, its success, all things considered, is to me somewhat astonishing. It is, doubtless, in a measure due to the great energy of our secretaries—late and present—and one or two of our council. But still it seems to me that there are many palpable reasons why the anxiety of the average member to attend regular meetings should be likely to fail him. In the first place, a month is too great a lapse of time to expect interest to be kept awake in any ordinary matter without some intermediate renewal. We have proof of this ebbing energy, due to the distant periods of successive meetings, in the fact of members every now and again actually forgetting that a meeting is to be held until the date is past.

This is, however, a minor objection compared with the unfavourable effects resulting from the extremely formal character of our proceedings and surroundings. We must all revere formality, routine, and ceremony in their proper places. It is easy to understand that an army may be turned into a rabble by lacking observation of these essentials; and nothing can be more unsatisfactory than a gathering of people where everybody should have their unlimited say. But still there *is* such a thing as "red tape." Formalities are commendable so far as they produce judicious effects in keeping with the necessity of their application; but if the aim be to invite discussion, and an amount of silent stiffness is produced in a majority of the members instead, then I take it that they may be safely set down as misapplied.

It is truly a gratification to note the goodly array of gifted professors, doctors, and other men of high scientific standing enrolled in our members' list, and we may find further room to feel proud for knowing that we are so closely encompassed within the sheltering wings of the College of Science; yet we have, as prior claim on our consideration and pride to all this—that is, in the advancing and fostering of our great art-science—photography itself. Of course, these matters and feelings might in reason be considered to nourish each other; and they, doubtless, would do so under certain guidances, and if they could be more closely coupled with social fraternity and intercourse.

That we have not yet reached this Utopian state of things, however, is evidenced by several suggestive facts which cannot now be shelved on the plea of the youth of our assemblies.

One of our members—the contrary of being a silent man, by-the-way—assured me that he had been nine months connected with the Society before he interchanged a syllable beyond the barest greetings with a fellow-member.

When our inestimable Secretary was nominated for the post which he now so ably fills I believe I am right in stating that even his name was unknown to most of us, although he had also been in regular attendance for some long period previously.

On asking a practical photographer, whose name is on our books, why he did not attend more regularly, his rejoinder was "that business itself proved dry enough without undergoing a repetition of the dose at our meetings." I asked another young fellow, who had been here on several occasions, why he did not join us, and his literal answer was—"Oh! it's too stiff for me; one's frightened to open one's mouth!"

These items speak for themselves. It may be that the last two of them, more than innuendoes, are not altogether deserved; but a celebrated painter and lecturer on art matters suggests, in addressing his students, that if a portrait be executed, and even an illiterate person, in criticising it, were to exclaim—"Ah! dear man! I see he takes snuff!" then the lecturer would consider it quite time for the artist to look to the actual extent of the shadow under the nasal organ. And we may

equally let the same gentle admonition strike home with regard to the smudge on that facial lineament of our Association.

It has been contended that each member has every liberty of speaking to the rest of the body individually or collectively; yet the stubborn fact remains that the opportunity is not taken advantage of—in spite, too, of the natural weakness we almost universally have to hear our own voices.

The fault of the present arrangement is that it does not encourage immunity from the heavy bondage of our own innate bashfulness; hence many interesting ideas and discussions lie buried, and

"Let concealment, like a worm i' the bud,
Feed on their damask cheek."

Now, there seems to me to be a very comparatively easy means of combating this lack of interest, general unsociability, and shyness, which I am striving to show is the combined outcome of the long intervals between our gatherings and their formal character. I would suggest that we have what I may term a club connected with the society—not as altogether an offshoot of the more austere Association, but rather to be as special gatherings of avowedly the same body. These meetings might be held on the alternate fortnights intermediate to the present recognised monthly attendances; and the *rendezvous* might preferably be in a large room of some respectable hotel, where we could be seated face to face. The club might be most harmoniously managed by the same council as the Association, seeing that the present duties of these gentlemen are far from excessive; but an extra secretary might be appointed, as one could not be well expected to attend to the double duties which fall so specially heavy on this particular officer.

The business of the meetings might principally consist of—1. Free discussions on technical matters, special encouragement being given to the recountal of everyday phenomena and practical observations, even when these are of a supposed trivial character. 2. Short papers on matters of common interest, that may be handed in on the night without previous notification and ceremony. 3. Some attention might be bestowed on the chemical action as well as on the practical effects connected with processes in ordinary use. This last item I take to be very recommendable, as the knowledge of the average photographer is, in this direction, particularly hazy. This business might continue to something like half-past nine o'clock, after which formalities should cease, a change of chairman be optionally effected, refreshments allowed, and the meeting generally partake of that amount of sociability with which the feelings of the members should care to judiciously invest it.

I have heard that maybe some of our members would raise their voices against this proposed state of things, as derogatory to the dignity of the Society. The project has not yet beheld the light of the world that could not be objected to in some particular, real or imaginary; and I think the objection would partake of the latter character in the present case. But do let us, at least, exercise common-sense in the matter; so long as we can calmly meet at dinner-parties for the absolutely set purpose of eating and drinking, I fail to see what *reasonable* exception can be taken to our socially cultivating the friendship of each other as brethren for half-an-hour or so "when the day's work is done." If the trust were abused—which, looking upon my *confrères* as gentlemen, I should feel it an insult to suspect—then it is the member and not the system which deserves censure.

There still appears to me to be an expedient as simple as it is efficient by which any of these particular gentlemen may avoid personal collision—that is, for them to quietly depart at the conclusion of the mechanical discussion. Or we might meet in Lockhart's cocoa-rooms. So far as I am invidually concerned, as regards either hotel accommodation or the presence of alcohol for inward application, I only feel inclined to withdraw the cork of strange restraint and allow the sparkling nectar of practical experience to bubble forth that we may all drink.

I think it almost impossible to estimate the benefit that would attend the organising and judicious managing of a satellite-like club, such as I have alluded to. While it would be pleasant in itself alone, its discussions would raise subjects and educate speakers for the more stately meetings, and our members would become more familiar, more interested, and subsequently more energetic, for reasons that I have already endeavoured to enumerate. Furthermore: this course of action would undoubtedly develope the interesting idea of outdoor social meetings to a satisfactory issue, instead of the non-successes which, I fear, we cannot deny their having hitherto been in our hands.

I have had some considerable experience in the arranging of picnics of one description or another, and I have always found persons of confined occupation look upon holidays as periods of too sacred importance to be thrown away where there existed a trace of the trammels of stiffness or coldness abiding.

I would strongly advise, too, that special social meetings be well countenanced; and, without going to the extent of investing them with the importance of recognised exhibitions, they might be held in some suitable hall or room where the photographic productions of members might be hung, and thus impart some additional interest to the proceeding, whilst it would also be an incentive to artists to work.

They should also assume the form of *conversazione* or *soirée*, in my opinion, and not dinners, such as we regaled ourselves with at our last annual gathering. Apart from this having strongly the same taint of formality, I hold that it is inconsistent in principle, seeing that it practically debars ladies from participating in the entertainment, at the same time that we acknowledge and are prepared to accept them as members of the Association. It seems to me that the inconsistency exists pretty much the same whether or not we have lady members enrolled in our books at the time. Besides, as I heard a gentleman remark, while the question of the form of entertainment was under discussion—"Many of the wives of practical photographers take almost as much interest in matters photographic as their 'lords of creation,' and it is surely, at least, ungallant to exclude them from its more genial phases."

I have left much unsaid, and probably, in some cases, stated more than is altogether acceptable in this matter; but, at all events, I hope I have opened a discussion that will result in the increased welfare of our Association. LYDDELL SAWYER.

Our Editorial Table.

WATER COLOUR PAINTINGS ON OPAL. By GUS RAINGER.

WE have received from Mr. Rainger, of Liverpool, specimens of his work in water colour on opal. These are of very fine quality, a full-length portrait of a lady in court dress being especially remarkable for its delicacy of finish. An example of what the artist designates the "club portrait" is of a very different type from the class of picture we are accustomed to meet with under that title; it is, in fact, a painting of a very high class. Mr. Rainger is an artist in more senses than that of a mere colourist of photographs, as several fine mezzotint engravings after Sir Joshua Reynolds, which are before us, sufficiently testify. From a close examination of the water colours submitted to us we are unable to decide definitely whether they have a photographic basis or not; but in either case the results are such as cannot fail to satisfy the most fastidious of clients.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATIONS FOR BRITISH PATENTS.

No. 2,316.—"Packing and Preserving Sensitive Plates." A communication from A. LUMIÈRE.—*Dated May* 7, 1883.

No. 2,323.—"Improvements in the Manufacture of Coloured Photographic Pictures. J. ADAMS.—*Dated May* 8, 1883.

PATENTS GRANTED IN AMERICA.

No. 276,173.—"A Sun Printing-Frame." J. S. HAMBAUGH, Jacksonville, Ill.—*Dated February* 17, 1882.

No. 276,311.—"A Photographic Camera." W. H. WALKER, Rochester, N.Y.—*Dated June* 26, 1882.

No. 276,443.—"A Process of Treating Pyroxyline Compounds." W. MCCAINE, St. Paul, Minn.—*Dated September* 11, 1882.

No. 276,455.—"A Photographic Camera." GEO. S. NORTH, South Norwalk, Conn.—*Dated February* 24, 1882.

PATENTS GRANTED IN GERMANY.

No. 22,244.—"Obtaining Photographic Plates of High Relief and Sunk Negatives." G. MEISENBACH, of Munich.—*Dated May* 9, 1882.

No. 22,421.—"Photographic Tail-Pieces Obtained on Diaphanous Paper by Means of Fat Ink. F. STOLZE, Berlin.—*Dated November* 14, 1882.

PATENTS GRANTED IN ITALY.

"Coloured Photographs called 'Photonature.'" J. CHAINE, A. DURAND, and SALLONIER DE CHALIQUY, of Lyons.—*Dated November* 3, 1882.

"Mounts for Transparent Photographs." F. C. NEUBER, Hamburg.—*Dated November* 25, 1882.

CERTIFICATE OF ADDITION.

"Reproducing Drawings, Woodcuts, &c., on Metal by Photography.' H. PHILLIPI, Hamburg.—*Dated September* 27, 1882.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 19	North Staffordshire	Wedgwood Institute, Burslem.
,, 23	Bristol	Studio, Portland-st., Kingsdown.
,, 24	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 10th instant, the chair was occupied by Mr. E. J. Golding.

Mr. A. COWAN showed an instantaneous shutter intended to be used inside the camera close to the plate, and so constructed that the closing screen moved with a reciprocating action, descending to allow of the passage of the rays of light and ascending to close the aperture. By this means

the foreground would receive considerably longer exposure than the sky. The movement of the shutter was effected by a pin on the edge of a revolving plate working in a slot cut across the bottom of the closing screen. To the axis of the revolving plate was attached a knob, which served as a short, broad spindle, and rubber bands attached from the margin of the frame of the shutter to pins on opposite sides of this spindle served as springs to draw the revolving plate round, when the bands were brought to tension by turning the plate round to the first close position of the sliding shutter. A catch, to be released when it was desired to make the exposure, completed the arrangement.

Mr. J. Harrison remarked that in some points the shutter much resembled one shown by him some years ago at one of the Brittlebank meetings.

Another shutter, constructed jointly by Messrs. Neate and Wellington, was exhibited. In this the movement was also reciprocal, and effected by the extension and re-closing of a knuckle joint, which acted upon a closing piece pivoted on a short arm.

A question was read from the box—Do all lenses possess a longer focus when stopped down than when used with full aperture?

Mr. W. E. Debenham said that whether the focus was changed by the insertion of a diaphragm or not depended upon the lens being properly corrected for spherical aberration. With well-made portrait lenses no such difference of focus could be found, and with lenses of other forms makers of established reputation corrected spherical aberration as far as the special characteristic of the lens admitted, and in those forms where this could not be eliminated, such as wide-angle doublets, they limited it by the use of a fixed diaphragm plate of such size as to leave a very small amount of aberration remaining.

Mr. J. Barker remarked that he could confirm Mr. Debenham's statement with respect to portrait lenses. With a large Dallmeyer lens he had not been able to find any difference in the length of focus between the full aperture and the smaller stop.

Mr. A. L. Henderson said that he had found with a particular portrait lens the focus was shortened instead of lengthened by the insertion of a dia phragm.

The Chairman remarked that he had a set of lenses by Darlot of different focus, but fitting into the same mount. With some of these he found a very considerable difference of focus between that given by the full aperture and that with a small stop. Certainly in this case, the mount having to be used for lenses of different size, the diaphragm plate was not limited to that opening which the maker might adopt if each lens had a separate amount.

The Chairman showed some transparencies printed on gelatino-chloride plates, the emulsion for which was prepared with barium chloride. He found this gave warmer tones than the ammonium.

Mr. Henderson said that he wished some of those members who had warm-toned chloride transparencies would expose them partially covered to the sun. He believed the light would convert the red tones into black ones.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The seventh ordinary meeting of the current session was held in St. Andrew-square, on the evening of Wednesday, the 2nd inst.,—Mr. A. Craig-Christie, F.L.S., Vice-President, in the chair.

The minutes of last meeting having been approved and signed, the following gentlemen were unanimously elected ordinary members of the Society:—Mr. Alexander Matheson, M.A., W.S., Mr. Stock, and Mr. Irving.

The Secretary read (1) a communication from the Photographic Association of America, announcing that their annual convention will be held at Indianapolis during the second week in August, and inviting exhibits from the Society as a body, or from its individual members; and a communication from the promoters of the Industrial and Loan Exhibition, to be held in July, at Dalbeattie, also requesting contributions. Full details and instructions regarding both exhibitions were laid on the table for the information of the members.

Intimation was given that Lanark had been selected for the next outdoor meeting. Any members wishing to join the excursion were requested to send in their names at once to the Secretary.

Mr. Wm. Forgan read a paper on *Photomicrography* [see page 284], which he illustrated by various apparatus. One of the most ingenious arrangements was a complete photographic enlarging apparatus, so contrived and rigidly adjusted that the whole, including the lamp, was handed round that each one present could see the exquisite details of a beautifully-stained section of *Traveller's Joy* and other preparations.

Dr. Thomson, R.N., next exhibited and explained very fully his apparatus for the production of photomicrographs, directing particular attention to the immense importance of adjusting the illumination to the special requirements of each object. As one example, he showed that the characteristics of *Pleurasigma angulatum* were best brought out by an oblique light. He directed attention to the fact that in the cheaper microscopes the eyepiece was far more likely to be faulty than the object-glass, and this was one more reason for urging the use of the simple microscope rather than the compound (*i.e.*, the object glass without the eyepiece). He also found the employment of diaphragms between the object-glass and the sensitive plate was of great advantage, as they prevented the action of reflected light from the interior walls of the camera, and thus the image was better defined. He (Dr. Thomson) also showed by demonstration that the paraboloid illuminator was of immense advantage in bringing out the beauties of very transparent objects—showing them on a dark background.

Mr. Alexander Mathison next exhibited his method of producing lantern slides from microscopic preparations, and, contrary to the directions of Mr. Forgan and Dr. Thomson, he preferred to employ the eyepiece, as he thus secured the negative of full size. He also stated that with the lenses he employed he could not find any falling off in definition by so doing. He passed round a number of transparencies in support of his views.

In reply to a question by Mr. Wm. Hume,

Mr. Forgan said that the use of the tube of the microscope was of no advantage; the object-glass alone was necessary, if it were provided with a suitable adapter for fixing to the camera front.

Mr. Garner passed round two large carbon prints from the same object—one being produced by means of the microscopic object-glass, the other by an ordinary photographic, short-focussed rectilinear lens. The print by the latter was universally admitted as better than the other; and, for sections of wood and other relatively large objects, such a lens might be employed with advantage.

At the conclusion a general desire was expressed that at the next meeting of the Society part of the time should be taken up by a lantern exhibition of a number of photomicrographs.

Votes of thanks to Messrs. Forgan, Thomson, and Mathison, for the great trouble they had taken and for their very interesting and instructive communications, and to the Chairman, brought the proceedings to a close.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of the above Association was held on Tuesday, the 8th instant, in the College of Physical Science, Newcastle-on-Tyne, at 7.30 p.m.,—Colonel Sheppee, the President, in the chair.

The minutes of the previous meeting having been read and passed, Mr. E. B. Mounsey, Darlington, was nominated for membership, and Mr. James Edwards, of South Shields, was elected by ballot. On the motion of Mr. Downey, Mr. Mounsey was also elected in the same manner.

The Secretary read a report from the Council, as follows:—"Special Council meeting, held on Thursday, the 27th April, in the County Hotel, Newcastle, at 7.15 p.m.—present, Mr. Payne (in the chair) Messrs. Downey, Dodds, Laws, and Pike—to consider the questions of outdoor meetings and the exhibition. The Secretary proposed that there be four outdoor meetings, held on the second Tuesday in each month, with the exception of August, in the ordinary way. This proposal met with general approval, and, after discussion, it was resolved to suggest as places of meeting respectively, Marsden, Chollerford, Riding Mill, and Durham. It was unanimously resolved, subject to the approval of the Association, that an exhibition be held this year in the autumn, and that a sub-committee be appointed at the next general meeting to arrange all particulars. Mr. Payne suggested, with reference to such proposed exhibition, that a silver medal be given for the best set of three seascapes or landscapes, restricted to members of the Association, a bronze medal for the second, and three certificates of honour; a gold medal for open competition for the best picture on exhibition, and a bronze medal for the second; a silver medal for the best figure study, open competition, and a bronze medal for the second."

A discussion followed as to the outdoor meetings, and it was finally decided that four be held on the third Wednesday in June, July, August, and September, the places being selected as above.

With regard to the exhibition: Mr. Auty proposed and Mr. Gibson seconded that a medal be given for the best picture taken at one or other of the outdoor meetings. This, on being put to the meeting, was carried.

Mr. Dodds authorised the Secretary to announce that a medal would be provided for this purpose.

Mr. Lyddell Sawyer read a paper on *Sociability in Photographic Societies.* [See page 285.]

The Secretary read a paper on *A Simple Method of Recovering Silver from Waste Gelatine Emulsion Plates or Paper.* [See page 283.]

Remarks were offered by the Chairman, Mr. Downey, Mr. Sawyer, and Mr. Dodds, to which the Secretary replied.

Mr. Lyddell Sawyer then read a paper on *The Relative Action of Carbonate of Ammonia in Conjunction with Pyrogallol Developers.* [See page 281.]

A conversation took place in which Mr. Galloway and the Chairman took part.

The Chairman proposed and Mr. Readhead seconded a vote of thanks to Mr. L. Sawyer and Mr. Pike, which was carried.

A very fine photograph was presented by Messrs. Mawson and Swan, others by Mr. Campbell Swinton and Mr. Templeton, and thanks were duly given to these gentlemen.

The following members were nominated and appointed to serve on the sub-committee:—The President, Professor Herschel, Professor Bedson, Messrs. Gibson, Laws, Sawyer, Downey, Dodds, J. W. Robinson, Schumann, and the Secretary, with power to add to their number.

The meeting was then adjourned.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held at Freemasons' Hall on Tuesday, May 1st.,—Mr. T. H. Morton, M.D, occupying the chair. The minutes of the previous meeting were read and confirmed.

Mr. J. Taylor (Hon. Secretary) referred to the excursion to Hardwick Hall and Bolsover, on April 25th. The Society was favoured with delightful weather on that occasion. Mr. Leader had obtained permission to photograph all objects of interest at both historic places, consequently the members were actively engaged all day. The negatives and photographs exhibited proved the first excursion to be an unqualified success.

The subject of developers and development of gelatine plates was discussed.

The CHAIRMAN said he invariably used the alkaline process, the proportion for $8\frac{1}{2} \times 6\frac{1}{2}$ plates being—

Pyro.	6 grains.
Ammonium bromide	2 ,,
Strong liq. ammonia	8 drops.
Water	4 ounces.

He preferred freshly-dissolved pyro. for each plate, and the usual alum solution before fixing. The formula was modified according to the exposure given.

Mr. HATFIELD succeeded with a preparation containing—

Sodium sulphite	$\frac{1}{2}$ ounce,
Citric acid	$\frac{1}{2}$ drachm,
Potassium bromide	2 drachms,
Strong liq. ammonia	6 ,,
Water	80 ounces,
Pyro.	2 grains,

which was dissolved in two and a-half ounces of the solution, and sufficient used to cover the plate.

Mr. RAWSON had tried this method, but found the stock solution deteriorated or lost strength by keeping. He had returned to Wratten and Wainwright's directions.

Mr. GILLEY suggested the following:—Sodium carbonate (washing soda), one pound to the gallon of water and two grains of pyro. to the ounce; also a weak solution of oxalic acid for clearing away stains.

Mr. SEAMAN (Chesterfield) secured very good results by developing with a mixture of equal parts of the following:—

No. 1.

Pyrogallic acid	1 drachm.
Citric acid	10 grains.
Water	20 ounces.

No. 2.

Potassium bromide	1 drachm.
Strong liq. ammonia	$3\frac{1}{2}$ drachms.
Water	20 ounces.

Mr. DEAKIN usually worked Swan's formula.

Mr. Yates and other members joined in the discussion.

A vote of thanks was given to Mr. Leader and Messrs. T. Firth and Seaman for making the excursion arrangements.

Correspondence.

THE SENSITIVENESS OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—I hope sincerely that the remarks made in last week's Journal by yourselves and Mr. H. Y. E. Cotesworth will induce makers of plates to adopt your suggestion—not because, with all due deference, I think it the best, but because Mr. Warnerke's figures, being the newest in men's minds, may be more favourably received. At the same time, I would urge that an explanation showing the relative value of these figures be also given, as few outsiders know how to translate them, and might easily, and with excuse, presume that 22 meant but ten per cent. quicker than 20.

As one of a society of over 100 members, I may state that those plates would be most readily bought to which such figures were attached; and it is, therefore, to the interest of makers themselves as also to the purchasers to adopt the system suggested.—I am, yours, &c.,

Liverpool, May 15, 1883. J. H. T. ELLERBECK.

EXCHANGE COLUMN.

Wanted, interior background or studio furniture, in exchange for gem and Victoria cameras.—Address, L. B., 2, West-street, Fleetwood.

I will exchange a superior new whole-plate tourist camera, three double backs, in leather case, by Watson, Ross's rapid symmetrical, rapid portrait lens, by Burr, folding tripod, dark tent, by Wratten and Wainwright, for a tricycle with lamps, &c.—Imperial Club, Royal Salvo, or Omnicycle preferred.—Address, ARTHUR BLAYDES, Harringworth Vicarage, Stamford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

John Edward Shaw, 6, South-parade, Huddersfield.—*Five Photographs of Miss Mary Davies.*

Thomas Bourke, 17, King-street, Perth.—*Two Photographs of the Right Rev. George Ring, Bishop of Dunkeld, N.B.*

*** We are compelled to postpone Part III. of Mr. A. Brothers' series of articles on *Astronomical Photography* till next week.

CHALK.—The patent has expired.

LENS.—1. The imitation stone work in photographic accessories is usually formed of papier maché.—2. The No. 2 lens, if your studio be sufficiently long, will be the best for general purposes.

MAJOR GUBBINS.—Either black varnish or paraffine will answer the purpose. The former material is the easier of application. Several coats should be applied to render the wood thoroughly impervious.

A. Z. A.—The crystals being slightly discoloured will be of no consequence whatever. Crystals of nitrate of silver that have been exposed to a strong light for a considerable time often become discoloured.

N. N. M.—We should certainly advise you to take your apparatus and a supply of dry plates on your trip to the Holy Land; but we strongly recommend you to defer the developing of the pictures until you return home.

SYNTAX.—The salt should be neutral. Some samples have a slightly alkaline reaction on litmus paper, but that is of little consequence. If the salt be acid it should be rejected, as it cannot then be depended upon for your purpose.

E. Y.—From the price at which the apparatus is sold we think you cannot expect it to be substantially constructed. It is more adapted to the requirements of the amateur than for the rough usage for which you say you require it in your professional work.

A. WHARTON.—Unless you can very materially improve your process (if the specimens enclosed are the best which can be produced) it will not compete with most of the photomechanical processes now in vogue. Certainly it would not pay you to take out a patent at present.

S. B. PROTHEROE.—It is always a good plan to add a small quantity of liquor ammonia to the bichromate of potash solution, particularly when employing the commercial salt. About twenty minims to each pint is quite sufficient. The temperature of the solution should always be kept low, never exceeding 50° or 55°.

BENJA Y.—If the acetic acid to which a crystal or two of nitrate of silver has been added become darkened, and deposits a mirror-like coating of silver on the sides of the bottle when it is exposed to sunlight, it shows that the acid is impure and unfit for photographic purposes. Procure a sample from another source, and we have no doubt your trouble will cease.

MELBOURNE.—If you take the published formulæ and then calculate the amount of alkali contained in the different salts mentioned you will arrive at the relative quantities of each required. Why not neutralise the free acid by immersing the prints, after washing out the free silver, in a dilute solution of washing soda? The free acid will not then cause you the trouble of which you complain.

N. J. WATKINS.—We fear you will hardly meet with a market for the old collodion negatives. You certainly will not get anything like the price of new glass, notwithstanding that some of them are portraits of former celebrities. We are not aware of any maker of gelatine plates who would undertake to coat your own glass, even if you sent it ready cleaned. However, write to some of the makers and ask the question.

HANTS.—From some cause or other the gelatine film has become insoluble; hence the patches of "undissolved black matter throughout its thickness." The sample of gelatine you have been using is not the best for the purpose. Try the "amber" of Messrs. Nelson, Dale and Co., which is the kind recommended for Woodbury reliefs. Be careful that the drying of the film does not take too long. Slow drying will certainly induce insolubility with any variety of gelatine.

J. H. M.—As some of the prints out of a batch turn out good it is clear that the hyposulphite of soda in which they are all fixed is not the cause of the evils of which you complain. If it were, all the prints would, of course, suffer alike; but you say that some are good while others are bad. This would point to something being wrong in the manipulation. Is your silver bath of full strength? and is it stirred up after each few sheets of paper have been sensitised? If this be not done the upper portion of the fluid becomes weaker with each sheet of paper floated upon it, and this may account for your trouble.

RECEIVED.—"Free Lance." In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—The subject for discussion at the next meeting of this Club, on Wednesday next, May 23rd, will be—*On the Means of Drying Gelatine Films,* adjourned from Wednesday last.

THE MANCHESTER PHOTOGRAPHIC SOCIETY.—We regret to hear that Mr. W. J. Chadwick, who has acted as honorary secretary of the Manchester Photographic Society for the last three or four years, has sent in his resignation as a member.

THE LANTERN ABROAD.—From an announcement in the last issue of the *Philadelphia Photographer* we observe that its proprietor and editor, Mr. Edward L. Wilson is about to devote himself to lecturing, aided by the potent services of the magic lantern. We hope that he will find in this field of labour all that he can desire in the way of financial encouragement. It is said that America is a promising field for a clever lantern itinerant.

CONTENTS.

SUPPLEMENT TO THE BRITISH JOURNAL OF PHOTOGRAPHY, MAY 25TH 1883.

INK-PHOTO, SPRAGUE & Cº, LONDON

FROM A PHOTOGRAPH BY MR L.M. RUTHERFURD, OF NEW YORK.
ENLARGED BY A. BROTHERS, MANCHESTER.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1203. Vol. XXX.—MAY 25, 1883.

PYROXYLINE FOR COLLODION EMULSION.

In the recent articles, by our contributor, Mr. Edwin Banks, the suggestion has been made of the possibility that collodion emulsion may, at no distant date, come within measurable distance of gelatine in point of sensitiveness. That such a consummation is devoutly hoped for by a large number of dry-plate workers we are fully aware; for, although the rejoicing has been great in some quarters at getting rid of the fumes of ether and alcohol and their concomitant inconveniences since the introduction of gelatine, the latter has most unmistakably brought with it a new series of troubles and uncertainties which make the older dry-plate workers sigh for the departed comforts of collodion plates.

It will be understood that we speak now more especially to those of our readers who prepare—if not wholly, at least occasionally—plates for their own use; for it is obvious that the mere user of dry plates need care nothing whatever about the process by which they are made, or what is their basis, provided they suit his purpose and he fail to experience most of the differences which surround the preparation of dry collodion and gelatine plates respectively.

In the course of his remarks Mr. Banks takes almost identically the same ground we did ourselves in a couple of articles which appeared on the 15th and 22nd November, 1878, and in which we showed how great an accession of sensitiveness followed the reduction of the proportion of pyroxyline to silver bromide. In our earlier experiments we found a gain equal to four to one in sensitiveness between an emulsion containing only one and a-half or two grains of cotton to the ounce and another which contained five or six, other details being identical. A little later we succeeded in obtaining even more favourable results, but were compelled to relinquish for a time further experiments in that direction; then came the sudden rush which brought gelatine to the front, and collodion emulsion has had to stand in abeyance.

That collodion emulsion need necessarily continue to occupy the position it now does is, we believe, an entirely erroneous idea. We are quite of the opinion of Captain Abney, Mr. Wm. Brooks, and of Mr. Banks—all of whom have stated openly their faith in the possibilities of the older form of emulsion—that there is more to be got out of collodio-bromide and washed collodion emulsion than has hitherto been the case. And we believe, further, that the experience gained by photographers, both amateur and professional, during the last four years of universal dry-plate work, in the department of *development* only, will go far to help considerably in the attainment of the greater sensitiveness now desired for collodion, if we start on the basis upon which the collodion process was left four or five years ago.

We are only repeating a remark that has been frequently made when we recall attention to the claim that was made on behalf of gelatine on its first introduction—that it was a definite and uniform substance obtainable nearly anywhere, and, therefore, far superior to pyroxyline or collodion as the menstruum in which to suspend the sensitive silver salt. Ten years or more before this plea was put in for gelatine a similar one was made in favour of the collodio-bromide process as distinguished from the bath processes for dry plates, namely, that the operator was rendered independent of the character of his collodion. The same advantage had been claimed previously for Major Russell's tannin preservative; but it was very soon discovered that the real secret of success, both in the tannin and in the collodio-bromide processes, lay in the character of the pyroxyline employed. Years later it was discovered that gelatine was not the uniform and tractable substance it had been supposed to be, and probably a more complete "bad boy's diary" could scarcely be compiled in connection with any material used in photography.

But if the quality and character of the pyroxyline were important in the earlier days of collodio-bromide, and again of washed emulsion especially, the necessity for care in this department is wonderfully increased when we reduce to the lowest possible point the quantity used, as in our early-published experiments and in Mr. Banks's more recent ones. Not only is the suspending power of the collodion greatly decreased and the facility for forming a finely-divided precipitate of silver bromide considerably lessened, but the physical properties of the resulting film are entirely altered. It, therefore, behoves all experimenters in this revived branch of dry-plate work to look to the pyroxyline they use, and not to accept "anything" that may be supplied to them.

"High-temperature" pyroxyline is *not* to be recommended unless it has been made with a considerable preponderance of sulphuric acid over that usually employed. Nor is a too low temperature advisable. What is required is a cotton which exhibits to the fullest possible extent the "parchmentising" effect of sulphuric acid, as first pointed out by Mr. Hardwich, without the "horniness" and contractility which comes from low temperature and concentration of the acids. On the other hand, the "powderiness" and "rottenness" of most high-temperature cottons is still more strongly to be condemned, as incapable of holding in suspension even the smallest proportion of silver bromide for any useful period.

PORTRAITURE FOR AMATEURS.

In the previous articles attention has been particularly directed to the optical part of the question, in order that the novice in portraiture, when taking groups, &c., should be enabled to obtain the best possible results from the apparatus at his command, be its construction or merit what it may.

Last week we pointed out that, in many instances, it will be advisable to dispense with some of the extreme sharpness to be obtained when the lens is worked with a very small diaphragm, in order to curtail the time of exposure as much as practicable. This it is essential to do in all cases, otherwise the chances are that the picture will be spoilt by some one or other of the figures moving during the time the negative is being taken. But, as we then stated, the power of reducing the exposure by the sacrifice of the microscopic definition was one that must always be exercised with judgment; for it is manifest that, unless the resulting picture possess a fair degree of sharpness, it will not be a satisfactory photograph. One thing to be specially guarded against in taking groups, or, indeed, any form of portraiture, is under-exposure; for if the negative (particularly if the picture be an open-air one) be not fully exposed

the result will always prove unsatisfactory. The shadows will be dark and heavy, and will lack that transparency which is one of the principal charms of a good photograph.

In working out of doors, when several figures have to be included in the picture, we have not that ready means of softening the shadows on the faces by the aid of reflectors which we possess when working in a room or studio, where we have only one figure to deal with; neither have we the light under the same control. Hence it will be seen that the only way by which we can secure full details in the shadows and general harmony in the negative is by fully exposing; for, if it be at all underdone, it will always partake more or less of what is familiarly termed the "soot-and-whitewash" character, the lights being of a chalky white and the shadows nothing more than black patches, which no amount of retouching can remedy, however skilfully it may be accomplished. This matter cannot be too fully impressed upon the mind of the student, and it is far better for him to err on the side of over- than of under-exposure in outdoor or, indeed, any class of portraiture.

Before leaving this part of the subject it may be as well, even at the risk of recapitulation, to give a few more practical hints on the arrangement of the group, in order to favour the lens to the fullest extent, so as to permit of its being employed with the largest aperture consistent with the amount of definition that is deemed sufficient, and to avoid the risk of movement of the sitters or of under-exposure in the negative. It is quite possible, if the group be judiciously arranged, to obtain the same amount of marginal definition with an aperture double in diameter what might be necessary under less favourable conditions, and this really means reducing the exposure to one-fourth. Thus, if the lens be used with a stop—say an inch in diameter—and two seconds be the correct exposure, no less than eight seconds will be required to secure the same quality of negative if a half-inch stop be introduced. When we consider the importance of this fact in practice our reason for dwelling so much upon this subject will be manifest.

In the article which appeared on the 11th instant we advised the student to try a few experiments with cards pinned on sticks placed in the ground, in order to see for himself that, if the figures in a group be arranged in one straight line—which, by the way, is frequently done by those who, it might be surmised, should know better—it was impossible to obtain the figures at the extreme ends in focus at the same time as those in the centre; and that, to secure the end figures sharp, they must be placed somewhat in advance of the others—that is, when we are working with the full aperture of the lens on the largest size plate it is intended to cover.

This is an instructive experiment, and one that may be profitably tried with each individual lens—if more than one be at command—inasmuch as some lenses have a much rounder field than others, and it is always desirable to thoroughly understand the peculiarities of each of the instruments with which we have to work. We may, it is true, obtain all the figures sharp when they are arranged in a line; but then a small stop is imperative, and a still smaller one would be required if the objects falling on the margin of the plate are situated farther back than those in the centre. This, of course, holds good whether they come at the ends or at the top or bottom of the plate.

With all lenses the image of a flat object is, so to speak, formed on the inner surface of the bowl, and, if we wish to obtain the image on a plane, we must arrange our objects in a concave form. The practical way of working is to arrange the group in such a manner that the maximum of sharpness is obtained at the margin of the plate with the full aperture of the lens, while the centre is in focus. When this is done, even to the best advantage, it will be found with most lenses, when the full opening is used, that the best definition obtainable at the margin is far from being sharp. There is no remedy for this but stopping down the lens until sufficient sharpness is obtained, taking care never to use a smaller stop than is absolutely necessary to obtain the figures themselves fairly well defined, leaving the surroundings to take care of themselves, for the reason we have so fully explained.

Having gained a knowledge as to how a group should be posed in order to accommodate the lens to the fullest extent, we are frequently met with another difficulty, namely, that the arrangement which suits the lens best is not always an artistic one. It is clear that if the group be arranged formally as the segment of a circle, and it show obtrusively as such in the picture, it can never be an artistic composition. But it may, with a little judgment, be so arranged—by posing some of the figures sitting and others standing, and thus breaking up the formality of the arrangement—that while preserving in the main the conditions required by the lens a pleasing result may be secured.

It is here that the judgment on the part of the operator is required in order to assimilate the two conditions necessary and bring them as much as possible into harmony with each other. On this point no definite instructions can be given—or, at least, in the space at our command—as so much must necessarily depend upon circumstances in each individual case, as well as upon the local surroundings where the picture has to be taken.

In our next article we shall give some practical hints on the selection of the most suitable situation for our operations.

ALBUMENISED PAPER AND RESIDUES.

In returning to this subject, according to our promise last week, we would first remark upon the greatly-increased extent to which ready-sensitised paper is made and employed at the present time. A number of years ago there was one manufacturer who, if not the only person in this country who made an article of good quality commercially, had at anyrate the command of the market; while now there are numerous makers, who produce and sell great quantities. Some photographers, we have been credibly informed, use no other kind, and, in fact, do not keep nitrate of silver upon their premises.

Fully alive to the great conveniences of a ready-sensitised paper, many photographers employ with greater or less success—mostly the latter—private formulæ of their own, the leading points in which consist of the blotting off of the silver from a newly-sensitised sheet followed by treatment with citric or tartaric acid. We are inclined to believe that this method also is gaining ground considerably. The correspondence we alluded to was initiated by a gentleman who pursues this plan, and has since its adoption found a difficulty with his residues.

Now, in the first case, it must be obvious that, if a sheet of nitrate of silver be blotted off, the chief part of the silver that would ordinarily find its way into the residue jar for chlorides would be absorbed by the porous paper, and that the important place among residues which is usually—we employ the word advisedly—given to the first washings from the prints must be taken by this blotting-paper, to which would be added the paper-cuttings from prints, &c. Still, we believe that many photographers do not trouble themselves about such cuttings, and it must be admitted that only a very small proportion of the precious metal is obtainable from a very large amount of print cuttings; yet it should be remembered that the addition of waste of spoiled prints, together with old printing baths, filters, slips used for skimming the bath, and such pieces as have been used for wiping baths, spilt solution, and soforth, will cause the whole bulk of paper waste to possess a very decided value. The toned print-cuttings contain so much gold that it enhances, perhaps by one penny or more per ounce, the price given by the refiners for the metal extracted.

Another difficulty experienced is the time and care needed for burning the paper, not to speak of reducing the ashes; and—the truth must be spoken—such work does absorb a large amount of attention and time. Yet the remedy is very simple. Instead of throwing the material away on account of the trouble involved, it would be a very simple matter to collect all the items above named, pack them into a sack, and despatch it direct to the refiner, who will do all that is needful—having every convenience at hand—probably with a greater ultimate return in cash, even after deducting his charge for assaying and reducing, which is usually very small, and it must be a weighty parcel that would cost over half-a-crown for a long distance.

Where the blotting-off method of preparing paper is employed, it will be imperative to save and reduce—either at home or through

the aid of the refiners—all silver-stained paper, or there will be a lamentable loss by the end of the year. It would be difficult to believe that anyone could pursue such a fatuous course, were it not that we have seen even worse waste practised within our immediate cognizance.

Returning, now, to the albumenised paper and the varied qualities which are found to characterise the different brands in the market: it will be seen that these most govern the actual waste of silver according to the residue-saving made use of, or as they contain more or less of the chloride employed. Thus, where a paper of four or five grains of chloride to the ounce of albumen is made use of, the bath then required being weak also, the amount of silver used up in the image bears a large proportion to the quantity actually employed; but when strongly-salted papers and strong baths are used the proportion found in the finished print is small compared with the silver engaged, although the actual amount does not vary much in the two cases. Hence the photographer who takes little care of his "waste" will find a weakly-salted paper a great deal more economical, while he who adopts a wise and judicious mode of dealing with his waste solution and papers will find little difference either way.

The chief difference will, perhaps, be found in dealing with the hypo., which in a strongly-salted paper will be very rich, but in a slightly-salted sample will contain but a small quantity of silver. Now, if our remarks have been followed, the obvious inference as to the system to be adopted in the present day is very plain. In the early days we had strongly-salted paper and strong baths. That was an era of weak salting and weak baths; now, if we judge rightly, strongly-salted paper, with the consequent necessity for stronger baths, is the present tendency of albumenised paper manufacturers.

We would, therefore, once more urge upon photographers the necessity, in their own interests, of saving their waste hypo.—not alone from paper prints, but from negatives also. A moment's thought will show, in the latter case alone, how much value there is in the old baths. It is plain to the most unscientific observer who compares a dry plate before and after fixing, that the "fixing" takes away the greater part of that semi-opaque appearance visible upon the developed plate, and it is equally obvious that the appearance in question is caused by the particles of bromide. Further: the merest tyro is aware that the "hypo." dissolves out that bromide; yet, knowing all this, how many photographers are there who do not throw their old hypo. baths down the sink! And this, too, though they contain within a small percentage of the whole of the silver used in the making of such dry plates!

Any business man strange to the practice of the science would say such a course was impossible; but it is not so, for it is most common. We can only suppose that a number of imaginary difficulties present themselves to the photographer who has not graduated in an establishment where the practice of saving hypo. waste prevails, and who has not himself initiated such a system. Such difficulties, however, are almost entirely imaginary; and, with the object of assisting those who would desire, after our remarks, to endeavour to extract all possible value from their residues, we purpose next week to give details of a method employed in a large establishment for treating waste "hypo.," which has been there used for upwards of twenty years.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

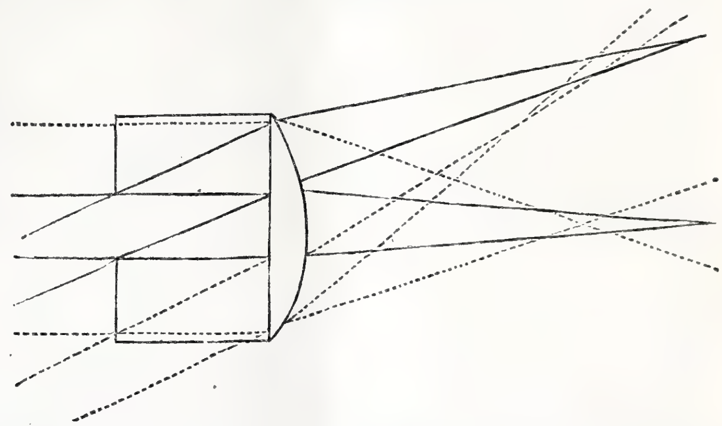
Chapter IV.—The Nature and Function of the Diaphragm, or Stop.—Depth of Focus.

How, by whom, or at what time a diaphragm came to be designated a "stop" we need not here wait to inquire. Photography has given rise to so many new terms and new applications of pre-existing terms that its literature, and especially its vernacular dicta, must not be considered as amenable to strict etymological rules. A diaphragm, even in all other branches of optical science save that of photography, differs from a stop, but in our young art-science they are held by the *vox populi* to be synonymous; hence the indiscriminate employment of the two terms in what we have further to say in these chapters.

A diaphragm fulfils two altogether dissimilar functions in photography, according to whether the lens to which it is attached be a single or a compound instrument. In the former it is a necessity; in the latter only an expedient. It has been shown in what manner rays are transmitted by a single lens, and that those impinging upon one part of the surface are not brought to a focus with such rays as are permitted to fall upon another portion. Now, by placing a diaphragm at a little distance in front of the lens, it cures all the evils arising from spherical aberration by debarring access to those rays which, if transmitted, would interfere with ultimate sharpness.

In *fig.* 8 we show in what manner the "curative" powers of the

FIG. 8.

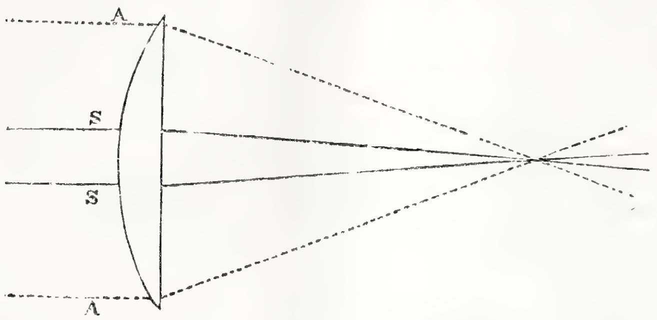


diaphragm are exercised when employed as a stop to obstructant rays, both central and oblique. Observe what havoc would be played as regards focal sharpness if the mass of the rays were permitted indiscriminate access to the lens. The dotted lines represent those by which definition would be entirely marred were they not stopped by the diaphragm, which, sentry-like, guards the access to the lens. What has, therefore, to be effected by the diaphragm in this case is this—no rays are allowed to take part in the formation of the central portion of the picture but those transmitted through the centre of the lens; and, in like manner, none but rays transmitted through the margin of the lens are allowed to form any but the margin of the picture. This is the law regulating the application of a diaphragm to a single achromatic lens, and from what has been said it will be seen that to a lens of this class the stop is a necessity.

Before proceeding further we may allude to a very prevalent and popular misconception, which finds expression in the suggestion that by making the lens of only the diameter of the largest diaphragm an equal degree of sharpness would be secured. While this is quite true as regards the formation of the centre of the picture—which would be equally well defined if an opaque disc of paper having a round hole in its centre were pasted upon the surface of the lens, and by which it would be practically reduced to the dimensions of the aperture in the paper—it is not so with the sides of the picture, which, although equally well lighted as before, are now badly defined. The following experiment is both suggestive and instructive:—Let a plano-convex or meniscus lens (the front lens of a portrait combination answers the purpose well) be mounted, flat side out, and without any diaphragm. Now try to focus the image, and observe that while no part of it is sharp, it is rather more so in the centre than toward the sides. Next make a cardboard diaphragm, with an aperture about one-fourth the diameter of the lens, push it close up against the flat surface, and then focus the centre as sharply as possible. This will now be well defined, but only over a very limited area. Without altering the camera or lens pull the diaphragm slowly away from the lens, and it will be found that, by the simple act of increasing the space between the diaphragm and the lens, the area of sharpness extends outwards, till a point is reached at which further withdrawal of the diaphragm cuts off the light from the corners of the plate without further increasing the marginal definition. At this stage the requirement has been fulfilled that the centre of the picture be formed by the centre of the lens, and, in like manner, that no rays have taken part in the formation of the margins of the picture but those transmitted by the margin of the lens.

When applied to a combination of lenses—such as that employed in portraiture—the function of the diaphragm is different from that just described; for such combination, being corrected in itself for spherical observation, gives a sharp image with its full aperture. But it is a characteristic of all portrait lenses and others having a large working aperture that they lack the power of bringing objects situated at different distances to a focus on one plane; or, as it is commonly said, they have no "depth of focus." By reducing the aperture a portrait lens can be made to possess as much of this depth of defining power as may be required. The way by which this is secured is shown in the diagram *fig.* 9, in which the dotted lines A A represent the rays transmitted through a lens worked with its full

FIG. 9.



aperture. Observe that this focus partakes of the nature of a definite point, at which it is imperative that the ground glass of the camera be situated in order to obtain sharpness. Now this is all very well, and it is the easiest thing in the world to place the focussing-screen in that precise position. But here lies the difficulty: this spot of precise focus is that for rays only which come from a definite distance in front of the lens (say twelve feet), while those rays emitted by an object either ten or fourteen feet away do not focalise at the same point or distance behind the lens—one set of rays coming to a focus nearer and the other further than the twelve-feet set.

To meet the difficulty just stated we must have recourse to a diaphragm by which all rays outside of S S are excluded, with this result—that the point at which the rays crossed the axis of the lens has now *in effect* become elongated, and a fairly-good focus is obtained without the necessity that formerly existed for having the ground glass situated in one definite position. The reduction of the aperture has given such a range to the focus that, while the sharpness of the object originally focussed upon with full aperture remains unimpaired, this quality is now imparted to objects situated both nearer to and further from the camera.

For the reason just given a portrait lens of very large dimensions cannot be used with its full aperture in taking a head unless the sitter be placed a considerable distance from the instrument, because such is the lack of depth of definition in a lens of this character that if the nose were sharply focussed the eye, ear, and other portions not situated upon the plane of the nose would be so much out of focus as to destroy the pictorial value of the head; while by focussing merely the eye, the nose and chin would be equally out. By employing a diaphragm, however, all the features may be brought into pictorial sharpness.

We may here foreshadow what we shall have to say afterwards in its proper place relative to the use of stops, by observing that a portrait or aplanatic lens (an *aplanatic* lens being one which is capable of working with full aperture) not only has its focal range, as regards depth, increased *ad libitum* by the employment of a diaphragm, but it has its lateral definition improved in similar ratio. A lens when worked with full aperture is unsuited for photographing anything requiring great marginal sharpness, such as copying a large sheet of printed matter or photographing a house on a plate otherwise within its capacity. By inserting a diaphragm the range of sharpness will be so far extended as to enable the lens to execute work for which, without having recourse to this expedient, it would have been altogether unsuited.

Now that summer weather has set in in earnest the long-delayed unpacking of cameras from their winter quarters will proceed rapidly, and many of our readers, especially of the amateur class, will be arranging their holiday plans. We shall, therefore, resume next week our series of articles on *Where to Go with the Camera*, which, as in past years, we hope to keep up regularly through the season. We trust mainly to our travelling friends for the descriptions of new or more or less unknown districts where "food" for the camera is to be found, and we shall be glad to receive contributions to the series from any who may have hit upon new ground in any direction during the last or previous seasons.

Two or three weeks ago a correspondent wrote complaining of a rather curious difficulty he had met with recently in the course of his emulsion making. He had for some considerable time worked successfully one of the formulæ given in our ALMANAC, obtaining a satisfactory degree of sensitiveness with half-an-hour's boiling. But he had found, according to his statement, that the time needful to produce the desired degree of rapidity was gradually increasing, and matters had gone so far that half-an-hour's boiling, at the time he wrote, gave an emulsion that was little more rapid than a wet plate, the process as well as the materials being all the same as formerly used. Our correspondent's difficulty presented a puzzle which we were unable to unravel except by attributing it to some unconscious variation from previous conditions. But, strange to say, exactly the same phenomena have been observed by entirely independent workers, including some of our most experienced emulsion makers—a circumstance that goes far to prove that there is something more than accident in the occurrence. In the course of a discussion at a recent meeting of the Photographic Club it transpired that Messrs. W. Ackland, W. K. Burton, and A. Cowan had each, independently, experienced this necessity for the augmentation of the time of cooking, but without being able to connect it with any change in the method of working or of the materials employed. It will be interesting if others who may have had similar experiences will make them public, in order, if possible, to trace the trouble to its source.

THERE is a peculiar patented filter-press known as Bowing's, and used for manufacturing purposes, which, in a communication to a scientific contemporary, is now recommended for laboratory work, and very possibly it might be found useful for emulsion experiments. The construction is most singular, and quite opposed to the common idea of a filtering apparatus. It consists of a most carefully-ground flat glass ring six or seven inches in diameter and half-an-inch wide, which, when the filter is put in use, is placed between two flat glass plates, upon each of which lies a sheet of filter-paper or linen, the sheets projecting about a quarter of an inch outside the ring. A provision is made for introducing the inclosed space, the liquid to be filtered by means of a projecting tube, to which is attached a tube connected with a supply at a height to obtain pressure. When the liquid is introduced under the requisite pressure the fluid part passes between the ring and the plates and drops from the apparatus into a vessel placed to receive it, the insoluble matter being left behind — not merely at the ring, but, strangely enough, upon the whole surface of the filtering medium. When large quantities of material have to be operated upon a number of rings and plates are used, and they are connected by a series of holes, one in each plate, placed exactly opposite to one another. The power of the filter is something very remarkable—certain coloured liquids which owe their colour to suspended matter, though the latter has never been mechanically separated, and is so fine as to be beyond the power of the microscope, are filtered so as to be clear and colourless with one passage through the press. There would appear to be considerable possibilities of usefulness in the instrument for removing the last traces of soluble matter from extremely-fine emulsions.

OUR readers will remember the lawsuit about a painting by Van Beers, which the critics had libelled by saying it was painted upon a

photograph. Whether as a little sly revenge or not we cannot say, but the hangers at the *Salon* have not placed Mr. Beers's pictures in a good position on the wall, and he in return has smeared them over with paint. This is a sort of thing we do not hear of in this country, otherwise the contagion might spread, and photographers who were "skied" at the exhibition of the Photographic Society of Great Britain might take to smashing the glasses over their pictures or painting them with cyanide solution!

The force of diffusion in liquids formed the subject of a leading article in our pages a short while ago. The same force in reference to gases formed the subject of a communication to the Physical Society last week, and an instrument was shown in which motion was produced by the force of diffusion between two gases.

The number of members of the British Association who have signified their intention of being present at the Canada meeting is now four hundred and ten. It is stated that Lord Rayleigh has accepted the Presidency. Meanwhile preparations are in active progress for this year's meeting at Southport, whose inhabitants have in contemplation the holding of a great international exhibition.

The use of nickel as a coating for iron has proved very serviceable in photographic mechanics. The old rusted steel roller that so often used to characterise a rolling-press which had seen service now gives place to one more like silver for brightness and freedom from rust, and we are now promised another kind of metallic coating, Dr. Gehring, of Landshut, having invented a process for producing a coating of aluminium upon iron in the same manner in which tin is put upon sheets of iron to form the familiar tin-plate. He states that his process is inexpensive, not requiring anything beyond a Bunsen's burner with a blast or a muffle furnace where heat is used. There would be no difficulty with aluminium, as it stands the heat of the naked fire, while for developing dishes and soforth a wide field of usefulness is open in photographic operations should the new process prove a commercial success.

We recently had occasion to make some remarks upon photography *versus* hand-engraving as regards the illustration of scientific works, and we pointed out the absurdity of spending money upon the production of scientific evidence in a form which could not be as trustworthy as that in which it was originally obtained, and in which it ought to be reproduced, if at all. Point is given to our views on the matter by a recent publication in the form of an appendix to the Washington Observations for 1878—*Monograph on the Central Parts of the Nebula of Orion.* Everyone taking the smallest interest in astronomical matters is aware of the great interest attaching to this mysterious object, and almost all observers in this science have investigated its form and various details, and in the monograph alluded to no less than thirty-eight reproductions of drawings of various parts of the nebula—made by different observers—have been given, while the frontispiece to the volume in question consists of an engraver's reproduction of a celebrated hand-drawing, Professor Holden arriving at certain conclusions upon the appearances presented by the drawings, which vary as much as those of the corona taken during an eclipse. But in 1880 the nebula was photographed by Dr. Draper, and again since that time other photographs have been made of the object. One taken in the latter part of last year accompanies the *mémoire* in the shape of a photolithograph. We would ask what comparison could there be between that photolithograph and laborious hand-engraving? The scientific value of photography could not be better shown than in Professor Holden's words:—"Although it is too soon to give a final discussion of the photographic results attained by Dr. Draper, I cannot refrain from pointing out some of the conclusions which may be drawn from this marvellously-perfect representation of the nebula. If we compare it with the engraving from Bond's drawing, which is the most accurate representation of a single celestial object that has been made by the old methods, the photograph will be found for nearly every purpose incomparably better than the drawing. Yet the photograph was made in 137 minutes, while the labour of observing for the drawing extended over years."

PHOTOGRAPHIC ACTION STUDIED SPECTROSCOPICALLY.

At the last meeting of the Chemical Society Captain Abney gave a lecture on the above subject to a large audience. We may premise by saying that the demonstrations he gave were carried out principally by means of experiments on paper, to enable his hearers to understand the different points he wished to enforce. The lecture was commenced by insisting on the fact that all photographic action took place within the molecules of the compound acted upon and not on the molecule itself, and from this he deduced that the absorption of radiation which takes place by such compounds is principally caused by the atoms composing the molecule. This was found to be the case in the organic liquids, which the lecturer to some extent had investigated, where he had further traced the absorption to the vibrating atoms of hydrogen in those bodies. In order to properly investigate the action of light it was necessary to ascertain which components of light in the spectrum were the chief agents in causing it, and this led him to consider the means to be employed to obtain a spectrum.

The effects of diffraction gratings were first discussed, and in two which were shown it was found that in some spectra the visible portions were dimmed; in others the ultra-violet and the infra-red were almost entirely absent. It thus became necessary to investigate the condition of a grating before placing any confidence in the results obtained. This was the first pit-fall into which an experimentalist was liable to fall. If prisms were used for obtaining the spectrum then precautions had also to be taken, since all glass absorbed a portion of the ultra-violet rays and some the infra-red. On the whole, he considered that the best glass to use was pure, white flint glass for the collimator, the prisms, and the camera lens. Another inquiry that was necessary was the source of radiation which it was proposed to use. Diagrams showed the unsatisfactory nature of solar radiation, and a photograph of the whole spectrum, taken with it under certain atmospheric conditions in which the effect of the green rays were almost *nil*, demonstrated the false conclusions that might be deduced as to the sensitiveness of any particular compound.

Captain Abney also showed the satisfactory conditions which existed in using the crater of the positive pole of the electric arc light as a source, and by diagrams illustrated the inferiority of an incandescent light for the purpose, owing to the deficiency of violet and ultra-violet rays. Having thus settled the source of illumination and the kind of apparatus to employ, he next considered the conditions under which the sensitive salts were to be exposed. The action of ordinary sensitisers was explained and demonstrated by experiments, from which point the results of certain coloured sensitisers were considered. Thus, various aniline dyes were proved to be bromine absorbents, and likewise, more or less, to be capable of being acted upon by light in those regions of the spectrum they absorbed. The result of the two effects was to produce a developable image of the spectrum just in those parts to which the salt of silver was sensitive, and also in the parts where the dye itself was acted upon. The latter effect was traced to the organic matter being oxidised in the presence of the sensitive silver salt.

The sensitising effect of one silver compound upon another was then gone into, and experiments and photographs showed where two salts of silver were in contact with one another, and without an energetic sensitiser being at hand, that the one when acted upon by light absorbed the halogen liberated from the other through the same cause, and that a new molecule was formed. This was of importance, since in photographic spectroscopic researches a conclusion might be arrived at that a body suffered absorption in those regions of the spectrum where this interesting reaction took place, whereas in reality the phenomenon might be due to the silver salts employed. This was another pitfall for the unwary. Again: it became necessary in studying photographic action to make sure that the effect of radiation was only a reducing action, and that the results were not vitiated by some other action.

The destruction by oxidising agents of the effect produced by light was then experimentally demonstrated, and photographs of the spectrum showed that this effect was increased by the action of light itself. Thus, when immersing a plate sensitive to all radiations, visible and invisible, in a very dilute solution of nitric acid

bichromate of potash, or hydroxyl, it was shown that if the plate were exposed to light first the parts acted upon by the red rays were reduced before the parts not acted upon at all by the spectrum, thus conclusively proving that light itself helped forward the oxidation or so-called solarisation of the image. It thus became a struggle, under ordinary circumstances, between the reducing action on the normal salt and the oxidising action on the altered salt as to which should gain the mastery. If the reducing action of any particular ray were the most active then a negative image resulted, whereas if the oxidising action were in the ascendant a positive image resulted. Thus, in determining the action of light on a particular salt, this antagonism had to be taken into account, and exposure made with such precautions that no oxidising action could occur, as would be the case if an inorganic sensitiser, such as sulphite of soda, were used.

The reversal of the image by soluble haloid salts, such as bromide of potassium, was then dwelt upon with experimental demonstration. It was shown that the merest trace of soluble haloid would reverse an image by the extraction of bromine from it, and the fact that the most refrangible part of the spectrum was principally efficacious in completing this action showed how necessary it was to avoid falling into error when analysing photographic action by the spectroscope. A reference was next made to gelatine plates, in which, owing to their preparation, reversal through the above cause was most likely to take place, and a plate soaked in sulphite of soda and exposed in the camera for a couple of minutes—a time largely in excess of that necessary to give a reversal under ordinary circumstances—proved the efficacy of the oxygen absorber, the image remaining in its normal condition after development.

The lecturer closed his remarks by showing the different molecular states of iodide, bromide, and chloride of silver, as produced by different modes of preparation. The colour of the film by transmitted light in every case indicated the effect which was likely to be produced on them, and the photographed spectrum in each of them showed the remarkable differences that were found. The points raised by Captain Abney at different times are well worthy the study of scientific photographers, since strict attention to the modes of exposure to the spectrum, to the instruments employed, and to the source of light used, can alone ensure accuracy in comparative experiments.

VENTILATION OF DRYING-ROOMS AND CUPBOARDS.

At the Photographic Club, on Wednesday, the 16th inst., a most interesting discussion on the best means of drying gelatine plates took place. On the general subject I do not propose to say anything, especially as it was to be resumed at the next meeting. On one point I have, however, thought that possibly I might write somewhat with profit, as it is one which has occupied much of my attention in connection with a profession other than the photographic. This is on the various means to be adopted for inducing a current of air, the general opinion of the meeting referred to being that by a brisk change of air the best results in the way of drying were likely to be brought about.

Mr. L. Warnerke gave a most interesting illustration of the matter in hand in recounting what he had seen at a large glue manufactory. It would appear that after the glue has been slowly dried it is again surface wetted, the object being—firstly, to get rid of adherent dirt; and, secondly, by very sharp drying to give the cakes of glue a glossy surface.

It appears that the means resorted to are as follow:—The glue is laid on shelves in a large room, which is heated by steam pipes to 80° or 90° Fahr. A space is left clear in the centre of the room, and here a large fan is kept slowly revolving, the object being simply to keep the air in the room in a state of motion. Little special means are provided for complete change of the air; but it is evident that if the drying is to be at all rapid such change must take place, or there would soon be complete saturation. It is not generally known what an enormous change of air will take place in the best-built room by natural leakage and percolation, even when no special apertures are provided. Many must have noticed in a room where gas burns a peculiar appearance of the ceiling. The position of each joist is distinctly visible, showing as a white streak with comparative blackness on each. This is produced by the passage of air through the plaster, the particles of carbon or soot being retained in the body of this, as foreign matter is in a filter. If a piece of the plaster be broken the blackening effect will be seen to have penetrated quite through it, if it have been long in position.

It has been demonstrated experimentally that in an ordinary well-built room, with all apertures closed and an excess of temperature over that out of doors of about twenty degrees Fahr. kept up, there will be a change of air equal to several thousand cubic feet per hour. It would appear from this that the method adopted by the gluemaker might be an excellent one for drying plates, even without any special ventilating appliance—understood as a means of *entirely* changing the air—were it not that the high temperature is objectionable.

The fan in the middle of the room may be an excellent adjunct; but it is not sufficient if the temperature of the drying-room is to remain the same, or nearly the same, as that out of doors. It was suggested by one member that the fan arrangement might be removed, the plates being placed on a revolving table. The most perfect arrangement of all would, undoubtedly, be a combination of both ideas. The revolving table might form a fan and distribute air amongst plates stacked in the four corners of the room and at the ends, if it were not square, thus avoiding loss of space.

For the actual changing of the air there are many methods, but they may be divided into two classes:—First, there is change of air by artificial expedients—by means of currents induced mechanically or by heat; and, second, there is change of air produced by currents induced by wind.

Of the former or mechanical method it may be said that the most perfect of all, when the motive power is at hand, is a fan driven by a steam or other engine. This method has, I have heard, been employed in at least one case. Water power, applied either direct in the form of a spray in a tube reducing a current, or, as in the case of Verity's ventilator, acting in the form of a small jet on a water wheel which sets in motion a fan, must not be omitted. Where water is plentiful it is probably the most economical method of all; but in London it would appear to be far from it.

As regards change of air by heat-induced currents, without the intermission of a heat engine in the form of a steam, gas, or hot-air engine, the greatest economy is attained by burning the fuel at the foot of a long tube or chimney, thus forming an extractor to draw from the drying-room. It is to be presumed that gas will be the fuel used; and here I may say that, if the arrangement adopted be even tolerably efficient, every two or three cubic feet of gas burned should secure the removal of a thousand cubic feet of air. Thus, an ordinary burner should draw from the drying-room from one to two thousand cubic feet per hour. Three or four such would probably produce sufficient change of air for the largest drying-room, the cost being about a shilling per day.

The natural method of inducing a current by taking advantage of the wind would be by far the most efficient and economical, if only some kind soul would discover a means of securing that the wind should blow at all times and seasons. Even without this much-wished-for state of affairs, the simplicity of wind ventilators is so great that they are likely to be adopted by many. The name and forms of the appliances which have been invented to cause a passing current of wind to induce a draught up a pipe or chimney are legion; and yet after all that has been done it is probable that, at anyrate where the pipe can be allowed to stand completely away from any sloping roof, nothing beats a pipe quite clear and open at the top.

Elaborate experiments have been made by more than one person in connection with ventilators for drains to ascertain what particular form of ventilator would draw most air in a given time. It is true that in these several ventilators have beaten the open pipes by a little, but it must be remembered that the conditions are different. In drain ventilators the great desideratum is to avoid a *down* draught; in the case of a plate drying-room this is of no consequence. A draught in any direction involves a change of air, and this is all that is required.

Referring to the tables of experiments compiled by Mr. S. S. Hellyer: I find that with a four-inch pipe, thirty-three feet long, square at the top, without ventilator of any kind, the current induced varied from about 700 linear feet per hour, in the most stagnant of atmospheres, to nearly 20,000 linear feet with a brisk wind. This corresponds roughly to from 60 to 1,600 cubic feet per hour—say an average of 800. In this case, however, there is an unusually long pipe, and, consequently, great friction. Moreover, an increase in the size of the pipe would result in an increased current of air *more* than proportionate to the area of the pipes. Thus, an eight-inch pipe would give *more* than four times as much change as the four-inch one. Probably, therefore, a very moderately-sized tube, if carried from the drying-room to a point clear of the roof and left open at the end, would bring about sufficient change of air, except in very stagnant weather.

Referring again to the tables mentioned: I find that none of the ventilators or cowls drew very much more than the open pipe, and most drew much less. There is, however, the advantage in most

ventilators that they prevent the access of rain. It may be well, therefore, to note that the one which came off best in the trials referred to—and, I believe, also in others—is that known as Buchan's. All cowls with moving parts, which either revolve working fans, Archimedian arrangements, &c., or which turn so as to face the wind and act somewhat after the manner of the steam regulator, are worse than useless; that is to say, they draw much less air than would be drawn were the pipe left without them.

To conclude: the arrangement which would appear to me the best, where it could be carried out, would be one in which the air is extracted from the room by some means not depending on the variable wind, in which it was admitted by suitable and *sufficiently-large* apertures and distributed by a revolving table, as described above, the power necessary to drive this being derived from the same source as that which induces the air current. W. K. Burton.

WHAT IS A RESTRAINER?

[A communication to the London and Provincial Photographic Association.]

Most of us know the usual interpretation of the word "restrainer," but with regard to its meaning in the development of an image that is an entirely different thing. The effects of restrainers are at least threefold:—1. One that will arrest the development at any stage. 2. One that will only delay it. 3. One that affects the exposure; that is to say, if a plate be over-exposed, by the judicious use of No. 3 the mistake is corrected. I will not attempt to go into the chemistry of the matter, but will leave it in other and more capable hands.

In wet-plate photography, in most works on the art, we are told that a weak developer will give a hard picture, and if a soft negative be required a stronger reducer would produce the desired result. Now, in my experience it is quite the opposite, and in the gelatine process there is no exception to this principle. I often wonder why a large proportion of the accelerator (ammonia) is recommended and a correspondingly large amount of bromide. Why, in the name of common sense, use ammonia so freely as to require also the free use of bromide? I know several photographers who use something like half-a-grain of pyro. solution per ounce and a proportionately small quantity of ammonia, and the development is fully under control and beautiful negatives are the result. I believe that the plate is yet to be made and the developer found that will develope completely with one solution requiring no restrainer, the retarding action being regulated by the strength of the developer. I have made many experiments in this direction. I am not going to detail my failures, but only a few of my successes. The most powerful restrainer or arrester I have met with is boracic acid. A drop or two of a saturated solution instantly stops development, and a very large amount of ammonia will be required before the developing action is set up again. I have already published the fact that nearly all neutral salts act as restrainers. Boracic acid is a valuable antiseptic. It has been found when injected into the arteries of animals that decomposition is prevented.

Perhaps some of the members of this Association will be able to explain why some plates require eight times as much bromide in the developer as others. I have tested some plates and found a small quantity of free bromide in the emulsion, and in this case very little bromide may be used in the developer.

I do not know who first recommended spices in emulsion as antiseptics. It is well known that in the process of preserving mummies spices play an important part. One professional plate-maker uses cinnamon as an antiseptic. I know of no more valuable preservative for emulsion than benzoic acid. I cannot say how long an emulsion containing it will keep, but I believe indefinitely. It imparts a quality other than a preservative. It is not very soluble —about 1 in 200 cold—and if a larger proportion be dissolved in alcohol and mixed with the emulsion it will form a precipitate in itself, and plates prepared with emulsion so treated develope and fix more rapidly than others. This is owing, I believe, to the benzoic acid dissolving, and leaving the gelatine more porous. Emulsion so made may be developed without bromide, giving dense, clear negatives.

Another restrainer for the developer is formic acid. Five to ten drops to each ounce of solution works beautifully.

One word more. Bromide in the developer does not tend to give density, but quite the contrary; yet a professional photographer who should know better lately criticised an over-exposed negative by saying that it required more bromide, when, in reality, the quantity used was very much in excess—something like two grains to the ounce. What the plate in question required was less bromide and more pyro. A. L. Henderson.

PHOTOGRAPHY FOR BEGINNERS.

IN SIX CHAPTERS.

Chapter III.—Over- and Under-Exposure.

Over-exposure is indicated by there being no contrasts between the lights and shadows of the negative. It is not difficult to understand how this becomes the effect of too prolonged an exposure. The deepest shadow in the subject should be represented by clearness of the film in the corresponding portion of the negative; the highest lights by opacity. As it is not possible for the latter to advance further, the only effect of prolonging the exposure in the camera is to allow the shadows to "catch up" to the lights, until they, too, shall have become opaque in the negative. Hence the flatness or want of contrast arising from over-exposure.

When negatives are found to possess the features just described, the obvious way to prevent it is to reduce the time of exposure. But in cases where a number of plates are to be developed in which the exposure has been nearly alike in all of them—although the one first developed, and which has allowed the fact of the uniform over-exposure to be made known, be spoilt—it may be quite possible to save all the others and develope them into good printing negatives by adopting the following modification:—The presence of a soluble bromide (such as that of ammonium or potassium) in the pyrogallic developing solution produces in the negative the effect of less exposure—a fact that would be very soon discovered if a plate after exposure were cut into halves by a diamond, and one of these previous to development were immersed for a half-a-minute in a solution of one of the bromides mentioned. Upon development the half thus treated would be found to have the appearance of having been greatly under-exposed in comparison with the other. The knowledge of this fact, for which the world is indebted to Major Russell, gives the key to the curing of over-exposure when developing by alkaline pyro. solutions. It is necessary, in order to meet such a contingency, that a solution of bromide of ammonium—twenty grains to the ounce of water—be provided, and a dropping-tube kept standing in it while development is going on. Upon the slightest indication of over-exposure, evidenced by the shadows appearing almost simultaneously with the lights, pour the developer from the tray in which it was into a graduated glass or cup of any form, and immediately add to it several drops of the bromide solution, mixing all well together, and then continuing with this mixture the development as before. This prevents further development of shadows, allowing the lights to acquire strength.

When it is known that the plate has received too prolonged an exposure it is desirable that the development be started with a pyro. solution containing a greater proportion of bromide than that given in the formula in the previous chapter; while, if the over-exposure have been very great indeed, a fair negative may still be obtained by immersing the plate, previous to development, in water to which has been added a small portion of the bromide solution. We have known, by this method of treatment, good negatives being made on plates which have been exposed twice as long as they should have been.

Bromide being such a remedial agent in cases of over-exposure, it follows that very sparing recourse must be had to its use when the plate has not received sufficient exposure. This fault is indicated by a persistent disinclination of the details in the shadows to appear long after the high lights have been developed. When this is the case pour away the old developer and apply a fresh one containing an extra large proportion of soda, a strong solution of which ought to be kept ready in case of emergency. This will produce a marked effect in coaxing out details.

Chapter IV.—How to Print.

Although it is not difficult for each one, even a "beginner," to prepare his own printing paper, yet, as it is somewhat "messy," we strongly advise that sensitive albumenised paper be purchased ready-prepared, especially at first. We shall suppose that such has been procured, which is now fortunately an easy matter, as all dealers in photographic appliances keep it for sale.

The explanation of the system of printing is this: sensitised paper is blackened by light, such parts as are protected remaining white. When, therefore, paper of this kind is exposed to light, with a negative superimposed, the clear portions, or shadows, of the negative offer no obstruction to the light, which consequently exerts its action on the paper; but the opaque parts offer such a degree of resistance to the transmission of the light as to produce upon the paper a much lighter stain, the result being a positive counterpart of the negative image on the glass.

The paper, previous to being printed upon, must never be exposed to a strong light, or it will acquire a uniform degradation of

tint. The manipulations should, if possible, be performed at a table in a room fitted with yellow blinds, which must be drawn down. This permits everything to be seen quite plainly without the paper becoming damaged. Proceed as follows :—Lay the printing-frame, face down, on the table and remove the back ; then into the rebate lay down the negative, film side up, having previously ascertained that it is free from dust or dirt, and upon this lay carefully a sheet of sensitive paper the proper size. Take care that the glazed side, or face, of the paper be placed next to the negative. Now put on the back of the printing-frame, lock the fastenings, carry it out, and lay it down in such a manner as will expose it, face up, to a strong light.

The time required for exposure depends on the strength of the light and the density of the negative. After about five minutes it may be advisable to examine the progress made. To this end bring the printing-frame into the partially-darkened room, and undo the fastening of one end only of the back of the frame, bend it back upon its hinge, lift up the end of the paper, and observe the condition of the print. If there be only a very feeble image visible close up the frame again as before, and expose for a further period, until upon final examination the picture appears rather darker than it is eventually desired to be. This is important, because the subsequent operations of toning and fixing undo a good deal of the printing and lighten the image. These operations may be deferred till several proofs have been printed. It is absolutely necessary that the prints must be protected from light on and after removal from the printing-frame, otherwise they would blacken all over. A drawer, a closed box, or light-proof portfolio suggest the means for securing this immunity from light.

To tone the prints: place them first in a vessel of plain water to remove the nitrate of silver by which the sheets were originally rendered sensitive. Immerse them one by one to ensure the free action of the water, which should be changed two or three times, the room in which this is done being but feebly lighted, as before directed. Next transfer them, one by one, to a bath composed of—

Chloride of gold	2 grains.
Acetate of soda	60 „
Water	16 ounces.

This preparation should have been made at least one day before use. It keeps good for a long time. Let the prints be kept moving about in it to ensure equality of toning. The probability is that at first the tones will become of a foxy red. This, however, depends upon the nature of the paper employed, and does not always occur. After some time the tones will be found to have assumed a rich, deep, purple colour, just merging into blue; and when this is the case transfer them to a solution of hyposulphite of soda four ounces to the pint. Keep them moving about in this and do not allow them to remain for a less time than eight minutes, after which lift them up and look through them. If the whites are translucent, it may be assumed that they are fixed by the removal of the chloride of silver which formed the sensitive ingredient in their preparation ; if not translucent replace them, for a few minutes more, in the fixing bath.

The prints must now be thoroughly washed in repeated changes of water, this being continued for some time after (upon applying the tongue to the surface) there is any peculiar saline taste appreciable. Blot them off with bibulous paper, then spread them out upon a dry towel until dry. They are now ready for being neatly trimmed by means of a pair of scissors or sharp knife, and mounted on cardboard with freshly-prepared starch paste.

ASTRONOMICAL PHOTOGRAPHY

Part III.

If a number of photographs of the moon taken at different times of the year are compared together it will be noticed that they are not all alike. Some will show a little more of one side than the other from right to left, and also when the upper and lower parts are compared. The difference in the pictures is caused by what is termed "libration." It is correct to say that the moon always turns the same face towards the earth ; but this libration, or swinging from side to side, enables us, as it were, to see round the corners of the moon, producing the same effect as when we look at an object near at hand alternately closing the eyes—the left eye will see parts of the surface invisible to the right eye, and *vice versâ.* Advantage has been taken of this peculiarity of the moon's motion to produce stereoscopic slides, and very remarkable results have been obtained. When two transparencies from negatives taken at the proper extremes of libration are combined in the stereoscope, the appearance of the moon is that of a globular body, and the combination of the two pictures adds very much to the beauty of the object, as compared with a flat picture. As this is exactly the effect we have when a globe is photographed near at hand and viewed in the stereoscope, one would have supposed it to be sufficient to convince those who think the earth is flat that, at least, our satellite is globular.

The inquiry may naturally be made as to what results are to be anticipated with the means accessible to an amateur. Perhaps I may be permitted to refer to what I was able to do with an achromatic telescope of five inches aperture; and if we judge by published results my little pictures have been considered to rank third in the list. I refer only to what had been done up to about ten years since, and anyone who desires to see what can be done with small means I would refer to the first edition of Mr. Proctor's book on the moon, in which the frontispiece is an enlargement of one of my negatives ; and at page 214 there is a series of ten prints showing the progress of an eclipse of the moon. I refer to my own work as an encouragement to others, and particularly to those who have access to reflecting telescopes.

By taking advantage of every favourable opportunity I am satisfied that excellent results may be obtained ; but unless workers in this direction are willing to give much time and patience to the matter they had better leave it alone, as, for the reason I have already given, success cannot be expected unless advantage be taken of every favourable chance. And here I may remark that success will depend in a great measure on always being prepared. A really fine night may occur, but if time has to be occupied in making preparations nothing is likely to be accomplished. Everything should be ready at hand, so that in a few minutes work could be commenced. Observatories are generally placed at some distance from the dwelling-house, so that if plates are to be carried backwards and forwards for development much valuable time will be lost. Everything needful for successful work can be kept in a small cupboard, which may be fixed in the observatory; and, if the wet collodion process be used, a sink should be put up over which the plates may be developed. But if gelatine plates be used the same advice applies, as it will be useless to expose a number of plates and develope at leisure. The results must be seen at once.

The focal length of a refracting telescope changes with the temperature, and consequently the proper place for the plate may not be always the same though very near, and this must be ascertained by trial. In any case several exposures must be made, as the appearance of a defective image is very much the same whether caused by incorrect focus or atmospheric disturbance. To an enthusiast a few failures should be no discouragement; and, as most photographers are enthusiasts, I can only say that the subject is very fascinating and well worth any time that may be devoted to it.

The planets show discs so small in diameter, even in large telescopes, that I consider time wasted in photographing them, and nothing of any scientific value is to be expected, even if the most perfect pictures could be produced.

For many years photographs of the sun were taken every fine day at the Kew Observatory in order to show the "spots." At the Greenwich Observatory the practice is continued, and at other places the surface of the sun is photographed for the same purpose.

At Meudon, in France, M. Janssen has accomplished some most important results by taking pictures on a large scale *direct.* In the case of the sun the interposition of an enlarging lens becomes practicable, because the light is so much in excess of that of any other celestial object that a very small part of a second suffices to impress the image.

Clearly, for making photographs of the sun some other form of apparatus is necessary if enlarged pictures are desired. By carefully excluding all white light of course the observatory itself might be made the camera, and an easel could be adjusted on which to rest the prepared plate ; but this, in actual use, would scarcely be a workable plan. It answers very well for making drawings of spots, but for our purpose it will be better to fix a frame in such a way that a dark slide may be held and used in the usual manner.

On a sheet of white cardboard or paper held at a short distance from the end of the telescope, the eyepiece still in its place, the image of the sun may be projected and focussed. It may then be determined on what scale the photographs shall be made. If the full disc of the sun be required a comparatively small image—say of four inches diameter—will be effective, and this can be made at a

ew inches from the eyepiece; but, if a photograph of a sun spot only be required, the plate must be placed at a greater distance, and this may be determined by trial with the white screen.

The method usually adopted for making the exposure when photographing the sun is to arrange a spring slide in such a way that it is held in position by a thread, which at the proper moment is released by applying a light to the thread.

In this department no one has been so successful as M. Janssen. It is quite impossible to convey in words a correct idea of what he has accomplished; but in a work on the *Sun*, by Dr. G. A. Young, Professor of Astronomy in the College of New Jersey, will be found two beautifully-executed mechanical autotypes of portions of the sun's surface, which show detail of a very interesting kind. The peculiar appearance shown in these photographs has been described by various observers as "rice grains," "willow leaves," &c. The appearance is more that of "granulation," but as these markings are about 1,000 miles long the terms are merely fanciful in either case.

The second of the two photographs was taken after an interval of fifty minutes, and a careful comparison of the two exhibits a change in the position of one of the spots, so rapid are the changes on the surface of the sun.

The prints referred to show some remarkable effects. There is a kind of blurring in some parts, and as the apparent defect does not appear in the same place in each picture it is assumed that the effect is caused by changes in the solar atmosphere.

I cannot do better here than to quote a short paragraph from Dr. Young's book. At page 112 he says:—"It is not, however, certain that the disturbed portions of the solar atmosphere, which produce the indistinctness in question, lie near the sun's surface. It may be that they are high up, and it would not be an unreasonable conjecture to suppose that the streamers and luminous masses of the corona may be concerned in the phenomenon; it is almost certain that any great aggregation of photospheric matter would modify the appearance of whatever might be situated beneath it." Therefore, perfect sharpness in the detail can scarcely be expected in our photographs when it is remembered that we are looking through an atmosphere many thousand miles in depth.

The Sun—to us the most important and wonderful of all the celestial bodies—has within the last few years attracted the greatest attention; the application of the spectroscope to researches as to his composition having yielded the most surprising results, photography having played no unimportant part, and there is stlll ample scope for discovery to anyone willing to enter the list of workers.

A comparison of the work done within the last few months and that of a few years since shows a remarkable advance, chiefly owing to the quicker process at our command, and the success gained will, no doubt, stimulate those who have done such excellent work to still greater efforts.

One of the most successful of these workers, Dr. Draper, has only recently passed away. He produced, I believe, the first negative of the nebula in Orion, and a print which I possess exhibits most of the characteristic features of that well-known object; but this picture is surpassed in beauty by one taken by Mr. A. A. Common, F.R.A.S., at Ealing, in January last. It is difficult to conceive that anything can ever be obtained to excel this triumph of photographic skill. It was taken with a reflecting telescope of *three feet* diameter. The original negative is about two and a-half inches diameter, and the autotype print before me as I write is enlarged to about seven diameters, giving a picture of wonderful beauty. The appearance of this picture confirms what I have before said that photography alone can be relied on to give faithful copies of such difficult and complex objects. Good drawings have been made, but none that I have ever seen can bear comparison with this photograph for delicacy and accuracy of detail. When we consider that this negative required an exposure of thirty-seven minutes to the light concentrated by a three-feet mirror, it must necessarily happen that the stars shown have discs, owing to the driving power not being absolutely perfect and partly to atmospheric disturbances; but this scarcely mars the beauty of the result, as they are all in proportion and are all irregular in shape in one direction, thus serving to distinguish stars from defects on the plate. The relative magnitudes of the stars are shown, and we have a somewhat convincing proof that a photographic chart of the whole of the stars will only be a work of time. Its practicability seems to be demonstrated.

The readers of The British Journal of Photography have this week to thank the Proprietor of that Journal for his liberality in presenting them with the very beautiful ink-photo. of the moon which appears with this concluding article. The original photograph of the moon in the first quarter was taken in New York, by Mr. Rutherfurd, and was presented to me by that gentleman with two others—one of the full moon and the other of the last quarter; and, as permission to publish was also given, it occurred to me that a picture of the moon would very appropriately accompany what I have written, and the suggestion was at once adopted. I selected the first quarter phase because it presents the most interesting features; and, as to the original negative from which the print is enlarged, I may say it is one of the best that was ever taken. I know of only one other of the same phase which is superior to it, and that also was done by Mr. Rutherfurd.

The process of Messrs. Sprague and Co. appeared to offer the appropriate means of showing what should be aimed at in making photographs of the moon. No process by which the half-tone of the photograph can be reproduced in lithography is yet perfected; but the ink-photo. gives a very fair idea of the original. The light parts are toned down too much by the "grain," and the so-called "seas" are too dark, but, taken as a whole, a fairly good picture of the moon is the result; and any amateur who can produce a negative which, when enlarged, will give a silver print of the size of the specimen and as good as the lithograph may consider that he has achieved a fair result.

That there are so few workers in scientific photography is, perhaps, explained by the attractiveness of landscape scenery and the natural desire to possess the portraits of one's friends; and these two branches of the art receive the greatest share of attention. They can be practised in daylight and in the most pleasant time of the year. But there are many nights when astronomical photography can be carried on with no discomfort as to temperature; and, when a fair share of success has been our reward, there is the satisfaction of knowing that what has been done has been in the face of disadvantages not encountered by those who care only for the two branches, the practice of which involves comparatively few difficulties.

In what I have written I have endeavoured to smooth the way, and I trust that those who have been sufficiently interested to try to use the telescope as well as the camera will find at least as much pleasure as if they were employing the same time in photographing microscopic objects. It may, indeed, be found that in astronomical there are less difficulties than in microscopical work, to which just now some attention appears to be given. The uses of photography are widely ramified. That there is yet much work in the scientific world to which it can be applied there can be no doubt, and not the least important in interest and value is the department of astronomy.

A. Brothers, F.R.A.S.

DECOMPOSED GELATINE.

When it was first proposed to substitute gelatine for collodion, one great advantage which the former was supposed to possess over the latter was its being a definite chemical compound, and therefore (so it was thought) less liable to the vagaries incident to indefinite substitution compounds, such as pyroxyline. A short acquaintance with gelatine, however, in the form of emulsion showed that it had ways of its own quite as troublesome as any that belonged to collodion, and hence the "vagaries of gelatine" has long been a favourite topic for discussion and an interesting subject of investigation.

It is generally believed that the greatest drawback to gelatine is its proneness to decomposition in presence of moisture, and many ingenious methods have been devised by emulsion makers, either to prevent decomposition during the process, or to eliminate every trace of decomposition that may have been formed. To the presence of a trace of such decomposed gelatine in an otherwise good emulsion the knowing ones attributed fogs, red and green, frilling, and many other objectionable features, while the less-experienced workers, believing in the dictum, regarded it as an enemy to be avoided, rather than—as I am now more than half inclined to believe—a friend to be courted. How far I am justified in this belief my readers must judge for themselves, as at present I shall content myself with a simple record of a few facts, in the hope that those who have time and opportunity will consider them worth investigation.

In August and September of last year, when I had become infected with what I used to consider the craze for rapidity, my experiments had for their object the production of the most rapid emulsion that could be made consistent with clearness and vigour. Having, as I thought, got my hand in, a batch of twenty ounces was made with a view to a drop-shutter raid on the harvest operations

that were about to commence in the fields which surround my home; but, like many other "well-laid schemes," it went "agley." The emulsion possessed all good qualities except rapidity, and as that was at the time a *sine quâ non* it was laid aside in the beaker into which it had been filtered, and forgotten until a few days ago—exactly eight months after its concoction.

Examination showed it to be a slightly yellowish-coloured fluid of the consistence of a thick syrup, which could easily be poured from one vessel to another, and having a smell like a carpenter's glue-pot. On spreading a little on a plate and taking it to the light it darkened rapidly, and dried perfectly in the course of an hour or two. On immersing the dried film in water it at once dissolved, and the glass came out of the tray quite clean, leaving only a slightly-milky solution caused by the silver bromide, and a teaspoonful of the emulsion dissolved in a few ounces of water as if it had been syrup.

This certainly did not look like a promising state of matters; but after a few experiments, which need not be recorded, one hundred and fifty grains of Heinrich's gelatine were soaked in water for a few hours, and, after pressing out as much of the water as possible, were added to the whole of the decomposed emulsion, and melted at a temperature of 140° Fahr. Being satisfied from the preliminary experiments that the emulsion would be in good working order, it was at once employed to coat a batch of plates, each of which was set and ready to be placed in the drying-box within less than five minutes after being coated. At the end of forty-eight hours the plates were found quite dry, with a slightly dull, but not what is generally understood as a "matt," surface.

So far all went well. But "the proof of the pudding is in the eating of it," and so the most important ordeal had to be applied to the plates—that of actual work in the camera. As, of course, this is the keystone of the matter, I am glad to say they came out of it triumphantly. They not only possess all the good qualities of the original emulsion, but, in addition, *are the most rapid plates that I have ever come across.* They develope rapidly, readily acquire sufficient density, and are free from all trace of fog of any description.

Now the important question arises—Whence comes the very great increase of sensitiveness? Is it from the action of the decomposed gelatine? or is it merely the usual ripening greatly extended and intensified, in consequence of the syrupy nature of the emulsion allowing a more free movement amongst the molecules of silver bromide? This question, as I said at the beginning, I mean to leave till further experiments have made it less difficult, and content myself in the meantime by emphasising what I think is proved to be a fact—that decomposed gelatine is not injurious in an emulsion.

John Nicol, Ph.D.

PHOTOGRAPHY APPLIED TO METEOROLOGY AT KEW OBSERVATORY.

No. III.

In my last communication a brief statement was made about the use of photography in the determination of the altitude of the higher clouds. The method was first brought into use in Germany, and Professor George Gabriel Stokes, Secretary to the Royal Society—whose researches on the beautiful phenomena of light, included under the term "fluorescence," were the delight of my boyhood—having drawn attention to the desirability of similar experiments being carried on in this country, the undertaking of the practical details fell to the lot of Captain Abney.

Mr. Robert H. Scott, Secretary to the Meteorological Council of the Royal Society—which Council issues the daily weather forecasts to the newspapers, and regulates the exhibition of the storm-warnings at various seaports—gave an address a few evenings ago at the Royal Institution, in which he spoke of the necessity for the accumulation of more knowledge about the cirrus clouds. Most of our storms come from the Atlantic, which places those meteorologists in Great Britain who have to try to forecast the weather at a great disadvantage, because they can establish no stations on the sea to the west of Ireland. In forecasting the weather in Eastern America the United States meteorologists have an enormous advantage, because there is a vast area of land to the west of them dotted with meteorological stations in the charge of good observers—men trained in the habits of military discipline.

Mr. Scott said that the Rev. Clement Ley, of Lutterworth, was considered infallible in his own district as a foreteller of the weather; but then he had spent one-twelfth part of his waking hours in observing the higher clouds, and to forecast the weather from the data so obtained could not be done by a common observer, but required considerable matured judgment and experience, as well as abundant leisure. In observations of cirrus clouds lies the only way of extending British meteorological outposts, to some extent, over the Atlantic; consequently observations of the higher clouds are now attracting the attention of most persons in these islands interested in meteorology. The speaker said that the Germans often complain that the English meteorological telegrams do not reach them early enough, and that without such telegrams from the west they can do little of value in the way of forecasting. England has no such advantages in the way of communications from the west, let it wait as long as it will.

"Right here," as the American orators say, it should be remarked that to establish floating telegraph stations beyond Ireland, with electric cables attached, would be an extravagant waste of the public money, however gratifying it might be to cable makers and meteorologists. Apart from the heavy first cost and permanent working cost, and apart from the swaying of the ship giving but a short general life to the cable, the latter is particularly liable to be cut by the chain anchor cable in swinging with the tide, and the remedies of Captain Boxer and of the Telegraph Construction and Maintenance Company yet require the testing of long experience to determine their practical value. Moreover, there is a more subtle difficulty not yet known to many except experienced electricans, namely, the liability to the rupture of the internal copper conductor under the incessant swinging motion, while the exterior of the signalling cable is intact.

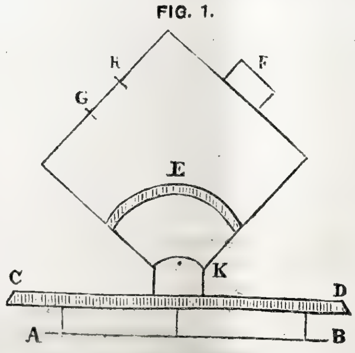
A Government blue-book—the Report of the Meteorological Council for the year ending March 31st, 1881—was published in 1882, and contains most useful general information on meteorology, as well as something about "photo-nephography," or the photographing of clouds. It states that cloud observations were then being made regularly by the eye at five places—Valencia, on the west coast of Ireland, whence the Atlantic cable starts, by Mr. J. E. Cullum; at Mullaghmore, by Mr. K. Kerr; at Lutterworth, by the Rev. W. Clement Ley; at Torquay, by Mr. E. E. Glyde; and in London, by Mr. F. Gaster, at the Meteorological Office. The observations have often been of material assistance by indicating the approach of barometrical depressions from the Atlantic.

As photographers everywhere may henceforth render themselves, if they like, very useful to meteorologists by making special personal and photographic studies of the higher clouds, I here copy from an official report the items of information which the Meteorological Office at present requires from observers:—

"1. The precise form of the upper cloud observed.—2. Its amount.—3. The precise direction whence it is moving.—4. The estimated rate of its apparent angular motion; that is, whether stationary, moving slowly, moving with moderate rapidity, or with unusual rapidity.—5. The point on the horizon from which the cloud appears to radiate. When the clouds appear in a bank on the horizon, there is added—6. The bearing of the middle of the bank.—7. An estimate of the density of the bank. The direction and force of the surface wind current and the weather prevailing at the time of observation should also be stated."

The photo-nephograph, or cloud photographing apparatus, now at Kew Observatory, was designed by Captain Abney, approved by the Meteorological Council, and manufactured by the Cambridge Philosophical Instrument Company, under the superintendence of Mr. H. Darwin. It consists of two cameras, the amount of error in the working of which was being tested by the Superintendent of Kew Observatory, Mr. G. M. Whipple, during a recent visit I made there. It consists of two cameras, each carrying a plate four and a-half inches square.

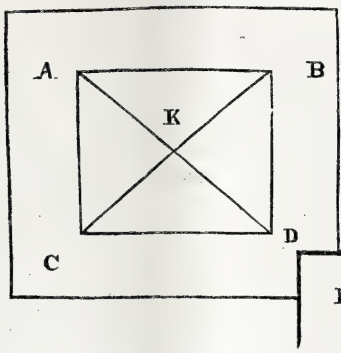
FIG. 1.



The accompanying diagram, *fig.* 1, will help to explain the principle of construction of each camera. A B is a brass bed-plate fitting upon the top of the camera stand, and, by means of three levelling screws, carrying the horizontal graduated circle C D and its vernier, to measure the movements in azimuth. E is a graduated circle, with vernier, to measure the position in altitude. Clamping screws are placed where necessary, and along the bottom edge of the camera, near K, is a tubular spirit level. At F is a small lens, and in front of it an electrical shutter, giving an exposure governed by the length of time an electrical current passes round an electro-magnet. A momentary depression

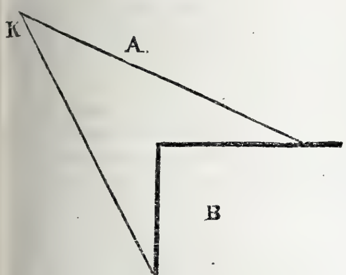
f the commutator will give an instantaneous exposure; but if the key"—as telegraphists call t—be pressed down longer, or the same length of time vill the exposure continue. The movements of the shutters of the two cameras are controlled by the same commutator, so the time of exposure must be the same in both nstruments. A "sight," to use a gunnery phrase, is fixed on one of the top edges of the amera, at G H.

FIG. 2.



The details of this "sight," G H, *fig.* 1, are given in *figs.* 2 and 3. A B C D, *fig.* 2, corresponding to H in *fig.* 1, is a plate of blackened brass, fixed on the top edge of the camera E, and carrying two fine cross-threads, A D and B C. *Fig.* 3 corresponds to G in *fig.* 1. It consists of a pointed piece of blackened brass A, fixed on the top edge of the camera B.

FIG. 3.



In use, when the point K, *fig.* 3, coincides to the eye of the observer with the crossing point K of the threads in *fig.* 2, the portion of the cloud or distant object seen in the same straight line will fall in the centre of the plate exposed in the camera.

The plates used are not very rapid, and are specially prepared to give strong contrasts. The emulsion consists of—

Bromide of ammonium	150	grains.
Iodide of potassium	10	"
Nelson's gelatine, No. 1	80	"
Coignet's gelatine	80	"
Water	3	ounces.

To the foregoing, dissolved by the aid of heat, are added—

Nitrate of silver	200	grains.
Water	1½	ounce.

The emulsion thus made is heated to 100° Fahr. for five minutes, allowed to set, and then washed in the usual way. In front of the sensitive plate in the camera is a piece of transparent glass on which are ruled two cross lines. These cross lines are thus photographed on every plate exposed, and are necessary to determine the position in space of the clouds submitted to the action of the photo-nephograph.

For a description of the principle of the method in which the photo-nephograph is used to determine the distances of clouds my last article may be perused. The cameras, it will be seen from what is herein stated, are mounted on the same principle as the telescope of the theodolite of the surveyor; and no doubt any amateur who wishes to mount cameras for measuring cloud distances will find in portions of a theodolite some parts of the apparatus readily obtainable, which might be of considerable expense if they had to be specially made for the purpose.

The amount of error in Captain Abney's photo-nephograph was first determined by Lieutenant Darwin, R.E., at the School of Military Engineering at Chatham. The error in azimuth was found to be quite negligeable, and those for zenith distance but small, yet necessary to be remedied in the calculations. Captain Abney makes the following statements as to the practical results of an actual experiment or two with the apparatus:—

"The next point to determine was the accuracy of the instruments in determining distances; and here I may say that the results obtained are very favourable. A base line of 200 yards was taken, and photographs of a distant landscape taken from each end, and the distances calculated for prominent points. As an example: the spire of a church was one of the objects selected, and the calculated distance was 3,040 yards from camera A. Measuring the distance on the six-inch map the true distance proved to be 3,070 yards, and the error would have been reduced had some slight corrections been made with which I am now acquainted. Regarding the recognition of points in a cloud I think there is not much difficulty. For example: in the measurement of the height of a cloud one edge gave a height of 2,050 feet, and the opposite edge gave 2,070 feet—a difference which would not materially affect the general results. The instrument can be perfectly well applied to clouds within a zenith distance of 60°, and there will be no difficulty, as far as I can see, in finding which is the lowest point of a cloud."

The chief fault of the present instrument is that, to work the electrical shutter, four or five Le Clanché battery cells are required, which defect could soon be remedied by calling in the services of an intelligent telegraphic instrument maker.

William H. Harrison.

ON TRANSPARENCIES BY THE CARBON PROCESS.

[A communication to the Bristol and West of England Amateur Photographic Association.]

The production of lantern slides and other transparencies by the carbon process is one of the most interesting and, at the same time, the most neglected branches of photography. This neglect certainly does not arise from any defects or want of excellence in the results obtainable by this process; for good transparencies in carbon are certainly superior to those produced by any other process, with the single exception of those on albumen. The fine transparencies, by M. Ferrier, on albumen are certainly unsurpassed; but the difficulties and complications, together with the extreme care necessary in working the albumen process, are such as to prevent it ever obtaining general popularity. On the other hand, the carbon process by single transfer is so exceedingly simple that it has always been a matter of surprise to myself that it is not more widely practised.

There appears to be a widespread and general opinion that the carbon process is troublesome and complicated, arising, I think, from the fact that in its early days the process, as introduced and first worked by Mr. J. W. Swan, of Newcastle-upon-Tyne, was somewhat difficult, complicated, and troublesome, needing screw-presses, rollers, and other apparatus not usually found in the kit of photographic amateurs. In order to show the difference between the complications of the past and the simplicity of the present process, I cannot do better than give a brief history of carbon printing from its infancy down to the present time, showing the difficulties first encountered in working the process and the gradual steps by which it has arrived at its present perfection and simplicity.

In the year 1838 Mungo Ponton observed that a sheet of paper soaked in a solution of bichromate of potassium turned brown when exposed to the action of sunlight, and that paper so prepared, when exposed to the sun's rays under an engraving, yielded a reversed or negative copy of the engraving; and, further, that this copy could be fixed by simple immersion in water till the unaltered or soluble portion of the chromate was dissolved out.

M. E. Becquerel, in 1840, discovered that the action of light on the prepared paper was due to the presence of size used in the manufacture or dressing of the paper. He also obtained purple impressions by coating paper with starch and bichromate of potassium, and subsequently subjecting the image to the action of a solution of iodine, the iodine combining with the starch, and giving an impression in the well-known purplish-blue colour, characteristic of the combination of starch and iodine. This colour is, however, so extremely fugitive that pictures so reproduced would necessarily fade in a very short time, and thus be of no practical value.

Mr. Fox Talbot, in his researches, discovered that mixtures of bichromate of potassium and gelatine were rendered insoluble by exposure to light. He coated copperplates with a mixture of gelatine and bichromate of potassium, and, after drying, exposed them under a positive. The parts shielded from light remained soluble, and the unprotected parts became insoluble. After washing away the soluble portions of the film the plates were dried, and the image etched or eaten in with a solution of perchloride of iron. In this discovery may be said to lie the germ of all the photo-engraving processes.

The credit of having discovered the groundwork of photography is due to M. Poitevin, a French chemist. He coated paper with gelatine, albumen, and bichromate of potassium, and, after drying, exposed to sunlight under a negative, and then applied ordinary printers' ink to the surface, which adhered only to the insoluble parts, and after washing in water a positive impression was the result. Poitevin also appears to have suggested the basis of the carbon process proper, which consists in adding finely-powdered carbon or other colouring matter to a mixture of gelatine and bichromate of potash, and applying to paper, which, after exposure to light, is washed with warm water. The unaltered gelatine dissolves out in the water, and the portion acted upon by light, being insoluble, remains on the paper, forming the picture.

M. Poitevin's suggested process appears to have been worked by Messrs. Pouncy and Sutton, but all the results were unsatisfactory in consequence of the impossibility of obtaining half-tones. Subjects in stipple or in line, as engravings, were perfectly rendered; but photographs proper, with gradation and half-tone, could not be satisfactorily produced. The Abbé de Laborde and Mr. Blair explained the cause of these unsatisfactory results. They showed that the sensitive film first became insoluble on the surface exposed to light, and the portions partially acted upon and forming the half-tones of the picture rested upon a soluble substratum, which, being removed in the washing, caused the half-tones to be undermined, and thus, losing their hold on the paper, would be carried away.

This can, I think, be more clearly shown by means of a diagram.

Let 1 represent the paper and 2 the gelatine film, the upper dark portion of which has become insoluble by the action of light, which penetrates to a greater depth in those parts where the transparency of the negatives has been greatest, as at A A, forming the shadows, and to a lesser depth in the other portions forming the half-tones. Now, it is evident that the unaltered gelatine, B B, will be washed away in development, and the half-tones above, being unsupported by the paper, will be more or less carried away during the washing.

It would naturally suggest itself that a way out of this difficulty would be to print from the back of the paper, thus getting the half-tones in actual contact with the paper; they could not be undermined and carried away in the washing. In practice, however, several difficulties occur, which render printing from the back of the paper objectionable. First, a reversed image is the result; secondly, the grain or texture of the paper and its defects are reproduced in the print; and, thirdly, the yellow colour imparted to the paper by the bichromate solution renders the printing very slow and necessitates a very prolonged exposure to produce a print. This yellow tint eventually darkens to a brown and prevents further action of the light, so that, even with the longest exposure, deep shadows and force are not obtainable. The obvious way out of these difficulties would be to print from the front and attach the film to a temporary support, and then dissolve the unaltered gelatine from the back.

M. Fargier (a Frenchman) patented a process for so doing in 1860. The exposed film was coated with a thick collodion, dried, and then immersed in warm water; the gelatine at the back was dissolved, the paper becoming detached, and the pigment washed away in those portions unacted upon by light, leaving the positive image supported upon the film of collodion, which was then re-transferred to a piece of paper. This process was, however, tedious and uncertain, owing to the difficulty of manipulating the delicate film of collodion. Any wet-plate worker who has had the misfortune of getting a collodion negative detached from the glass in washing will readily understand the difficulty encountered, especially when we take into consideration the prolonged washing in warm water necessary for the proper development of the picture.

The first really practical and successful carbon process was worked by Mr. J. W. Swan, of Newcastle-upon-Tyne. He introduced the material now generally known as carbon tissue. By the aid of machinery bands of paper were coated with a compound of gelatine, sugar, and colouring matter, made sensitive either at the time of preparation or afterwards by means of bichromate of potass and ammonia. The sensitive tissue was exposed as usual under a negative, and was then passed through rollers and stuck face down by means of a solution of india-rubber to a sheet of paper, either as a temporary or permanent support; then, by immersion in warm water, the original paper backing came away, and the image developed by the continued action of the warm water. If left cemented to the paper by the india-rubber it constituted what is known as a carbon picture by the single transfer process.

The picture thus obtained would necessarily be a reversed one, a second transfer, or what is known as the double transfer process, being necessary to obtain a re-reversal of the image. For this purpose the picture was again stuck face down upon a second sheet of paper by means of gelatine, and the temporary support to which it was previously attached by india-rubber was then removed by benzole or other india-rubber solvent, leaving the picture permanently attached to paper by the gelatine, which was subsequently rendered insoluble by the action of alum. The pictures thus produced left nothing to be desired as far as the results obtained; but the use of india-rubber solutions and the dissolving away of the temporary support by means of benzole were both troublesome and disagreeable, in consequence of the noxious fumes of the benzole or other hydrocarbon used as a solvent.

The next step in advance was made by Mr. Johnson, who discovered the fact that carbon tissue soaked for a short time in water will, without the use of any adhesive medium, adhere to any non-porous or waterproof surface, such as glass, waxed or waterproof paper, and sheet metal. This discovery vastly simplified the carbon process, without in any way sacrificing the excellence of the results obtainable by Swan's more complicated method of working. In practice, the exposed tissue is damped in water and made to adhere to the glass or other surface by slight pressure. Under the action of warm water the gelatine is softened, the paper detached, and the unaltered gelatine removed by continued washing in warm water. The portion of the gelatine acted upon by light, being insoluble, remains firmly adhering to the glass or other surface forming the picture. The image is necessarily a reversed one, but if on glass is, of course, corrected by viewing through the glass, and as such is a transparency by the single transfer process.

I will now give a practical demonstration of the method of working by transferring to glass and developing a few transparencies, and at our next meeting propose to give full details of both the single and double transfer processes.

EDWARD BRIGHTMAN.

ON THINGS IN GENERAL.

PHOTOGRAPHERS will have to be circumspect, or they will be apt to become entangled in the meshes of the new Explosive Substances Act. Seeing that purchasers of substances such as, among others, nitric acid, glycerine, saltpetre, chlorates, iodine, nitrate of mercury, &c., have by a special memorandum from the Home Secretary been put under a sort of surveillance, we may expect that whenever the next nitro-glycerine scare occurs a few odd photographers will get "interviewed" in an unpleasant manner, and, if they do not give a satisfactory account of themselves and their purchases, will pass a bad quarter of an hour. It is somewhat singular that the bulk of the chemicals named are substances commonly found in the photographer's laboratory, down even to the fearful gun-cotton itself.

What a mistaken idea, by-the-bye, the public have of the powers of these nitro-compounds! Half-a-hundredweight of gunpowder would do far more widespread damage than a larger amount of gun-cotton, though for causing an injury to a particular spot the former would not approach the destructive power of gun-cotton. Add to this the array of photographic "guns," "pistols," and "revolvers," and he would be a bold man who went about in a time of scare without carrying a few testimonials as to his integrity in his pocket. Even the innocent but universal gelatine will be subject to suspicion when thoughts of blasting gelatine occur, and the manufacturers of dry plates must beware!

Speaking of dry plates reminds me that some remarks I made about an American brand of plates a little while ago appear to have given umbrage instead of pleasing the maker, who ought to have been glad of the opportunity to explain that he does *not* consider four seconds a quick exposure for "baby" work, and yet, strange to say, he admits that this paragraph was inserted by accident or without supervision. I will, however, make him the *amende honorable* by saying that the mention made in *Anthony's Bulletin* for April, of two game cocks photographed in fighting positions, proves the plate to be *A 1* as to sensitiveness.

I notice several capital hints—"when found make a note of"—in THE BRITISH JOURNAL OF PHOTOGRAPHY, for April 20th, in a communication read at the Edinburgh Photographic Society; for instance, Mr. Forgan's mode of blacking stops or other brasswork in a simple and efficient manner:—To make a solution of nitrate of copper, dip the stop or other brasswork (first previously heated) into it, and then reheat over a Bunsen burner. This is within the capabilities of any operator. Then, again, Mr. Knolles' "director," for attaching to the camera, and his simple view-meter are capital aids to comfortable working.

Mr. W. Brooks, too, has some good hints on the storage of chemicals, though my experience does not coincide with his in one or two points. For instance, he recommends keeping hypo. in a jar instead of a cask. Now, even when the consumption of this salt is not very quick, its deliquescent qualities never need give any trouble, while if put in a jar the liability to cake which it, in common with all other salts, displays is apt to become a nuisance, and the chances are quite even that every other time a jar approaches emptiness some clever printer or apprentice will knock a hole through it in getting out the crystals. In speaking of iodide of potassium being deliquescent, I expect Mr. Brooks intended to say "iodide of sodium," the former with its cubical crystals being a particularly dry salt to handle.

In the same number of the Journal just quoted I happened to look over Mr. Farmer's concluding paper, and, again, I see he has fallen among the Philistines—

$$12 \div \tfrac{1}{4} = 12 \times \tfrac{1}{4} = 48$$

I read on page 225. What nonsense! Who is to blame? This Journal is usually a model for the way in which it is "read;" hence I expect the worthy lecturer's notes are at fault. These things have to be written plainly, or the "P. D." is liable to make a hash of them.

Mr. W. K. Burton has some useful and interesting remarks upon photographic lenses, but I think the extinction of portrait lenses proper is far from being so near a probability as he would appear to suggest. What with dull days—liable to occur at any time of the year—late sitters, baby sitters, groups, and a number of other considerations, I am inclined to think that this type of lens will still continue to be the "sheet anchor" of the photographer. Notwithstanding, the perusal of Mr. Burton's article will be found instructive and useful by most readers.

M. Léon Vidal's "dodge" of fastening sensitive pellicles or paper to a slide is as droll as ingenious. He buys a "penn'orth" of sticking plaister, and glues its back to a thin sheet of ebonite; then, placing the paper upon it, rubs it down with his hand, and, *presto!* it sticks *à merveille!*

Another useful "dodge" is that of Mr. Aristide Reimann. Instead of wasting plates, when he wishes to take long-shaped views he cuts them in two lengthwise, and keeps them *in situ* by two pieces of plain glass, the size being a moiety of one of these halves, placed one in each side of the narrow plate. He economises his plates, and gets a perfect fit without any trouble of frame-making.

FREE LANCE.

ACTINIC RAYS.

III.—*Genre* Photographs.

Some short time ago we had an excellent elucidation of what is embraced under the name of "*genre*" pictures, as the term is applied to photographic impressions. That this style of production yields us the best opportunity of representing those conceptions which actually originate in our thoughts there seems little reasonable cause to doubt; nor can it be considered possible in either landscape or portraits, simple and pure, to create art as we can in the *genre* picture—that is, when the essayist is equal to the task.

In landscape photography we can do little more than simply reproduce what *is*—"hold the mirror up to nature," under favourable circumstances maybe—but our artistic claims are principally embraced in the choosing of a favourable scene and light; otherwise in this direction, owing to the unavoidable limitations of our process, we are perforce subservient to the "science of the beautiful."

Art, however, only commences where science ends, or, we might rather say, that it is bounded by certain æsthetic laws, within which extensive radius it owns a freedom governed alone by the ideal conceptions of the true artist. Now it is easy to comprehend it possible that the thoughts of the painter may soar into the "realms of fancy" and cull therefrom its choicest blossoms with which to adorn nature and make his landscape picture evidence his art-feelings; but we photographers have practically no such varied power of selection in this particular. Unless Nature herself yields up the complete essentials we can only gaze upon the pictorial fields which lie beyond, and mourn that our media and its exactions are too ponderable to permit of us crushing them through the gateway leading into these art-pastures.

Then, in the case of portraiture: while a photograph remains legitimately a portrait it cannot, in my opinion, go beyond portraying normally that which exists. If it be sought to represent some individuality of expression (and the effort is successful), then the subject is engulfed in the noble art-thought of the manipulator, and the simple portrait has verged into a *genre* picture, irrespective of the absence or presence of aught betokening landscape form.

I am striving to express only my own conceptions of the subject that I treat of, without hoping that these opinion are incontrovertible; but, if my argument be accepted, then, undoubtedly, in the little-thought-of *genre* photograph principally abides the opportunity of elevating ourselves and our profession to a higher sphere.

We are told that those gentlemen who proportion out the rewards connected with photographic exhibitions have been hitherto scant in their recognition of *genre* pictures. Without inquiring if their motive in the matter be commendable, undoubtedly their action has, at least, much to excuse it, as the subjects which have been attempted in this class of picture have, in a great majority of cases, proved too great for the ability of the would-be artists, and a *tout ensemble* has been presented to the judges vastly more objectionable than the more mechanical or scientific representatien of quiescent nature.

Let us refer to the walls of the last photographic exhibition in Pall Mall for examples, meanwhile strictly confining our observations to *only* the *genre* class of impression. When we except that sweetly-consistent, little thought-picture of Adam Diston's, the exhibits of only one man proved him to have his technical media firmly and entirely in leash, and by whom every art had been wooed to lay a willing tribute before his complete sense of the picturesque.

I allude, of course, to the works of Robinson, and if my statements appear inconsiderately strong they are still made advisedly, and certainly not with any feeling of it being safe to simply laud abilities which are already abundantly acknowledged. I think I recognise sufficiently that a man who has obtained his first medal has thereby also surmounted half the work towards procuring his second; for judges, while they are honourably disposed, are yet but human, and if a few are to be selected from a large number of pictures within a limited time it is very difficult to avoid noticing principally the representations of those artists already recognised, unless, indeed, an outsider shows some very conspicuous extra ability. But Mr. H. P. Robinson's pictures have the truly independent and unusual merit of keeping pace with his fame.

What a greatly-required lesson we can glean from his touches of nature! There seems nothing in them, but therein lies their charm; for there is no apparent effort. It would seem as though the artist had simply strayed into the midst of his scene at a happy moment, where all is so natural and unconscious of his presence; when the group figures but chanced to be in such artistic relationship to each other and to the rest of the accessories; when the brightly-gleaming faces and the animated *contour* of the figures united in suggesting life and youth and buoyancy; and when that jaunty, soft-hooded hat and uplifted apron had been momentarily persuaded by Boreas to lend their aid in completing the balancing of these charmingly-unique art lines.

This is the feeling suggested by Mr. Robinson's series of pictures, because our senses are instinctively satisfied with them; but, before we conclude that these effects are half the result of accident, let us take a peep at what others have accomplished in the direction of *genre* pictures alongside of those we have been admiring.

Some of these are pleasant to look upon because they are simple in conception, and hence they have at least the merit of being less or more natural; but, as the subjects become more ambitious, alas! how plainly are the extra efforts evidenced! No airy nothings there! But, instead, the weakness of the process laid bare; the "staginess," or else utter want of expression and the forced stiffness of the poses, proclaiming a consciousness of some ordeal on the part of the model, and, moreover, displaying plainly that the artist has grasped at more than his abilities would allow him to control.

These are no farcical defects that I am conjuring up. I have a number of the principal exhibits that were shown still "in my mind's eye, Horatio," wherein these failings were only too piteously palpable. This being the case with so many of the pictures which are expected to be representatives of the best photographic efforts, can we be surprised that contemporary artists are tardy in accepting our profession as capable of producing art? Surely, no! Rather should we feel nervous to know that many of those works are so prominently displayed, evidencing a lack of those merits which are readily found in even the ordinary sketches which illustrate a majority of our weekly serials.

True, we are handicapped—dreadfully handicapped—with the binding requirements of our exacting tools. Many of the roads, indeed, can only be traversed a very short distance before we are brought face to face with a *cul de sac*; but still that there do remain many solid paths invitingly open to us is shown without looking further than noting the far-striding footprints of Robinson alone.

It was to be hoped that the welcome accession of rapid exposures would have vastly increased our richness of pictorial capacities by giving a power of working while a certain amount of motion was going on, and avoiding that conscious "packing;" but, so far, we have little improvement to boast of, and it would seem now that it is the art-culture of the essayist which really wants looking to.

I hope the time is not far distant when a photographic artist's education will not be deemed complete until, in addition to scientific attainments, he has undergone a sound experience in the schools of design or similar commendable institutions, and that he shall be, moreover, expected to study the principles of art as they are expounded by both the writings and works of the great masters. If the conditions of photography are more stringent than those of the pencil, surely it suggests the requirement of an attending sounder knowledge to govern it, instead of, as is the case too often at present, the principal work of the camera being apparently to delineate the shortcomings of its manipulators. Then, when we had acquired this tuition, we could fearlessly give rein to our inspirations, feeling confident erstwhile that under the able guidance of this art-knowledge the jostling imperfections of our process would be skilfully skirted; or, like knights of old, we could then go afield with the camera, and know in our new-found strength that the very obstacles would turn renegade and aid us in the capture of the truly picturesque.

Lyddell Sawyer.

FOREIGN NOTES AND NEWS.

Copying by Electric Light at Berlin.—Herr H. Gelpke on Mr. A. L. Henderson's Method of Cold Emulsification.

At the Royal General Staff Establishment at Berlin electric light is now used for reproduction. A Siemens' dynamo-electric machine, driven by a four-horse-power gas machine, furnishes a light equal to about 1800 candles. If powerfully driven by a six-horse-power engine the light would be increased to equal 3000 candles. The above-mentioned 1800 candle-power light is only used for the reproduction of drawings. A white reflector, about 20 c.m. in diameter, is placed behind the light, so that the drawing is illuminated partly by direct and partly by reflected rays. The drawing is placed about half-a-metre from the light, at which distance it has been found that only drawings up to half-a-metre square can be equally illuminated. The following shows the requisite exposure:—

To diffused daylight, exposure	....	$2\frac{1}{2}$ minutes.
To direct sunlight ,,	....	40 seconds.
To electric light ,,	....	6 minutes.

These figures give an approximate proportion only, as, of course, the power both of diffused daylight and direct sunlight vary.

Herr Gelpke writes to the *Correspondenz* that, attracted by two articles describing Mr. Henderson's method of cold emulsification which appeared in the pages of that journal, he was induced to give the process a trial, and was charmed with its simplicity. At the same time, not being quite satisfied with the results of his first experiments, which he made exactly according to Mr. Henderson's directions, he introduced some changes by means of which he obtained far better results. He found it of great advantage to add a small quantity of citric acid, preferably adding it in the pulverised form to the ripened solution, and making the addition immediately after the small quantity of gelatine is dissolved. When the citric acid is completely dissolved he adds twice as much carbonate of ammonia as is given in the original formula. The addition of the carbonate of ammonia gives rise to a brisk effervescence or, rather, frothing up intensified by the citric acid, and care must be taken that the frothing liquid does not run over the vessel. When the froth has subsided he adds the prescribed quantity of bromide and iodide. He also reduces the quantity of alcohol, as he finds that the addition of so much alcohol is apt to cause the gelatine to fall down,

and then the ripening does not proceed so smoothly as when less alcohol is used. He only uses about 60 to 70 c.c. of alcohol, while Mr. Henderson prescribes 105 c. c., and at the end of three or four hours' ripening a very sensitive ripened solution is obtained.

The next variation made by Herr Gelpke is that he does not add the remainder of the gelatine to the ripened solution, but dissolves it separately in about 200 to 250 c.c. of water, and then adds the ripened solution to it in small quantities. The advantage of this procedure, he thinks, is that they combine more easily. The quantity of water used to dissolve the gelatine varies with the quality of the gelatine. The precipitation with alcohol he omits altogether, for two reasons—firstly, because when he did use it he got no better result than without it; and, secondly, because it is troublesome. Even if, as Mr. Hendersons says, part of the alcohol can be used again for ripening a new batch, there would always remain a considerable surplus which could not be used, and which, consequently, helps to increase the cost of the emulsion. Besides, in spite of the precipitation with alcohol, the emulsion has still to undergo a washing process, so Herr Gelpke concluded that the omission of the alcohol was both simpler and more practical.

Finally: the emulsion may be variously prepared for washing. If it be desired to obtain "gelatine nodules" in the usual way the emulsion should not be left to stiffen too long, as the alcohol it contains renders it tough. It must be squeezed through the gauze at the end of an hour or an hour and a-half. If one neglect to press the stiffened emulsion through the gauze during this interval another way of dividing it must be taken, as this one will no longer answer. A very good and rapid way is to divide it into small strips with a strong horn comb, providing the emulsion has not been poured in too thick a film into the vessel in which it is placed to cool, as, of course, only a well-broken-up emulsion can be perfectly freed from the superfluous bromides.

Here follows a tabulation of the altered formulæ upon which Herr Gelpke's experiments at last led him to fix, and which furnished him with really satisfactory results:—

I.

Dissolved warm.	Gelatine	0·7 of a gramme.
	Water	35·0 c.c.
	Citric acid	1·0 gramme.
	Carbonate of ammonium	2 to 3·0 grammes.
	Bromide of ammonium	6·0 ,,
	,, potassium	6·0 ,,
	Iodide of ,,	2 to 5 c.c. of a 10% solution.
	Alcohol (absolute)	60 to 70 c.c.
	Ammonia	2 to 4 ,,

When all has been properly dissolved and is sufficiently cooled add the silver solution II., shaking continually meanwhile:—

II.

Nitrate of silver	15 grammes.
Distilled water	70 c.c.
,, ,, for rinsing	15 ,,

When the ripening is completed add—

III.

Gelatine	20 grammes.
Water	200 to 250 c.c.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 31	London and Provincial	Masons' Hall, Basinghall-street.
,, 31	Liverpool Amateur	Free Library, William Brown-st.
,, 31	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday last, the 22nd instant, Mr. John Spiller occupied the chair.

A question was opened for discussion:—What difference is there in the result when developing with ammonium and potassium bromides respectively as restrainers?

Mr. A. Cowan thought that plates developed rather more clearly when potassium bromide was used than with the ammonium salt.

Mr. T. Sebastian Davis could find no difference in the result if the equivalent of one bromide was substituted for that of the other.

Mr. Peake said that with some commercial plates it was necessary to use ammonium bromide, and that these could not be developed with potassium bromide.

Mr. Herbert B. Berkeley remarked that it need not be assumed that the bromide was the restraining agent. It might be the alkaline element of the salt with which the bromide was combined.

Mr Jabez Hughes said that this question might fairly be raised. In some German works recently he had seen that it was recommended to use an aqueous solution of iodine as the restrainer. In the English journals he observed that carbonate of soda had been spoken of in a similar manner. They were directed, if the image did not come out clear, to use more of the sodium carbonate.

Mr. Davis stated that an addition of one grain of iodide of potassium to the ounce of developer sufficed to destroy the image which light had impressed upon the plate.

Mr. T. Bolas said that it must not be supposed that the addition of a solution of iodine to the developer was equivalent to that of an iodide. In the former case a compound was formed resembling in composition a bleaching powder.

Mr. Hughes remarked that the question had recently been raised as to the necessity for using any restrainer at all. In the daguerreotype process no restrainer was employed, but in all other processes up to the present restrainers had been utilised—acetic acid in the collodion process and bromides with bromide plates. He looked upon the present mode of working—that is, by alkaline development of bromide plates—as having originated in Major Russell's dry collodion process, in which, when the proportions of iodide and bromide of silver were at all nearly equal, the development might be conducted either in the acid or alkaline method. In the one case this depended upon the iodide, and in the other upon the bromide of silver.

Mr. Cowan said that there was no necessity for any restrainer if only the ammonia used in developing was cut down in quantity. He did not think that carbonate of soda had any advantage in this or any other respect over ammonia. Provided that only so much ammonia was used as would develope as slowly as carbonate of soda did there was no need for bromide, and the colour of the image was better than with soda.

Mr. Davis stated that phosphate of soda used before applying the pyro. and ammonia acted beautifully as a restrainer. The development was slow, but the results were the best obtainable. Both this salt and borax had the effect of forming an insoluble compound with silver. This was also characteristic of the bromides as restrainers.

The Chairman said that, in company with Mr. Bolas, he proposed to photograph the Deneholes, in Hangman's Wood, in Kent—caverns sixty feet below the surface of the earth—in about a month's time, and he would like to know the best means of lighting them. If magnesium were employed they would have to wait, perhaps, hours after each exposure till the fumes had subsided before making another attempt.

Mr. Bolas thought that the sulphur light, if means were taken to absorb the fumes in a chimney filled with alkaline fragments, might be successful; but after all he believed they would do best with a great number of ordinary paraffine lamps.

Mr. Cowan showed a shutter, a description of which will be found in our last week's report of the meeting of the London and Provincial Photographic Association. He said that he thought the principle of working with the shutter close to the plate, so that whilst the lens was open its whole power should be employed, was certainly the right one.

The next technical meeting of the Society was announced for the 26th of June.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 17th inst., the chair was occupied by Mr. A. L. Henderson.

A question from the box was read:—What is the chemistry of the restraining action of bromides in development?

The Chairman said he had a paper bearing upon the subject, which he then read. [See page 295.]

Mr. A. Cowan remarked that any plate would do without bromide in the developer if the ammonia were sufficiently reduced in quantity. He had developed several makes of plates on this method, and, although the negatives did not look nice, they printed exceedingly well. He added that much more ammonia could be used without fogging if it were added gradually than if put into the developer to start with. Thus, two minims of ammonia to a developer without bromide might spoil a plate; whereas, if the development were commenced with half-a-minim, the remaining one and a-half might be added after a time and the negative be good.

Mr. E. J. Golding's experience was similar to Mr. Cowan's.

Another question was then opened:—What is the best way of recovering silver from waste emulsion?

Mr. Cowan said that his practice was to boil for half-an-hour with caustic potash or soda, half-a-pound to the gallon, after which the bromide deposited from the decomposed gelatine.

Mr. W. Cobb boiled for some hours with the addition of hydrochloric acid instead of alkali, and obtained a similar result.

Mr. Golding said that treatment with oxalic acid caused the bromide to go down in a condition fit for re-emulsification.

A discussion then took place as to the desirability of having a competition for speed and quality in gelatine plates, and it was decided that there should be an open competition, but that the name of the most successful competitor only should be announced. Further details of the contest were to be discussed and decided upon at a future meeting.

THE POSTAL PHOTOGRAPHICAL SOCIETY.

A committee meeting was held on Friday, the 11th instant, at the President's house. Present:—J. Pocock (President), W. M. Baylis, W. Withall, and H. H. Cunningham (Hon. Secretary).

The following, amongst other business, was transacted. The minutes of the preceding meeting having been read and confirmed, the votes upon Competition No. 1 were laid before the meeting, and the following were declared to be the winners:—

Class I.—Landscape. 1st prize, J. W. Leigh, Manchester, with 36 votes.
,, ,, 2nd prize, H. H. Cunningham, with 15 votes.
Class II.—Portraits. W. Withall, with 49 votes.
Class III.—The Set Subject. A. Watkins, Hereford, with 36 votes.

The accounts were submitted to the meeting, showing a balance in hand of £9 3s. 3d.

The prints sent for competition No. 2 were brought before the meeting, and after they had been inspected the Committee awarded the prizes in value:—

Class I.—Landscape or view. 1st, 15s.; 2nd, 10s.
Class II.—Portrait, figure, or group. 1st, 15s.; 2nd, 10s..
Class III.—Set Subject (a winter subject). One prize, 7s. 6d.

The thanks of the Society were ordered to be sent to the two members who had offered prizes in encouragement of special subjects, to be competed for in June. The Society adopted their proposal, and added a second prize of 5s. in each of the classes as defined by the givers:—

1st.—Landscape, 5 × 4 10 × 8.

2nd.—Portrait of member *taken by himself* (not to be printed in platinotype.

3rd.—The best architectural picture, to be competed for under the rules of the Society.

Resolved: That for the future no member be allowed to exhibit more than three pictures in each class for competition, and that all members be requested to use mounts as light in weight as possible, and not larger than "half royal."

That some special slips be printed for the use of members in noting competion prints.

That the general meeting be held on Saturday, the 16th June, at 3 o'clock, and a Committee meeting the same day at 2-30—both at the Hon. Secretary's address.

That a date be fixed at next meeting for sending in prints intended to be exhibited at the Photographic Society's Exhibition in Pall Mall. Everything below half-plates to be excluded; but otherwise members may send what the like as to size or subject.

That at the same time a competition in two set subjects be invited as follows:—

The best study of an "old house" or cottage.

The best marine, lake, or river view.

That the Committee decline, for the future, to assign any print in the competitions to any particular class, preferring to leave it to the members themselves in giving their votes to decide whether the picture properly comes within the class in which it is placed by the exhibitor.

That, on account of the great increase in the amount of the secretarial work, the office of hon. secretary and hon. treasurer be divided, and that Mr. W. M. Baylis be appointed honorary treasurer. On the motion of Mr. Withall, that a small gratuity should be named at each meeting to be given to Mr. Cunningham's clerk, and for his services up to the present the meeting award him the sum of 5s.

The Committee learned with pleasure that the Society was prospering, and now numbered between fifty and sixty members. After having inspected some specimens of platinotype in the new sepia tint, and learning details from Mr. Withall and the Hon. Secretary, the meeting was adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held at the Studio, on Wednesday, the 25th ultimo,—Colonel Playfair in the chair. The minutes of the previous meeting having been confirmed,

The Chairman called on Mr. E. Brightman to read the first portion of a paper on *Transparencies by the Carbon Process* [see page 299], at the close of which he (the Chairman) stated that he had been till then quite ignorant of the practical working of the process. He had felt great pleasure in listening to Mr. Brightman's interesting remarks, and watching what appeared to him to be the very simple *modus operandi* of the process.

Mr. H. A. H. Daniel said he had done a few large transparencies by the process, and regretted that want of time prevented him from practising it so much as he should like. He warned those present against using oil stoves for drying the tissue, as he had had a quantity rendered insoluble by so doing a few years ago. The vapour from a petroleum stove seemed to have a peculiar effect on the tissue, which nothing could remedy.

Mr. Brightman, in reply to inquiries, stated that the semi-opaque margin of the picture was caused by what was called the "safe-edge," a semi-transparent mask being placed round the edge of the negative to give the tissue a safe holding, through being only partially dissolved all round.

Mr. Stephens asked whether it was not very difficult to acquire the requisite experience for successful printing as regarded the depth necessary.

Mr. Brightman replied that by classifying one's negatives and carefully using the actinometer certainty was easily attainable.

During the evening some albums of very fine specimens of carbon printing, kindly lent by the Autotype Company, were exhibited.

On the motion of the Chairman, a vote of thanks to Mr. Brightman for his interesting paper and experiments, and a similar vote to the Autotype Company for kindly lending the fine collection of prints shown, were accorded, and the meeting was adjourned.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A meeting of this Society was held on Saturday last, the 19th instant, at the Wedgwood Institute, Burslem,—Mr. Humboldt Sexton, F.C.S., F.I.C., President, occupying the chair.

The Chairman proposed several alterations and modifications in the present rules of the Association.

After some discussion it was resolved to hold during the year two exhibitions of members' work—one to be taken from the work of the present summer; the other to be held some time during the winter, and this to partake of the nature of a lantern entertainment.

It was proposed, and the resolution unanimously adopted, that a few summer excursions be organised.

The Chairman announced that at the next meeting a paper, upon *Various Modes of Development*, would be read by the Secretary.

Mr. Blackshaw was proposed and duly elected a member of the Association. It was announced that the next meeting would be held, in about a fortnight, at the Town Hall, Hanley. The meeting was then adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met on the 6th March,—Dr. Hornig presiding. The copyright laws of different nations, in so far as they apply to photography, was the first subject discussed.

Lieutenant David demonstrated the working of his improved digesting apparatus. It is furnished with an electric alarm signal, so that when the temperature of the fluid rises above 60° a bell rings to warn the operator.

Herr Czerny's stereoscopic vulcanite shutter was handed round for inspection, as were also prints of a series of photographs of artillery evolutions which took place near Vienna.

Herr Scolik showed an improved stereoscopic tourist apparatus. The camera-stand consists of a tripod, the legs of which are brass tubes which push into each other like a telescope, and weigh nearly two pounds. The camera belonging to this apparatus is made of vulcanite.

Professor Dorfwirth, an amateur, reported favourably of the plates he had prepared according to Obernetter's formula. He got powerful negatives by developing in a weaker bath (oxalate 1 : 4 at most) than usual, and continuing the development for a long time.

Herr Wrabetz had developed some of the same plates according to Prof. Dorfwirth's directions, but not with the same good results. He thought it possible that the spring water used by Prof. Dorfwirth for the preparation of his developer might have contained ingredients which have a favourable effect upon the powerfulness of the plates.

A number of other communications respecting the Obernetter emulsion were received, most of them reporting unfavourably of it in some respects, but they were not of general interest.

A short communication from Herr Wilde was read, in which he advocated the substitution of alcoholic tincture of iodine for bromide of potassium in the ferrous oxalate developer.

The meeting was adjourned shortly afterwards.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 20th April,—Dr. W. H. Vogel, the President, in the chair. Several new members having been admitted,

The Chairman laid on the table the publications which had accumulated since the last meeting, mentioning at the same time that one of them contained the patent specification of an arrangement for taking wet plates in the open air without using a dark room. He thought it right to call attention to the specification in question, though in the present state of the dry-plate process there was little scope for such a wet process. It was also mentioned that no real novelty was embodied in the new process.

Herren Schleicher and Schüll sent a sample of tissue paper said to be free from sulphur, chlorine, acids, or any substance likely to impair the gloss of metal, and therefore recommended for wrapping up fine metallic goods, photographs, photographic plates, &c.

The Chairman read the reports of the examinations recently conducted by the Chambre Syndicale de la Photographie de Paris, and expressed a wish to see a similar arrangement set on foot in Germany.

Herr Quidde inquired whether the Technical High School could not initiate some such examination, when doubtless much of the trouble would fall upon the Chairman and other prominent photographers.

The Chairman expressed himself quite willing to undertake any trouble that might be involved in starting examinations.

The suggestion was favourably received by the meeting, and it was resolved to recur to the matter at some future time.

The Auditors reported the Treasurer's statement for the year perfectly correct, and then a collection for a needy brother photographer and member of the Association was made.

An instantaneous shutter by Herr Möller, of Nyborg, was shown. It consists of a rotating disc in which apertures are made. The shutter is moved by a spring set pneumatically in motion.

Herr Kurtz, of New York, sent a number of cabinet and boudoir portraits taken by electric light, and pictures of a plaster cast of the Dionysius dug up at Olympia.

Herr Reichard said that, even with good daylight, it would be difficult to get softly-shaded photographs of such purely-white objects.

The Chairman remarked that in the studio of the general staff photographs are at present being taken by electric light.

The Librarian's annual report was then read.

Herr Dietz forwarded eight 10 × 8 views in the German colony at South Brazil; Herr Meyer sent views of old buildings in the town of Brunswick; and Herr Schwartz presented some landscapes, the cloud effect in one of which was so beautiful that permission was asked to reproduce it in lichtdruck as an illustration to the Association's official organ, the *Mittheilungen*.

Herr Linde said these landscapes were better than any English or French views he had ever seen, and he thought a good business might be done with them.

No further business of importance was transacted, and the meeting was shortly afterwards adjourned.

Correspondence.

LENSES FOR PORTRAITURE.

To the Editors.

Gentlemen,—Your article on *Amateur Portraiture*, in the last issue of the Journal, not only comes opportunely, but contains suggestions indicating the necessity for some modification in lenses to suit the requirements of the now extremely sensitive plates in general use,

This advantage, I think it will be admitted, will enable us to avoid the necessity for the expensive extra-rapid make of portrait lens formerly requisite for the wet process, and may cause a demand for lenses of the "universal" and "single-view" type, permitting the use of a large aperture when required.

Unfortunately those with rotary diaphragm plates will not permit the increase of aperture as suggested by you. Seeing this I obtained one of the cheap single make, having an aperture about $\frac{f}{12}$. The result obtained by this, herewith enclosed, may perhaps so far serve as an illustration for your excellent practical contribution.

The addition of some arrangement in the tube of such lenses for making the varied exposures would, I think, be a great advantage.—I am, yours, &c., S. S. Crewdson.

Union-street, Ulverston, May 21, 1883.

[The picture accompanying our friend's letter is a very charming little outdoor study, and speaks well for the capabilities of even cheap lenses of the class employed. We have always advocated the use of the more rapid forms of landscape or "group" lenses for outdoor portraiture.—Eds.]

ASTRONOMICAL PHOTOGRAPHY.

To the Editors.

Gentlemen,—Mr. A. Brothers, in his excellent paper on the above subject, in your issue of the 11th instant, doubts the practicability of obtaining an enlarged image by the interposition of a lens to magnify the focus of the object-glass.

Permit me to say that I have negatives of the partial eclipse of the 17th May, 1882, in which the diameter of the sun's disc is enlarged to 1¾ inch, by using a B microscopic eyepiece with an alt-azimuth telescope of fifty-inch focus. I used gelatine plates, and the exposure was made with a drop shutter placed some inches in front of the object-glass.—I am, yours, &c., William J. Allsup.

Old Charlton, May 22, 1883.

EXCHANGE COLUMN.

I will exchange a good fifty-five inch bicycle for a rustic balustrade.—Address, Photographer, 2, Holly-terrace, Lansdown-road, Worcester.

I will exchange a splendid new silver-plated tricycle, value sixteen guineas, and backgrounds, for modern tourist's cameras, two sizes, and 12 × 10 portrait camera and stand.—Address, Vincent Hatch, Huddersfield.

I will exchange a quantity of negatives, all sizes, once used, many on patent plate, good head-rest, grooved plate boxes, all sizes, cameras and lenses, outdoor dark tent, on wheels, for backgrounds, studio furniture, or anything useful in photography.—Address, E., Connaught House, Worthing.

Wanted, portable tripod stand, must be light yet strong enough for a 10 × 8 camera, also strong iron head-rest, and focussing-glass, in exchange for old oak furniture, china, &c., or for whole-plate camera, backgrounds, or other photographic goods.—Address, J. B. Smithson, Leyburn, Wensleydale, Yorkshire.

We will exchange a Victoria camera, new, with two lenses for four pictures or quarter-plate, or art scrap album, new, containing eighty cabinet photographs, statuary, and famous paintings, by celebrated artists, gems of art, photographed by Mr. W. England. Wanted, Ross's rapid symmetrical lens, 8 × 5, must be in first-class condition, or offers requested.—Address, Kay Brothers, photographers, Stranraer, N.B.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered—

William Marsden Harrison, 40, Church-street, Falmouth.—*Three Photographs of the Right Hon. the Earl of Kimberley.*

Ellen Kay, 160, St. George's-road, Bolton, Lancashire.—*Four Photographs of John Hick, Esq., of Mytton Hall, Lancashire; also Photograph of Great Lever Football Club.*

Royal Academy.—Our second notice of the Academy Exhibition stands over until next week.

D. R.—The gentleman named is an amateur.

A. F. (London).—Communication inadmissible.

S.—Received. The Publisher will reply privately.

F. W. T. (Florence).—Post-card to hand. Will receive attention from the Publisher.

Esalb.—After the image has been bleached with bichloride of mercury, any alkali will blacken it.

E. Beveridge.—The more expensive of the lenses mentioned will certainly be by far the more rapid in action.

Brighton.—Yes, you are quite right; there is very great danger, if the film be at all thick, of the picture splitting off the glass.

Wm. Buckley.—Yes; a license is required, but the charge for it is small. You will have to procure the materials from the patentees.

F. Bridger.—The want of sharpness is due to the movement of the camera during the exposure. Clearly the shutter does not work freely, or there is a hitch somewhere.

Brighton Tyro.—Our Almanac for 1883 contains all the information you require in a concise form.

A. Z.—You will do well, now that the weather is warmer, to reduce the strength of the bichromate solution from five to three and a-half, or even three, per cent.

Simpleton.—We agree with you. Through attempting to be too smart you have outwitted yourself. You have only yourself to blame in the matter, and you have now no remedy whatever.

O. P. Z.—The "shining deposit" at the bottom of the bottle is metallic gold. The solution has evidently been put into a dirty bottle, which has reduced some of the gold to the metallic state.

R. P.—Without knowing how the paper is prepared in the first instance, it is impossible for us to explain the reason why it discolours so quickly. Does it do so if it be not fumed? We imagine not.

G. H. F.—A small quantity of sulphite of soda added to the iron solution will prevent its oxidation—at least for a time—but will not preserve it indefinitely. It will produce no injurious effect, so no harm can be done by trying the proposed alteration.

T. H. S.—The photographs are very satisfactory indeed, considering your short experience. So far as we can judge from the prints the exposure has been about right, although the light on the landscapes was not quite so well chosen as it might have been.

R. J. S. (Edindurgh)—Try developing the plates with the ferrous oxalate in place of pyrogallic acid, and we have little doubt you will obtain better results for your purpose. If the shadows are still so much veiled add a little bromide as a restrainer to the developer.

L. Stewart (Glasgow).—We believe that no license would be required under the patent alluded to; but a patent was secured in this country for a similar contrivance by Mr. Clark a few years back. We are not aware whether or not this patent is still in existence.

Lux.—On the date mentioned, in your neighbourhood, the sun rises E. 40° N., and sets the same number of degrees W. You will find tables in our Almanac for 1869. As the sun will be very low at the time you propose to take the picture, the shadow will, of course, be very long.

Stephen B. J.—The reason the paper blackened when sensitised is that the sample of paper you have been using is not suited for photographic purposes. Some rough drawing-paper may be successfully employed in photography. Try one or two other samples from different mills. We have lately received several similar complaints.

Lennox.—Doubtless the warm weather we have had of late has caused the sensitising bath to become stronger by evaporation; hence, if you float the paper for the same time as before, it becomes more highly sensitised, which will fully account for your trouble. Test its strength, and, if our surmise turn out correct, dilute to the original strength.

B. Beatson.—The cause of the coldness of tone is that the picture was under-exposed in the first instance, and you have forced it in the development. If you want warm tones in "collodion transfers" you will never be able to get them unless the picture be fully exposed, so as to secure a quick development. As much depends upon this matter as the kind of developing solution employed.

Photographic Club, Ashley's Hotel, Henrietta-street.—The subject for discussion at the next meeting of this Club, on Wednesday next, the 30th inst., will be—*Estimating the Duration of Short Exposures.* Mr. L. Warnerke has kindly promised to bring his test apparatus, by which members will be able to ascertain the exact speed of their instantaneous shutters. Those desirous of taking advantage of this opportunity must bring camera, lens, and plates.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,

For two Weeks ending May 23, 1883.

These Observations are Taken at 8.30 a.m.

May	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
10	29·61	N	44	38	—	49	37	Overcast.
11	29·89	NW	46	42	99	56	37	Fine.
12	29·80	WSW	52	51	108	65	42	Raining.
14	29·85	SSW	60	55	82	64	52	Cloudy.
15	29·10	N	59	54	92	69	53	Hazy.
16	29·31	NE	62	57	110	72	52	Cloudy.
17	30·42	E	58	52	103	71	49	Fine.
18	30·29	W	57	52	106	65	52	Fine.
19	30·03	NW	56	51	91	61	50	Cloudy.
21	30·20	SE	56	50	108	68	46	Fine.
22	30·19	W	60	50	116	75	48	Fine.
23	30·16	W	65	57	113	80	52	Fine.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1204. Vol. XXX.—JUNE 1, 1883.

COLLODION EMULSION.—THE SOLVENTS.

In a short article, last week, we spoke on the subject of pyroxyline for collodion emulsion; and, as a considerable degree of interest is being evinced in the possible revival of that form of emulsion, we may, perhaps, be permitted to extend our remarks to the solvents.

Next—if not really equal in importance—to the pyroxyline come undoubtedly the ether and alcohol employed for its solution. To those professional and amateur photographers who have been accustomed for years to work the wet collodion process, and have probably at one time or another become perfectly familiar with the details of the manufacture of the collodion, this statement may probably appear an unnecessary, if not a misleading, one; but we can assure them, after many years' experience, that for emulsion work it is absolutely and emphatically true. The chief point to be attended to—after, of course, a fair degree of chemical purity, which is not difficult to obtain in ordinary commercial samples—is the strength or "grade" of the solvents employed, the greatest possible freedom from water being desirable for reasons we shall indicate.

In the case of collodion intended for use with the bath the only function of the solvents is to dissolve and hold in solution the pyroxyline and, of course, the "iodising" salts. For the former, the stronger the solvents—that is, the lower their specific gravity and the greater their freedom from water—the better, as a rule, the result, though a comparatively large addition of water does not cause any serious inconvenience, and in some cases (where the pyroxyline is of a particular character) weaker solvents are an actual advantage. On the other hand, many of the salts which have obtained the greatest favour for "iodising" wet-plate collodion are but little soluble in absolute alcohol and ether—notably the potassium salts—and, therefore, require a certain proportion of water to keep them in solution. If high-grade solvents are employed it is absolutely necessary to use water to dissolve the iodising salts; so that for wet collodion it is, perhaps, positively advantageous to employ comparatively-weak solvents. At anyrate, provided the collodion will flow readily and "set" without structure or "crapiness," the requirements are satisfied.

In the case of collodion intended for emulsion, however, the conditions differ. In addition to the pyroxyline originally dissolved and held in solution the solvents are required, after the collodion is sensitised and becomes emulsion, to assist in holding in suspension the silver bromide thus formed; and in proportion as the grade is lowered so does the suspending power decrease, because the pyroxyline is in a less perfect state of solution and the collodion becomes a less viscid medium. Add to this that the operation of sensitising involves the addition of a notable quantity of water, and it will be recognised that high-grade solvents are a necessity.

As regards the question whether any advantage accrues from the use of pure solvents as distinguished from methylated, we are distinctly of opinion that there is no advantage, provided the latter are of good quality. There are, undoubtedly, many samples of methylated alcohol met with in commerce which are entirely unfit for any purpose connected with photography; but their bad qualities are not due to the presence of methyl but to the employment, for methylating purposes, of very inferior spirit, in the belief that anything is good enough for the purposes for which the bulk of methylated spirit is used.

As the majority of our readers are aware, methylated spirit is a mixture of pure or ethyl alcohol with a certain percentage of methyl alcohol or wood naphtha, as it is commonly termed, which latter renders the mixture (or is supposed to render it) unpotable without interfering with its various applications to industrial purposes. This admixture of methyl secures immunity from the heavy tax upon pure or drinkable alcohol, and enables the methylated to be sold at a fraction of the price of the pure article. Methyl alcohol is, *sui generis*, as pure a preparation, though much cheaper, than ethyl alcohol. It has been proposed to substitute it for the latter in collodion making, and we know from actual trial that such is quite feasible. If, then, the addition of a small quantity of this cheaper and innocuous though nauseous liquid to the purest ethylic alcohol clears away the duty the latter would otherwise have to pay, there is no reason why a methylated alcohol of the highest quality should not be sold at very little more than the price at present charged for ordinary "burning spirit," as the methylated spirit of commerce is frequently termed.

In proof of this it need only be stated that methylated ether—that is, ether made from *methylated* (not *methyl*) alcohol—can be obtained of the very highest strength and of perfect purity for one-third of the price of the pure ethyl ether, commonly called "sulphuric ether," and its preparation involves the expensive process of *distillation*, not merely *mixing*, as in the case of alcohol.

The methylated ether of commerce may be thoroughly relied on for all purposes in photography, and is readily obtained, in London at least, at various strengths, from s. g. ·730 down to ·705 or even lower. Further than this: the methylated spirit of commerce, if obtained from a respectable maker, may also be relied upon for *purity*, its applicability to emulsion work depending upon the specific gravity of the particular sample. The law provides that the mixture sold as methylated spirit shall not exceed the specific gravity of ·827; but as a rule it will be found much lower than this—generally between ·820 and ·825. We have frequently met with it as low as ·817, and on one occasion as low as ·812, the price being tenpence per pint retail. Even with ·730 ether the last-named strength would suffice for the particular requirements; but when methylated ether of s. g. ·720, or even lower, can be obtained for less than two shillings per pound, it is obvious that with a methylated alcohol of ordinary commercial strength there is ample margin for the proper working of emulsion.

In cases where methylated spirit cannot be obtained of sufficiently-low specific gravity, though otherwise pure enough for emulsion purposes, it may be strengthened in the following manner without redistillation—a method we have frequently adopted with perfect success. Procure some carbonate of potash—the salts of tartar of the shops is frequently too impure—and having dried it thoroughly in a porcelain basin over a Bunsen or spirit lamp, transfer it while still warm to a wide-mouthed bottle and pour on to it the spirit to be strengthened. Cork well and shake at intervals for a day or two. The potash salt will partly dissolve in the water contained in the alcohol, and when allowed to settle will form a dense layer at the

bottom of the bottle. Siphon off the upper layer of alcohol, taking care not to go too near the aqueous solution of potash, and test it with litmus. It will be found to be alkaline. Now drop in a few drops of a solution of nitrate of silver, shake well, and expose the milky solution to sunshine or daylight until it blackens and deposits a sediment. If a small quantity of the clear solution no longer becomes milky on the addition of silver the bulk may be filtered, and is ready for collodion or emulsion purposes. The presence of a *minute* trace of free silver will not greatly affect its applicability to emulsion work or interfere with the calculations of equivalents.

Since the above was written we have received Mr. Wm. Brooks's article, accompanied by two excellent negatives, taken, as he informs us in a private note, with a not particularly rapid emulsion eighteen months' old, the exposures having been respectively two and three seconds. Despite the shortness of the exposures the detail in the darkest portions is perfect, and the negatives have all the appearance of wet collodion. Mr. Brooks expresses his belief that he can make dry collodion emulsion plates rival gelatine in rapidity.

PORTRAITURE FOR AMATEURS.

The taking of portraits in groups—even in a well-appointed studio, where the light is under full control and the most perfect of apparatus at command—is one of the most difficult phases of portrait photography, and one that taxes the skill of the operator to its fullest extent in order to obtain satisfactory likenesses, at the same time combined with an artistic picture.

After calling attention to this fact it will be manifest that one of the principal considerations in connection with outdoor portraiture —and one upon which much necessarily depends in obtaining satisfactory pictures—is the judicious selection of a situation for our operations. On this part of the question no definite instructions can, of course, be given, as all must of necessity be dependent upon the space available. However, we shall endeavour to give the student a few practical hints which may materially assist him in his selection, and, at the same time, help him to make the best of what circumstances have placed at his command.

First, let us consider our present requirements apart from the apparatus, as that portion of the question has been fully disposed of in previous articles. A space is required where the sitters can be posed so that the sun does not shine directly upon them, and where the surroundings will form a good natural background. This is an important matter from a pictorial point of view; for what looks worse than to see a picture, otherwise good, spoilt by an unsightly background? Yet one often sees a group of figures posed before a plain, flat brick wall; and nothing uglier than this, in the eyes of an artist, can well be imagined as a background.

One thing to be specially guarded against, when it can possibly be avoided, is to include any portion of the sky in the picture, except, perhaps, when taking sunlit pictures. We also require sufficient space to allow of the camera being placed at such a distance from the group that the whole of the figures are included on the size of plate with which we are working. Furthermore: it is very desirable that the situation chosen be one in which the sun does not shine upon the lens; for, although the direct rays may be shielded from it during exposure, it will not be possible to obtain anything like so brilliant a negative as if it were shining in any other direction. If a verandah be available it will, as a rule, form a very desirable spot for operations, as the main building with which it is connected will block out the sky, as well as tend to shield the lens from extraneous light. It will also afford us facilities for obtaining good *chiaroscuro*, as, generally, the supporting columns are covered with trailing plants of some kind, whose foliage casts shadows which may be utilised with advantage in the composition.

In posing a group under or about a verandah, care must be exercised that none of the figures are placed in deep shadow while others are in strong light, otherwise in the picture some of the faces will be dark—sometimes nearly black—while others are all that can be desired. This is very likely to occur if the roof be a low one and some of the figures are standing beneath it. When any of the figures are arranged under a low verandah they should be sitting, or, if standing, brought well forward, so that the shadow cast from the roof or foliage does not fall upon any of the faces. This arrangement, if the central figures be under the verandah, will suit the requirements of the lenses admirably. When very fair and very dark persons have to be included in the same picture, the blondes may with advantage be posed somewhat under cover, whilst the brunettes are brought more into the open.

In composing the group the figures should be arranged as much as possible in the middle of the plate, the principal figures occupying the most central position, as the centre should always be the most important part of the picture. A few plants or shrubs in pots, judiciously distributed, will form charming accessories when the group is posed in the vicinity of a verandah. Some of the most successful outdoor groups we have ever seen were taken under or about a verandah that was charmingly covered with creeping plants.

A portico or porch affords a very admirable situation for posing a group, particularly when only a few figures have to be included, as some one or two may be arranged within and the others outside, taking care, as in the case of the verandah, that those which are posed within are in no way placed in direct shadow. This is best avoided by having those within seated and fairly well forward, so that they will be clear of the cast shadows from the roof and sides. Porticoes are usually covered with foliage of one description or other, which is a great advantage for our present purpose. When the foliage happens to be ivy (which it frequently is) a very full exposure must always be given to the negative, otherwise the background will be exceedingly dark in the resulting picture, the foliage of ivy being of such a very non-actinic character; and, unless the sun be shining directly upon it so as to produce bright reflections from the leaves, it will always look unpleasantly heavy unless very fully exposed.

Very admirable groups may be secured with an open window as a background. Some of the figures may then be arranged within the room, while others are without on either side. If the window be a French window opening to the ground so much the better, as then the whole of the figures of those inside the room, whether standing or sitting, can be included in the composition. It is necessary, in arranging a group thus, to be careful that none of those figures which are outside shall be in such a position as to cast a shadow, at least, on the faces of those within. This arrangement, it will be seen, favours the lens, as the centre figures are situated at a greater distance from it than those at the sides.

When some of the sitters happen to be in very light dresses it is always advisable to pose them in such a manner that the dress, or the major portion of it, is hidden or subdued. This is easily accomplished with the window background, by placing such sitters inside the room, or, in the case of either of the other situations, by arranging those in the light dresses somewhat behind the others, so that the dress is for the most part hidden by those in front, or a strong shadow from them is cast upon it.

In taking a photograph where a window forms part of the background care must be observed that no reflections from the glass is shown in it, otherwise it will cause the picture to look patchy. These reflections should be carefully looked for when focussing, and, if any be noticed, they can generally be avoided by slightly altering the position of the camera—placing it at a slightly-different angle with regard to the reflecting surface.

In concluding this article, we cannot too strongly impress upon the student the necessity of observing, when the group is finally arranged, that all the faces are equally illuminated, otherwise it will be impossible to secure equal density in the negative, which, if successful portraits be the chief consideration, is most essential.

HYPO. RESIDUES.

Whatever may be the cause, it is an undoubted fact that a very large number of photographers take no steps to recover the precious metal from the fixing baths that have been used for paper or glass; yet we do not hesitate to assert that, taking them

all through, the silver so obtainable will equal, if not exceed, that which is usually extracted from print washings when even albumenised paper, sensitised in the ordinary fashion, is employed. We have time after time endeavoured to impress upon photographers the desirability of such saving, and the present period, when almost every one appears to be complaining of "quiet times" and bad business, is an opportune one for again drawing attention to the matter.

So averse to it and so conservative in their modes of working are some photographers, that we believe there is no exaggeration in the story told of one professor of the art, who, when recommended by a chemist and dealer in photographic materials to effect the saving, replied sarcastically that he presumed the dealer wished to sell some chemical for the purpose !

Another reason for the want of energy in taking up a system whose necessity should be self-evident may, perhaps, be found in the carrying out of experiments in a wrong manner. We remember a writer in our columns describing his having seen a large heap of residues which the owner estimated to be worth some scores of pounds while in reality it was almost worthless, he having used hydrochloric acid for precipitation, just as in throwing down the silver from print washing. We need not say that the precipitate he had so carefully stored would be mainly sulphur, and would not be likely to contain any silver unless the whole of the hypo. were decomposed, while even then the silver would bear a very small proportion to the entire mass. A method that has been recommended is the passing a stream of sulphuretted hydrogen gas through the liquid. This would be quite effective; but, except in establishments having laboratory arrangements such as few photographers possess, it would be perfectly impracticable, and the foul smell produced during the process would be unbearable, not to speak of the difficulty and loss of time of preparing the gas and the need of special apparatus for the purpose. In fact, our own opinion is that such a method of extracting silver is worthless in all photographic establishments on its own merits, while it is undoubted that processes equally efficient as to results obtained are available at a smaller expenditure of time or material.

The method of suspending a piece of metallic zinc in a spent hypo. solution is open to none of these objections, and where the use of a hypo. bath—as with the amateur who only works at intervals—is merely occasional it will be quite effective; but unless heat be applied the process is very slow. Some discussion was caused a little while ago by the proposal of one gentleman to use a zinc vessel to hold the solution. It is true it would answer if time were given, but it is also true that if much hypo. passed through the vessel would soon be pierced with holes, for as the silver is thrown down the zinc is taken up.

The method above all others to adopt is that so often recommended—the addition of a solution of sulphide of potassium, commonly known as "liver of sulphur," to the old fixing-bath, the result being a precipitation of all the silver as sulphide, along with any gold also that may be present, which, as we have pointed out, gives such an increased value to the precipitate that the refiners will give a higher price for the metallic silver obtained from it than for that from chlorides.

The chief objection to the use of this substance is the smell that is emitted during the process; but, if care be taken to keep the solution of the liver of sulphur in a well-closed bottle, and a large excess be not used, the smell will not extend outside the room in which the precipitation takes place, while if done in the open air there is no nuisance whatever.

Owing to the dark colour the old fixing acquires by keeping the process of precipitation cannot be so readily watched as with print washings and salt or hydrochloric acid. Therefore, to obtain the full amount of silver present, it will be needful after the first addition of the precipitating fluid, followed by thorough agitation, to take up a little of the solution in a measure glass and try it with a small quantity of the sulphide. It will at once be perceived whether there be any silver left, and a further supply of sulphide solution must be added if that should be the case.

It is very desirable to use a minimum quantity of the precipitant, as if used in excess it will dissolve the sulphide of gold produced, and so lessen the value of the sulphide of silver. In employing this method there is no trouble or difficulty; in fact, except that the solutions and precipitate are coloured instead of white, the manner of procedure is exactly analogous to the precipitation of print washings by salt, in which process also it is desirable that an excess of the precipitant should not be employed on account of its solvent action on the precipitate, for which reasons, among others, we have always recommended hydrochloric acid for print washings.

There is one precaution it is desirable to take with regard to the sulphide: it will not keep long unless sealed from the air, and those who are unfamiliar with the materials might possibly use a sample quite worthless. The sulphide of potassium is always covered with a dirty light-brown coating, which by keeping increases in thickness till the whole is decomposed; but its nature can at once be seen by breaking a piece in two. The inside ought to be a rich dark-brown—in fact, such a colour as, no doubt, gave rise to the name "liver" of sulphur. On this account we should recommend the sulphide to be kept in solution, as it loses very little of its strength in that form. It is also to be remembered by the non-chemical reader that the clear, red solution—not the deposit—is the precipitating agent.

We trust that our explanations have been sufficiently explicit to enable any user of "hypo." to get all the value possible out of his residues, and we venture to express a hope that the number of those who throw their old "hypo." down the sink may be a continually-decreasing minority.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter V.—Deep Meniscus Lenses, Plain and Achromatic: Their Properties.

The simpler the parts and structure of a photographic objective the less danger is to be apprehended from flare or false light caused by internal reflections. This being the case, why, it may be asked, not employ the simplest of all lenses—a single meniscus?

A deep meniscus lens, whether single or achromatic, possesses properties different from all others. Those who desire to see the finest exemplification of the so-called "depth of focus" possible to be obtained have only to procure a meniscus of very deep shape, expose its concave side to a bright object, and observe the image. This experiment may be performed by directing it to the flame of a candle situated at a distance of a few yards and receiving the image on a sheet of paper held in the hand. Having got the sharpest image that can be obtained, observe to what a great extent the lens may be moved backwards and forwards without the identity of the candle flame ceasing to be observed. It is true that it is surrounded with an areola of false light, but the form itself is still there. In this respect it is quite unlike an image obtained by any other lens, such as a plano-convex, curved side out, in which the slightest motion of the lens from its correct focal distance converts the image of the flame into a circular disc of light.

The spherical aberration by which the flare or mistiness of the image in the foregoing experiment is caused can be entirely eliminated by the employment of a diaphragm; and here we may observe that photographs of great beauty and even sharpness may be, and often have been, taken by means of a simple non-automatic meniscus lens. For a reason which will be apparent to those who carefully study the diagram, *fig.* 2, the photographic image will not be sharp unless care has been taken that after focussing upon the ground glass the lens is then pushed in towards the camera to such an extent as to cause the focus of the chemical or violet rays to take the place of the visual ones, which, as regards the ground glass, will now be quite out of focus. The difference between these foci is approximately one-fiftieth of the focus of a lens formed of crown glass; hence, if a ten-inch lens were employed it would, after focussing sharply, have to be pushed in almost a quarter of an inch in order to secure a sharp image on the sensitive plate. Now, this would be of no consequence whatever if distant objects alone were to be photographed, because the difference between the two foci being a constant one the ground glass could easily be let deeper, or set farther forward, in its frame to effect the requisite compensation.

But while the difference is a constant one with respect to proportion, it is not so as regards quantity; for upon focussing a near object the lens, as everyone knows, must be withdrawn farther from the focussing-screen in order to obtain a focus, and the quarter-of-an-inch alteration of the screen in the frame would prove totally inadequate when, in photographing an object on the scale of the original, the lens had to be twenty inches from the plate.

This would obviously demand an adjustment between the visual and the working focus of a measurement greatly exceeding that employed under the circumstances described. Among other reasons, the trouble necessitated in effecting this adjustment has operated to prevent photographers from making use of lenses other than those in which the actinic achromatism is effected in such a manner as to ensure a strict coincidence of the visual and chemical rays. But as, notwithstanding the drawback mentioned, there are several advantages to be found in simple crown glass meniscus lenses—cheapness being one, and less loss of light another—it is fitting that we here give the means whereby an accurate adjustment can be made so as to ensure the requisite sharpness with such lenses when used in either a single or combined state.

Proportional compasses and suitable markings upon the sliding mount will suggest themselves as one obvious method by which to effect the desired adjustment; but that which we have long confined ourselves to—invariably recommended as superior to all other methods, and which owes its inception to that profound mathematical optician, Mr. Robert H. Bow, C.E., of Edinburgh—is one more practically perfect (as we have often proved it to be under many ramifications) than even its talented progenitor could easily have imagined it to be. A weak and thin convex lens—such as may be obtained from spectacle lens opticians at a price astonishing from its inexpensiveness—must be selected, its strength being such that, when added to the focal length of the operating lens, it will have the power of reducing the focus two-per-cent., or any other proportion found to be the proper amount of adjustment for a very distant object. As the focal length of this supplementary lens will be very great—say from forty-five to fifty times that of the camera lens—very little error will be caused by inserting it at the place of the stop instead of in contact with the working lens. It has, therefore, merely to be dropped in a suitable slit in the mount, like a Waterhouse diaphragm, where it remains till the focus is obtained, after which it is removed and the photograph taken without it. The simplicity and beauty of this system must approve itself to every one.

The rule for finding the focus of the lens that must be inserted as a stop (when focussing) to effect the correction of the working lens is this—f being the focal length of the required lens:—

$f_{11} = \frac{f_1 + f}{f - f_1}$ or when $f = 50$ and $f_1 = 49$, $f_{11} = 49\,f = 245$ inches.

This rule will be found useful in another direction when we come to speak of over-corrected lenses; for the means described for curing the annoyances arising from the use of non-achromatised lenses apply equally to those in which the achromatism for colour is carried further than is required for photographic working as to those in which it is not carried sufficiently far.

A deep meniscus, whether achromatised or not, requires a small stop placed comparatively close to the lens. This permits of the transmission of a very oblique ray, the incidence of the ray being more normal than in the case of a flatter lens. For this reason all wide-angle lenses must partake of the external form of the deep meniscus, and the diaphragms must be placed near to the lens.

When single meniscus lenses are mounted in doublet form—that is, one lens in front of and the other behind the diaphragm—there is a species of correction accomplished naturally in the case of oblique rays, the nature of which we may explain as follows:—Let a symmetrical or non-symmetrical doublet be imagined, its two elements being deeply-curved crown-glass menisci. When an oblique ray impinges upon the anterior lens in such a manner as to enable it to be transmitted through a stop placed equidistant between both lenses it undergoes decomposition, and its violet constituent, being more strongly refracted than the yellow, falls upon the surface of the posterior lens nearer its margin than does the yellow ray, which, as we have said, is less refrangible than the other. But the nearer to the centre of a lens that a ray falls for transmission the less is it refracted; or, on the contrary, the margin of a lens possesses the refractive power in a greater degree. The yellow and violet rays which, therefore, were separated by the action of the front lens are, to some extent, made to reunite by the back lens, seeing that the violet falls under the influence of a portion of this back potent to cause it to reunite with the yellow, which, being less refrangible in itself, is also transmitted by a portion of the lens possessing less power for refracting.

The deep meniscus lends itself wonderfully to combinations intended to have an easy, accommodating elasticity of focus. A single, achromatic, deep meniscus, which is properly corrected for actinic achromatism, may have wedded to it as a back combination a lens formed of a single crown glass meniscus, which shall not only correct the distortion of figure necessarily caused by the former when used alone, but shall do so without any sensible interference with its actinic correction. In other words, the achromatised front when used alone has its chemical and visual foci coincident; yet when a single, non-achromatic, crown glass meniscus is added to this, although there is a diminishing of the focus to about one-half, the chemical and visual foci are still practically coincident as before.

A practical outcome of this fact is that, when a photographer has a lens of the achromatised, wide-angle, non-distorting class, which may not be of precisely the focus he desires, he may temporarily lay aside its posterior element and substitute for it a simple lens of another focus, by which he can arrive at almost any focal result required. Having determined upon the focus desiderated he must start with this fact as a basis—that no two lenses of only half that focus will enable him to obtain what he desires. An important factor in the calculation is the distance that must intervene between the two lenses forming a combination. Knowing the foci of the particular lenses about to be employed in the formation, temporary or otherwise, of a new objective, the combined focus of the pair may be ascertained by multiplying together the individual foci and divide by the foci added together, subtracting from the divisor the distances apart at which the lenses are to be mounted.

It will be obvious that when a combination is very near the focus desired, that focus may be lengthened or shortened till the required power is obtained by slightly separating or bringing the lenses nearer together. The nearer they are together the shorter the equivalent focus.

By the courtesy of the Hon. Secretary, Mr. H. H. Cunningham, we have had an opportunity of inspecting the albums of the Postal Photographic Society, together with the voting lists and the remarks of members in connection with the first prize competition. It will be remembered that this Society was formed a few months ago for the purpose of circulating amongst amateurs, who are otherwise isolated from the world photographic, specimens of the work of others, with which they can form an estimate of their own, and, if possible, improve it. So great has been the success of this venture that the Society already numbers upwards of seventy members, whose contributions necessarily throw a vast amount of work on the shoulders of the Secretary. The albums, of course, contain work of varying degrees of excellence, though the greater portion is of good quality and much of it of a really high class. Landscape, as a matter of course, predominates; but portraiture and *genre* subjects are also represented. One feature in the circulation of the albums is novel and interesting. A separate book accompanies them, in which each member records his votes and also enters any remarks he may feel called upon to make on the pictures themselves or on the working and management of the Society. Thus, though the members never meet together, they are afforded a ready means of interchanging ideas and discussing points of interest in common. "Would not No. — have been improved by the introduction of clouds?" queries one member in reference to a certain picture. "Does very well without," briefly replies the next. Another member referring to the prize landscape picture (a wet plate, we believe) asks a question and answers it:—"Could gelatine

do this ?—Doubtful." Others state at some length their opinions on various matters, and altogether the volume forms very interesting reading. The method of voting, too, is novel. It is open to the members, each of whom has three votes in each class—one for quality of negative, one for quality of print, and one for artistic feeling. These may be all given to one picture or divided, according to the opinion of the voter, and the aggregate of all the members voting decides the question. When some little misapprehension as to the exact conditions of voting has worn off, this plan will, we think, be found to work admirably.

The Season Extension Committee of Eastbourne has resolved to expend a sum of £170 in photographs, to be utilised for advertising purposes.

Referring to Mr. Brothers's remarks with regard to the "grain" in the lights of the ink-photo. of the moon given in our last number, Messrs. Sprague and Co. inform us that they are able to produce a grain of any degree of fineness, but that it involves the expenditure of a greater amount of time and attention than the hurried production of Mr. Rutherfurd's picture permitted.

The continually-increasing high price of glycerine renders it very liable to adulteration, and the materials chosen for that purpose are frequently the very substances most inimical to its photographic use. Thus sugar, glucose, gum, &c., are added to give a fictitious thickness to the liquid; and it is evident that, for all purposes where nitrate of silver is employed, an injurious action would result from substances so capable of reducing it to the metallic state. It is stated that molybdate of ammonia detects the presence of sugar or dextrine. Six drops of the suspected sample are diluted with about half-an-ounce of water, acidulated with a drop of nitric acid, and boiled for a minute and a-half with about a grain of that salt. If either of the two adulterants be present a blue colour will be produced; if absent the liquid will remain colourless. Glucose is shown if a brown colouration be produced upon heating with caustic alkali.

The Philological Society have for some years past, with the aid of a number of amateur helpers, been engaged in the preparation of a dictionary of the English language which shall surpass beyond comparison anything of the kind yet produced. Books are issued to the various volunteers who are assisting, and they cut out sentences containing certain words, to be used as quotations when that word comes to be tabulated and defined. More than three millions of these quotations have been sent in and eleven hundred thousand of them are to be made use of. The first volume will contain words from A to Ap, and is to be published in October. All these three millions of quotations do not appear to be sufficient, two words being insufficiently quoted—"American" and "*Ambrotype.*" The readers of photographic literature would have no difficulty in supplying any number of references to the latter word, and we would suggest to the committee that they requisition some of the earlier numbers of our Journal, the word not being now commonly used in this country.

A very interesting paper by the editor appeared in *Knowledge* last week, treating upon subjects interesting to photographers, both practically and theoretically. Our readers cannot do better than procure a copy of the periodical (which they may perhaps know costs only twopence), and carefully study the article in question. Speaking of bodies which are luminous of themselves, Mr. Proctor states first that, in whatever the direction they may be viewed, they appear equally bright; and, secondly, that whatever distance they may be placed at they look equally bright, excluding, of course, any considerations of absorption in the atmosphere. Further: he states these two laws hold equally good for opaque bodies illuminated from a source of light other than themselves, and, in fact, that the laws here enunciated are capable of more thorough proof in the latter than in the former case, the latter being practically the conditions governing photographic work. He combines these laws and their double applicability into an easily-remembered statement:—"A surface, whether self-luminous or illuminated, appears in all positions and all distances just as bright as it is in reality." This law is so diametrically opposed to common belief and the practice of photographers that it should be learnt by heart, and the arguments upon which it is founded will, if carefully read, aid in understanding the cause of the phenomena and in remembering the principles by which it is governed.

When a photographer wishes to make a supply of chloride of gold he usually, regardless of the laws of the land, takes the requisite number of gold coins, dissolves them in *aqua regia*, and precipitates or not as the case may be. He knows that every twenty-four grains contain twenty-two grains of pure gold and two grains of alloy, or, in other words, that it contains $91\frac{1}{2}$ per cent. of gold and $8\frac{1}{2}$ per cent. of alloy—the latter being as simple a method as possible of describing the proportions. For some hundreds of years the Mint authorities, in their mode of setting down proportions, have made use of a method far more cumbrous and roundabout; they have set down how much stronger or weaker (than the standard) in gold any alloy under examination is, using the words "better" and "worse." Thus, in an alloy of twenty carats fine—that is, twenty parts of gold in twenty-four—they would not have said it contained $83\frac{1}{3}$ per cent., but that it was **Wo** $\genfrac{}{}{0pt}{}{\text{car}}{\text{ii}}$, or, if 23 carats $3\frac{1}{2}$ grains fine, **Br** $\genfrac{}{}{0pt}{}{\text{car}}{\text{i}}\ \genfrac{}{}{0pt}{}{\text{gr}}{\text{iii}}$ ob., and so on. These details are brought out in an appendix to the report to the Mint just issued, and from it we learn that the old practice here described—which, though long condemned, has not been without advocates—has at last given way to the more rational decimal mode of describing proportions. It is stated that gold of the value of two millions sterling has recently been imported for coinage, and the simplicity and accuracy of the new system has, in connection with its estimation, been abundantly demonstrated.

The late Professor Henry Draper contributed as much as any man to raising the scientific status of photography, most of the astronomical photographs he obtained being among what might be justly termed the classical achievements of the science. It is pleasant to learn that devotees of the science he followed with such ardour will not be entirely losers by his death; for at the annual meeting of the United States Academy of Sciences the first act of the President was to announce the donation of six thousand dollars by the widow of the late Professor, to be held in trust "for the purpose of striking a gold medal, which shall be called the 'Henry Draper Medal,' shall be of the value of two hundred dollars," and will be awarded from time to time, but not oftener than once in two years, as a premium to any person in the United States or elsewhere who shall make an original investigation in astronomical physics, the result of which may be deemed by the Academy of sufficient importance and benefit to science to merit such recognition. It will be seen that, American citizen as he was, the range of the medal is cosmopolitan; and knowing as we do the important part which photography plays in the investigation of astronomical physics, we see no reason for improbability in the anticipation that a "Henry Draper medal" may ere long be bestowed upon a British observer, the physics of photography being studied here with thoroughness—almost, we might say, with enthusiasm.

PHOTOGRAPHING THE "DERBY."

Although Mr. Muybridge has demonstrated what may be effected by wet collodion in photographing a running horse, it is to dry gelatine plates that we must look for the greatest triumphs in this direction. When our readers learn that Mr. A. L. Henderson has again this year (accompanied by Mr. William Cobb) been "on the war path" with his camera, photographing the exciting scenes at the Derby, they will conclude that the experience acquired by this gentleman last year at Epsom will have tended to render his efforts at the "event" of last week still more successful. And this has proved to be the case.

On inspecting the photographs of the Derby of 1883 we notice an absence of the grand cloud effects and clearness of atmosphere by which Mr. Henderson's efforts of last year were characterised. It is unfortunate that no skill a photographer possesses can remove such obstructions to the attainment of the highest effects as are implied in laying the dust on a crowded racecourse or controlling atmospheric conditions; nevertheless, the large 12 × 10 photographs obtained of the crowd and the grand stand, together with the race, are both marvellous and highly-interesting from a photographic point of view.

The inspection of one picture taken under exceptional and experimental circumstances prompts us to remark that it is matter for regret that it appears to be quite futile to hope to get a large picture taken instantaneously by a lens of long focus; for, no matter what skill is possessed by the photographer, the optical conditions under which large lenses of this class are worked are such as to render it impossible to obtain an instantaneous photograph which will be sharp over even a moderately-large field. When the aperture is stopped down to ensure covering power the light is attenuated to an extent too great to permit of an exposure being made that will impress the plate in the infinitesimally short space of time required. This difficulty does not apply in similar ratio to lenses of smaller dimensions and shorter focus; and hence, for every purpose involving rapidity, the securing of this quality in the highest degree will be nearly always concomitant with the employment of lenses of actual, not relative, short focus.

The experimental plate referred to was one of 12 × 10 dimensions, and it was exposed with a lens of the "rapid" type made by a maker of eminence. Its focus was sixteen inches. It was worked with an inch stop ($\frac{f}{16}$) and a shutter falling in one-tenth of a second, this duration having been previously determined by accurate calculation. The picture possesses some curious and interesting features. The grand stand and the crowds of people are quite sharp, but the horses are altogether unrecognisable as such. Nor is this to be wondered at when it is considered that according to calculation the horses moved about six feet during the brief period the exposure lasted. This establishes the fact of the tenth of a second, brief though it be in itself, being totally inadequate to ensure the representation of bodies moving at that rate, especially when such moving bodies are at no greater distance from the point of photographic operation than a hundred feet.

Compared with an angular movement of this extent, that of steamers proceeding under full steam and at a distance of a quarter, or even an eighth, of a mile is as nothing at all, although the photographing of such steamers has been considered an exploit. Contrasted with the other, the steamer may almost be considered a motionless object. This indicates how excessively rapid must be the action of a shutter and lens that will photograph distinctly the horses under such rapidity of real and angular motion. It is also to be noted that the fall of a shutter over an inch aperture is longer than a shutter with proportionate aperture over half-an-inch, although the intensity value of both apertures is the same.

Setting aside, however, the experiment described, the plates employed on the actual pictorial work of the Derby were of the dimensions respectively of 12 × 10, 10 × 8, and 5 × 5, the lenses in every instance being of the "rapid" type. The shutter employed with the 12 × 10 and 5 × 5 cameras was of the usual drop form. It was fixed to the front of the lenses, and when the check was liberated by the pneumatic ball the shutter was driven down—not alone by the force of gravity, but by the strong propelling power of an elastic strap of india-rubber under tension. The duration of exposure cannot in these cases be estimated with accuracy; but the results indicate that it must have been somewhere about the four-hundredth part of a second. This duration is assumed from calculations made by an examination of the horses' feet in the photographs. The 10 × 8 camera was, we understand, fitted with a shutter of that convenient type which may be described as a flexible band passing over a roller, a suitable aperture being cut in each end so as to be concentric when opposite the lens.

The groups of people, with the excited expressions on their faces, form not the least valuable feature in the Derby pictures; and it is not difficult to understand the interest displayed by artists in these photographs for this reason alone, for as studies of intense expression they are admirable.

As for the horses themselves, it is perhaps altogether unnecessary to say that they are not represented in the conventional attitudes adopted by artists in depicting the running horse. Although there exists every other evidence—even that of trained ocular observation—to prove that the noble quadrupeds were rushing forward with the well-known outstretched legs, yet the analytical camera, which possesses neither imagination nor persistence of vision, presents them to us in the most fantastic and ludicrous positions conceivable, some of them conveying no idea whatever save that of dogged determination not to move a single step forward if it can be avoided. That the animals really did assume such positions these photographs prove; that no human eye ever saw them in such position, or, to put it more correctly, ever realised that as one of the positions assumed, is also correct. It raises the old question between artists and men of science as to realism in nature not necessarily being truth to our perceptive faculties. These Derby pictures of Mr. Henderson will be an excellent contribution to the discussion of this matter.

The plates employed were of Mr. Henderson's own preparation by a formula he has already published, the development being effected with pyrogallic acid and ammonia.

HOT-WEATHER DEVELOPMENT.

Each year on the recurrence of warm weather a cry of distress goes up from a number of gelatine-plate workers that they get green fog, and of course the plates are blamed. All makers come in for censure alike. Even when actual fog is not produced there is found a grievous lowering of the tone and quality of the negatives, giving very flat prints. That this is caused in development and not from faulty plates is shown by the fact that plates of known good quality often produce poor results at such times. The same plates used in winter or cooler weather give all that can be desired. It arises, then, in development.

It will be remembered by collodion workers that very similar and quite as bad troubles came on during hot weather with that system of working. Now we may bear in mind that sulphite of soda was announced as a complete remedy for green fog; but many found otherwise, some saying it even produced it, and that it grievously slowed down the development. This seems to have arisen from want of complete examination into the manner of using it; in fact, the way seems to have been missed. The following method of mixing pyro. and sulphite gives even more developing power than pyro. alone, and negatives of the exact oxalate or wet-collodion colour, enabling one to judge correctly of the printing value. They also have the great advantage of being similar in colour to the retouching pencils:—

Make a saturated solution of sodic sulphite by pouring on boiling water, adding to each pint one drachm of citric acid, and allow it to cool. When lukewarm pour fifteen ounces of it on an ounce of pyrogallic acid. This is the usual stock solution, to be mixed with water one ounce to fifteen ounces for use. For the bromide and ammonia the same I have before given in these columns may be used, namely:—

Bromide of ammonia	300 grains,
Ammonia, ·800	2 ounces
Water	12 ,,

so that for use take (say) two drachms of stock pyro. and the same of bromide and ammonia, and pour into a four-ounce measure of water. This keeps quite clear whilst in use and will develope at least two half-plates, which, when fixed, are of an excellent colour. Looked down upon they are often rusty and iridescent. The great principle of this sulphite developer is to mix the dry pyro. with the saturated *acid* sulphite. There may be a precipitate of sulphite crystals at the bottom of the pyro. stock solution, which can be disregarded. Sulphite may, if preferred, be mixed with bromide and ammonia, instead of pyro.

Samuel Fry.

THE ROYAL ACADEMY.

[Second Notice.]

Our first notice dealt with the portraiture in the present Exhibition, and we shall now proceed to review the general subjects, reserving pure landscape work for a third and concluding article.

The first picture which attracts notice is Mr. Marcus Stone's *An Offer of Marriage* (No. 5). The chief feature consists of a group of two persons in the quaint costume of a couple of centuries ago. The young lady has received "an offer of marriage," which she has dutifully submitted to her parent or guardian, who is in the act of perusing it. The anxiety of the interested party as to the decision is evident both in attitude and expression, while the features of the arbitrator exhibit as yet no sign, favourable or otherwise. Mr. Stone's only other work is a single-figure study of a young lady, *Asleep* (No. 415), which is worth inspection.

Mr. H. T. Schäfer's *The Bride* (No. 6) is a full-length classical study of a maiden in the hands of her attendant in preparation for

the bridal ceremony. It is chiefly noticeable for the tenderness of the flesh tints and the admirable manner in which the gauzy veil is made to cover without hiding the figure beneath. *Day Dreams* (No. 75) is another study by the same artist, showing exquisite delicacy of treatment; while *Charity* (No. 484) is of a more commonplace character—well painted, and evidently a portrait.

Mr. J. C. Hook, R.A., exhibits his usual power in rendering rock and water in *Catching a Mermaid* (No. 28), which represents a party of lads landing the figurehead of some unfortunate vessel which has been washed on to the rocks. The whole composition is an admirable one. *Love Lightens Toil* (No. 36) is a pleasing study of a mother and child. *The Wily Angler* (No. 324) and *Carting for Farmer Pengelly* (No. 331) complete Mr. Hook's complement.

The Village Genius (No. 41), by Mr. F. W. W. Topham, is a humorous representation of a precocious youngster executing a portrait, his "canvas" being the hull of a fishing boat. The figures are well grouped and the colouring good.

A Sacrifice, by Mr. R. W. Macbeth, A.R.A., represents a girl whom necessity has compelled to part with her flowing golden tresses, and who is in the act of being deprived of them by the barber. The varied expressions and the different faces are admirably rendered.

Penelope (No. 45), by Mr. Percy Macquoid, exhibits some clever figure painting.

Miss J. M. Dealy's picture (No. 57), which is described by the couplet—

> "And she went to market
> All on a market day"—

is a charming little child seated in the midst of a mass of simple flowers tied up in bundles for sale. The attitude and air of importance of the little market woman are very happily caught, and the rendering of the masses of wall flower and jonquil is clever in the extreme.

The Last Look (No. 70), by Mr. Maynard Brown, is full of pathos and sadness. Invisible, but suggested in the picture, lies the coffin containing all that is mortal of the father of the family, the remaining members of which, with various expressions of grief, are taking the last fond look of the loved one.

The Marabout Lion, Algiers (No. 82), by M. Eug. Pavy, is a fine piece of animal painting, but it is difficult to decide what is the precise feeling he excites in the breasts of the apparently-excited crowd—whether of reverence or the reverse.

Mr. Edwin Long, R.A., has two admirable figure pieces, in his usual masterly style, representing *Merab* and *Michal*, the daughters of Saul (Nos. 91 and 97).

Mr. Thomas Faed, R.A., has two pictures of widely-different character, the first of which, *The Waefu' Heart* (No. 92), is in the style which Mr. Faed has marked so thoroughly as his own. It is simple in construction. The central group consists of a young Scotch mother sitting by the burn side with her child, mourning the absence of the husband, who is away fighting for his country. This centrepiece is especially noticeable for its perfection of arrangement, and the moorland landscape completes a picture which is worth a good deal of study. *They had been Boys Together* (No. 262) represents the first meeting, after many years, of two men who had been boys together, but who, in the struggle of life, have followed the different paths of prosperity and adversity. The humble, deferential attitude of the poorer of the friends, and the puzzled, half-incredulous expression of the other, are equally happy; while the supercilious indifference of the two clerks forms a fine contrast.

A very clever piece of animal painting, carrying with it a strong tinge of sentiment, is Sir Arthur Clay's *Bereaved* (No. 100). A cow has just been deprived of her calf, and stands fixedly gazing over the low fence after the cart which is bearing her offspring away to market. Extremely simple in construction the composition of this picture is admirable, the colouring, and especially the foreshortening of the animal, being remarkably clever.

Miss Hilda Montalba's *Venetian Girl Fishing* (No. 144) is worth studying as an example of easy and graceful pose. *A Tale of Kassassin* (No. 14), by Lance Calkin, comprises some good points, the expression on some of the listeners' faces being very good.

A picture which attracts as much attention as any in the exhibition, perhaps, is Mr. Frith's *Private View, 1881* (No. 163). The attraction is due, however, rather to the fact that it includes the portraits of a great many notabilities than to any intrinsic pictorial merit. Were the portraits "nobodies" and the artist unknown the picture would probably be passed by unnoticed.

All Hands to the Capstan (No. 166), by Mr. Arthur Hopkins, contains a wonderful amount of vigour and life. The scene is laid on some point of rock-bound coast, where, presumably, the fishing boats find a difficulty in landing. Rigged up in a favourable position on shore is a capstan, by means of which those on land render assistance to any returning boats, men and women responding, as in the picture, to do what they can when their services are needed. The different attitudes have evidently been well and carefully studied, with the result that a very realistic impression of motion and power is conveyed.

One of the most remarkable pictures of this year is *Conscience* (No. 177), by Claudius Harper. It illustrates a verse from the *Spectator*:—

> "I sat alone with my conscience
> In a place where time had ceased,
> And we talked of our former living
> In the land where the years increased."

The picture represents two figures seated—the one in earnest converse, and the other dreamily but attentively listening. The whole colouring is cold and grey, and eminently suggestive of "the place where time had ceased." The artist's conception of Conscience as a separate individual is poetic to a degree, and the idea of earnest yet listless self-communing intended to be conveyed is admirably expressed in the treatment of the figures.

Mr. Henry Woods, A.R.A., is represented by a single work, *Preparation for the First Communion* (No. 179). A young Spanish or Italian girl is having a "full-dress rehearsal" previous to her first communion, and is being submitted to the criticism of the village, from the priest downwards. The subject is one which gives great scope for depicting varieties of facial expression, and the artist has not failed to avail himself of the opportunity.

A very touching picture is Mr. P. H. Calderon's *The Faithful Heart* (No. 194). An elderly rustic, accompanied by his little grandchild, is represented in the act of depositing a bunch of simple flowers upon the humble grave of his lost wife or daughter. Quite in contrast is the same artist's *Joyous Summer* (No. 241), where all is brightness, sunshine, and rich colouring. The graceful attitudes and the artistic grouping of the figures are especially noticeable.

Mr. J. C. Horsley's solitary work this year is entitled *Wedding Rings* (No. 200). The subject is a somewhat commonplace one, but the artist has attempted to rehabilitate it in something like freshness. The scene is a market town. A young couple of the farmer class, in view of approaching events, are about to pay a visit to the little jeweller's shop; while, as a foil to their evident happiness, we descry inside a figure clad in widow's garb negociating the sale of some loved trinket—possibly her own wedding ring—which stern necessity compels her to part with. The conception is on the whole well carried out.

Space compels us to break off at this point, but we shall resume our remarks next week.

COLLODION *VERSUS* GELATINE.

During the past few months I have received numerous letters asking my opinion as to the relative merits of collodion emulsion in comparison with gelatine, to answer which I consider a rather difficult question, especially to those who have done but little dry-plate work with collodion. My replies have been that each has its special advantages according to the class of work to be produced, and each, at the same time, has certain disadvantages.

As regards collodion emulsion: probably I have done as much work with the process as anyone, as I commenced it at the time of its first publication by our esteemed Editor in conjunction with Mr. B. J. Sayce, of Liverpool, and up to the present time I have continued to make and use it, which, I think, is something like eighteen years. In working collodion there is a certain charm that there is not with gelatine. With the latter there is the heat required and also the levelling of the plates, which is absent with collodion, while there is also a great saving of time. The other day I had a quantity of plates to coat for making lantern slides and timed myself, and I found that I coated at the rate of one hundred in forty minutes. As respects the rapidity of collodion emulsion: I find not the least difficulty in making it outstrip a good wet plate.

In my own practice I use collodion emulsion both wet and dry—the former for enlargements, which I have made up to twenty-four by eighteen inches. For rapid work in the field I have also used it moist. With regard to the keeping quality of collodion plates (dry): I have repeatedly sent plates to the continent, and in some cases six weeks and two months have elapsed between exposure and development without the slightest deterioration, the failures not having been more than five per cent. on the average.

For making transparencies, as far as my experience goes, there is nothing to equal collodion emulsion, both as regards colour and

clearness. I know many who have been working hard trying to make lantern slides with gelatine emulsion, and have seen a few fairly good; but, when I have asked the question as to how many failures compared with successful results were obtained, I find the number of failures has been very considerable. One gentleman told me that, on the average, he did not get more than one good slide out of twenty plates he had exposed. I believe that I have a tolerably-fair amount of patience and perserverance in all experimental matters connected with chemistry and photography, but practice of this nature goes beyond me. I would admit that if the result were better in any way when compared with collodion it would be worth following; but I have *yet to see*, for transparencies, that gelatine surpasses collodion, though I am open to conviction.

There is another point that photographers look at, and that is the cost of preparing the emulsions. Gelatine, we all know, only requires water as its solvent, whereas pyroxyline requires sulphuric ether and absolute alcohol, and these must be of first quality or the results are uncertain. One great drawback here in England is the spirit duty, which is so heavy; and my experience is that methylated alcohol will not do to ensure good results. To make (say) twenty ounces of washed emulsion forty ounces of solvents are required. Now, the cost of these, compared with water as the solvent for gelatine, tells its own tale. Looking at collodion emulsion from the manufacturing point of view for sale, it is very expensive; and a sufficiently-remunerative price must be charged to allow for any mishap or spoiled batches. To make either gelatine or collodion emulsion with any certainty requires an immense amount of experience and practice, for which, as a rule, those who use it are unwilling to pay. Not long ago, talking with a friend of mine, an eminent commercial gentleman in the city, he said that, as a money-making speculation, very little was gained in manufacturing any article for sale when the article required was of a costly nature to manufacture.

At any time I would rather develope a collodion plate than a gelatine one, as its progress can be seen far better than that of gelatine. When speaking of collodion emulsion I mean the washed emulsion, as I think an unwashed emulsion a thing of the past. At the time collodion emulsion was in vogue very few professional photographers had much to do with dry plates. The workers in a given area might be counted on one's fingers, whereas now, in the same area, they can be counted by hundreds; and all this change has come about since the rush for gelatine. Still, I honestly think that if photographers would give a little of their attention to collodion emulsion they would be pleased with it, and the process in many hands would be developed to a greater extent than it has been. I have refrained from publishing for several years anything appertaining to the process, for fear of its being little read and out of place in these pages; but now the matter seems to be cropping up again, and there is a probability of its being well received.

There is one point I must not omit, and that is that a great many seem to think the smell of collodion in the studio might be objectionable to their clients. I can safely say that the smell of collodion need not enter the studio, as plates could be coated and be kept in water until required; in this state I have kept plates for several days, and ready for exposure at any moment.

It will be remembered that just at the time collodion emulsion fell into disuse the ferrous oxalate developer came in, and I believe that in the use of the ferrous oxalate developer lies the secret of success for rapid working with collodion emulsion. When I first tried it I was truly astonished at its energy, and I throw this out as a hint to intending workers.

For compounding collodion emulsions, I recommend those who are interested in the process to read articles written at the time by such writers as Mr. Henry Cooper, Mr. M. Carey Lea, and others, and which were published in these pages. They will be found full of interest on the subject. Following these came the washed emulsion process.

I think photographers are greatly to blame for discarding certain processes. When the wet process was in full swing it must do everything; now it is all gelatine, and everything must be done with gelatine and no other. What I contend for is to use half-a-dozen different processes, if necessary, for varying classes of work, if better results can be obtained for certain descriptions of work. A little trouble should not be considered if a man's heart is in his profession. I would suggest to get up an evening (say) at the South London Photographic Society, and induce photographers to bring up some of their best negatives, with prints from the same, by the wet collodion process with nitrate bath, collodion emulsion (unwashed), collodion emulsion (washed), and gelatine, comparing the results, without fear or favour, each process to rest on its merits; and, now that nearly all photographers know something of dry-plate work, they would be better able to appreciate the results by the different processes than in former years. I think a great deal might be learnt by a gathering of this kind; and, speaking for myself, as far as I am concerned I shall be most happy to do my part.

I have no doubt there is one objection many would make to this kind of thing, and that is the fear of damage to the negatives submitted for inspection. I think, however, that might be arranged satisfactorily in this way: every one to take charge of his own negatives *at the table*, and not let them go out of his sight. I believe that then there would be very little to fear. I know that when papers are read before the societies, and examples are handed round, I have seen them returned all piled one on top of the other like so many dinner plates, or, perhaps, stacked up on the end of a seat, for the owner to claim if he require them.

I think also an addition might be made of (say) specimen negatives of all dry-plate processes; for instance, collodio-albumen, Fothergill, tannin, gum-gallic, morphia, &c. I was very much pleased the other day, in looking over a series of negatives by Mr. G. F. Williams (landscapes) on tannin plates. Some of them were absolutely perfect in their way. I think he told me they were taken twenty years ago, and I believe it would take many "all their time" to beat them by any process. They are as full of vigour and delicacy as anything I have ever seen. In those days the preparation of dry plates with the nitrate of silver bath entailed a large amount of work. For information to those who know nothing of the early dry-plate processes I may add that in the collodio-albumen process two different nitrate of silver baths had to be employed. I am sure I do not know what would be said at the present day if all this work were required to produce a dry plate; but I think many would be disgusted at the mere thought of it. I have had a hand in all these processes, so can speak from experience concerning them.

Times are now greatly altered. I remember, years ago, when reading a paper on dry-plate subjects at the meeting of a society, to have seen satirical smiles on several of the members' faces when the subject of my paper had been announced, and have been told it was a very dry subject; but now, I think, if any member came forward with anything appertaining to the wet-plate process he would scarcely obtain a hearing, and few would feel interested in the subject.

It has often occurred to me to ask why collodion emulsion is not used more for opal pictures, as it produces the most perfect results—exceedingly soft and delicate, without any of the inky-black tones perceived in the results by the wet process. In using collodion or gelatine for positives, either on opal, glass, or paper, they require some protective medium or varnish over them to seal them from the atmosphere. Only a short time since I was looking over some positives, and noticed the sulphurisation of the surface. I do not think this has been thought of, though it will readily be understood that this action will take place. If not protected by some means it will be noticed, in the case of an old negative, either collodion or gelatine, how soon its surface is blackened by exposure.

Reading the leading article in the last issue of this Journal, wherein my name was mentioned, brought a host of thoughts to my mind, which I thought I would commit to paper for the perusal of those who may feel interested. WM. BROOKS.

THE DRYING OF GELATINE PLATES.

The subject mentioned as my title was again discussed at the Photographic Club, on Wednesday, the 23rd instant, and so much useful information was elicited from the various members who joined in it that it appears to me a pity it should be confined to the limited number of those who were present.

A very ingenious method of producing the desired current of air was mentioned by one member, who suggested that those who had command of steam at considerable pressure but had not a steam engine at all, or had not one in such a position that power could readily be taken from it for a fan, might use the steam direct by causing a jet of it to issue injector-wise into a tube or chimney, the direction of the jet being that of the axis of the chimney.

In connection with this idea, I may say that such an arrangement is used for blowing smiths' forges on a large scale, and gives excellent results. The economy is not quite so great as the working of a fan, but, there being no mechanism, there is less liability to disorder of the appliance. For smiths' forges a pressure of air by no means inconsiderable is necessary, and a specially-formed injector with several concentric nozzles is used; but for simply inducing a ventilating current such would not be necessary. The steam pipes

need only be carried into the exhaust chimney or tube, bent so as coincide for a short distance with the axis of this, and be contracted at the end to a nozzle form.

I am, unfortunately, unable to give precise data as to the quantity of air which a given quantity of steam at any particular pressure will, in this manner, draw; but it is very great. In the case of steam-engine boilers, where the exhaust steam is not available for causing a draught—either because it is used for heating purposes or because the engine is a condensing one—it is common to form roughly, over the fire-box door, an arrangement such as I have described. A short tube several inches in diameter is fixed so that air blown in through it will strike on the fire. A small steam tube is then caused to blow into it. I have seen the fire for a sixty horse-power boiler in this manner most efficiently blown by the current of air induced by steam issuing from an orifice only one-eighth or three-sixteenths of an inch in diameter.

It is almost needless to say that, in the case of the drying of plates, it would be necessary to *draw* the air from and not to *force* it into the drying-box or room, as, in the latter case, it would come in contact with the plates saturated with the vapour of the steam used.

The matter which came most prominently before the meeting was that of drying by means of chloride of calcium, and the discussion which took place leaves no doubt, on my mind at least, that this method is the correct one for drying a substance so sensitive to atmospheric influences as gelatine emulsion.

First, to look at the advantages of the method without taking into account cost or trouble: in the case of drying by the ordinary method, air is continually drawn over the surface of plates for a time varying from a few hours to two or three days. Does it not appear evident that, especially with such an atmosphere as that of London, the films are greatly endangered by such a process? It would appear about the most ingenious method which could be devised for bringing about on a given quantity of emulsion the maximum of influence which the atmosphere may possibly have on it! The emulsion is spread in a thin film, and then air is drawn rapidly over it. To take only two particular causes of damage, I mention dust and water vapour. The effect of the former needs no description. Of that of the latter I have had no inconsiderable experience, having had to dry plates in a very damp shed, finding the utmost difficulty in avoiding on the one hand fog from long-continued action of damp air, and, on the other hand, reduction of sensitiveness from the application of heat. Again: there is the possibility of the air being, during a part or the whole of the drying process, impregnated with gas fumes or other impurities.

Contrast with all this the drying by means of any highly deliquescent substance. No special arrangement is required, but the operation may be performed in any box which can be closed, so as to be light-tight, and as nearly air-tight as may be. The plates are placed in this in racks, a quantity of the deliquescent substances is put in with them, in a flat dish or otherwise, and the lid is closed. The deliquescent substances absorb the moisture of the air, and, as a consequence, evaporation goes on rapidly from the surfaces of the plates, even at a low temperature. This evaporation causes a circulation, water vapour being lighter than air; but it is always the same air which is brought into contact with the emulsion, and, as a consequence, the only impurities or dust which can affect it are such as are contained in the few cubic feet which the box will contain, and this instead of what may be present in the many thousands of cubic feet of air which, by the usual method, pass over the films.

Further than this: the chloride of calcium box may much more easily than the ordinary one be placed in such a position that there will be approximately uniform temperature in summer and in winter. A cool cellar is, of all places, the least suitable for a box drawing air, as it is almost always damp. For a chloride of calcium box it is quite suited, as the vapour which is first enclosed in the box when it is shut is so insignificant in quantity as not to require taking into account.

Even for drying on a large scale a cellar would be particularly suitable with the method in question. Cellars are generally damp because of insufficient ventilation in winter, and because in summer they are cool compared to the outside air, and, consequently, cause condensation of moisture from such of this air as finds its way into them. Securely closed, however, and with sufficient chloride of calcium in it, the moisture in the air which the cellar contained would soon be absorbed, and it would make an excellent drying-room. If dampness were given off continuously from the floor and from the walls on account of the absence of a dry course in the latter, it might be necessary to render them with cement to make things perfect.

Now for the practical aspect of the subject. Two gentlemen who spoke had had practical experience of chloride of calcium drying, and thought very highly of it. They found that with a cool atmosphere not more than ten or twelve hours were necessary to dry plates.

The only question which would appear doubtful is that of cost. I believe, however, that if the thing were properly carried out this might be much less for chloride of calcium drying than for that by almost any other method. The most perfect arrangement would certainly be one in which the calcium was constantly dried after it was used; and thus the whole expenditure, after that of the first cost of a sufficient supply of the salt, would consist in the cost of the small quantity of fuel necessary to perform this. Several gentlemen, however, spoke as to the great difficulty experienced in drying calcium chloride when once it has become liquid, or nearly so, by the absorption of water.

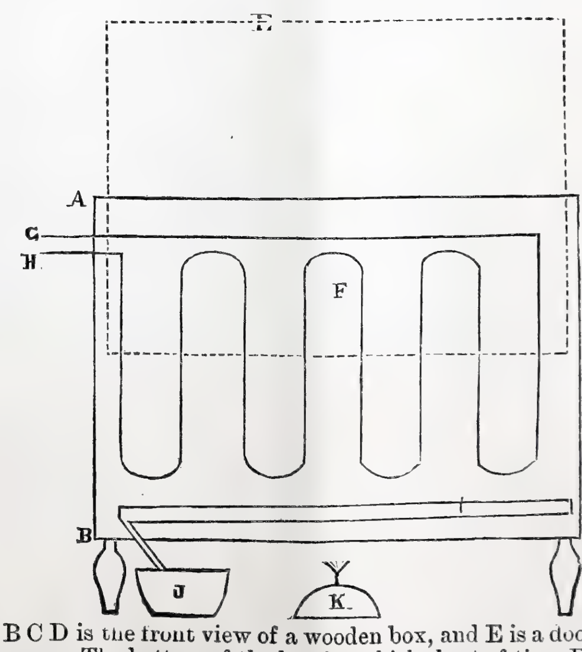
I believe that, even if the same calcium were never used twice, the economy might be greater than when gas is used to induce a draught. A crude sample of calcium chloride may be purchased for between three and four shillings per cwt.—let us say a halfpenny per pound. This cheap stuff is certainly not quite dry, but has still powerful desiccating properties and retains these till it has become quite liquid. It will certainly retain its strong affinity for water till it has absorbed water equal in weight to its original self. But we will suppose that from leakage of air into the box or room and such like causes it were found impossible to transfer from the wet films to the calcium chloride a quantity of water equal to only one-half the weight of the latter: it will be seen that for one penny we can evaporate one pound weight of water from an emulsion. A gallon of emulsion contains ten pounds of water nearly. We may therefore assume that, making every allowance, the plates coated with a gallon of emulsion may be dried by the use of less than a shilling's worth of calcium chloride.

The question was asked, at the meeting referred to, whether the calcium chloride ought to be placed on the floor or near the roof of the box or room. Theoretically it ought to be placed near the roof, as water vapour is lighter than air and tends to rise. Mr. Bedford, however, who has had practical experience of the matter, states that the drying goes on satisfactorily when the calcium chloride is spread on the floor of the box or room. W. K. Burton.

A NOVEL DRYING-BOX.

It was with much pleasure that I read Mr. W. K. Burton's communication in your last issue, entitled *Ventilation of Drying-Rooms and Cupboards.*

If you permit me I will describe another method of drying which I experimented with some months ago, and which I consider to be theoretically perfect. My experiments were made during the cold months, and ill health prevented my continuing them during the hot weather. I mention this as I think it likely that similarly-good results would not be obtained unless the temperature of the water were decreased by the use of ice. The arrangement is as follows:—



A B C D is the front view of a wooden box, and E is a door sliding in grooves. The bottom of the box is a thick sheet of tin. F is small

leaden gas piping fixed inside at the back of the box, the end G being connected with the cistern, whilst the other end, H, is connected with the waste pipe. I, zinc gutter to catch drippings from the pipe. This gutter has a narrow piece of tubing at its lower end, which goes through the bottom of the box, to permit the water to run out of the gutter into a basin (J) placed underneath it. K is a lamp to heat the air of the box.

The plates when thoroughly set are stacked in a V-shaped plate-rack, and placed in the box on two supports fixed at a little distance above the gutter. I have not shown these supports in the diagram, as I thought it would tend to confuse it. The door is then let down and the gas or lamp lighted for the purpose of heating the air in the box to 80° Fahr. The tap from the water supply is then turned on; the water passes into the box at G through the bent pipe, and out again at H. In its passage it cools the air in its neighbourhood, and causes the moisture in the heated air to deposit itself as dew upon the pipes, from whence it runs down in drops and falls into the gutter. The water runs out of the gutter into the basin, and by measuring the quantity which accumulates in it one is able to judge when the plates are dry.

The plates take about twelve hours to dry; but this, of course, depends upon the size of the box, the quantity of plates to be dried, the difference between the temperature of the water and of the heated air, and the rapidity with which the water passes through the pipes. As I said before, my experiments were cut short by ill health, and I had not an opportunity of seeing whether the box might not be advantageously heated to a higher temperature than 80° Fahr. to quicken the drying. The box should not be opened until the plates are quite dry, otherwise they show marks where the drying was checked.

I am informed that this system is patented in America, and probably in this country too, and is used for drying timber. If this be so I presume it could only be used by arrangement with the holder of the patent rights. The result of my rough experiment gave me the highest possible opinion of this method, one great advantage being that from the complete absence of movement in the air there is not any fear of dust injuring the films.

J. Dudley Radcliffe.

ON MEN AND THINGS.

Every now and then, on the occurrence of a fire in a photographic studio, we are told that it was caused by the concentration of the sun's rays by a photographic lens—an explanation which appears to me a somewhat apocryphal one. Attention was called in a leaderette recently to the greater danger to be feared from graphoscope lenses, and under favourable conditions I can quite believe in the possibility of the accidental ignition of easily inflammable articles by such means; but as regards photographic lenses of ordinary construction I am sceptical. I have on more than one occasion and under the most favourable of conditions wasted valuable time in endeavouring to light my pipe with a single achromatic landscape lens when other and more legitimate means were not immediately available.

* * *

Another matter in which I cannot help thinking that a great deal of misapprehension exists, or where the effect is frequently attributed to the wrong cause, is the alleged injury to the eyesight arising from the working of gelatine plates. Many operators imagine that the red light of the developing-room is directly injurious, either from its colour or from the strain it puts upon the eye; but I would cite, in disproof of this, the case of an operator in a large establishment with whom I was conversing a few weeks ago. His testimony is that, though for the past three years he has daily (Sundays, of course, excepted) spent from five to seven consecutive hours in the dark room, he has not experienced the slightest inconvenience. "One swallow does not make a summer," it may be said, and this solitary instance does not prove the safety of red light to the eyesight. It is not, however, a solitary instance, but the first that comes into my mind. A large dry plate manufacturer has informed me that his *employés*, male and female, who work all day long in a far feebler and, therefore, more trying light than is necessary in developing, are quite free from any sight-troubles.

* * *

These are cases where the exposure of the eyes to the red light is continuous. Possibly where the operator is compelled to change frequently from the dark room into daylight, and *vice versâ*, some injury may accrue from the strain put upon the eyes at each attempt to adapt themselves to the alteration of light. It would be an interesting question for discussion at some of the photographic meetings, and much benefit might be derived from a collation of the experiences of some of our practical men.

* * *

I was much interested in reading the description of Mr. Thomas Furnell's lens given a few weeks ago, which, if it answers the claims made on its behalf, will prove a valuable addition to our list of instruments. But it struck me, first of all, that very few amateurs—or professionals either—have the means, the appliances, or the ability to fit up such a lens, even when the operation consists merely in putting together certain lenses of given foci so as to produce a definite result. The construction of the instrument, therefore, devolves upon the practical optician, but even he would find himself in a difficulty; for, although Mr. Furnell is careful to give the exact radii of the curves he has found best, he says nothing whatever of the density or refractive indices of the glasses he employs. That the "practical optician" would arrange such matters satisfactorily for himself is true; but why, Mr. Furnell, go so minutely into details which are entirely valueless without other important information that is ignored?

* * *

The closing paragraph in Mr. J. H. Halvey's paper, read before the Glasgow Photographic Association, is rather ambiguous. Amongst other things he advises *not* to be done in photographing children, he says "never give it the penny you promised before sitting." Does this mean that your promise, made before sitting, is not to be kept? or that the promise is not to be fulfilled until the sitting is over?

* * *

The alum and hypo. joke has cropped up again—this time in France. At a recent meeting of the French Photographic Society M. Laferrounays communicated his method (which he describes as "the best") of preserving the hypo. bath so that it may be employed for any length of time. This consists in adding to it a certain quantity of alum and filtering. I should have thought that after all that has been written on the subject the farce of mixing alum and hypo. would have been perfectly exploded.

* * *

Perhaps, however, M. Laferrounays' intention has not been explicitly stated. A ray of light strikes me—possibly the mutual reaction which takes place between alum and hypo. is utilised in order to get rid of the silver salts introduced into the fixing bath. The addition of alum to a fixing bath that has been used causes the silver it contains to be precipitated in the form of sulphide, which may be filtered out. So far so good; but I expect the fixing bath could scarcely be "employed for any length of time," unless frequently strengthened with fresh hypo.—for which no allowance is made in M. Laferrounays' instructions; but, even then, what about the other products of the reaction—especially the sulphurous acid?

Argus.

(To be continued.)

NOTES ON PHOTOGRAPHY.

The City Guilds' examination having been held on Wednesday evening last, the object for which these *Notes* were written no longer exists, and I must say farewell to those students who have not also attended the lectures.

While wishing every one may be successful in gaining certificates, I sincerely hope that all, whether successful or not, will appreciate that the *best* prize they could and have won is the *knowledge* which the hope of a certificate or medal has induced them to obtain; and that having learnt *a little* they will not be satisfied until familiar with the whole theory and practice of their profession.

At the exhibition of work done by members of the Institute the following prizes have been awarded by the judges to the photographic department:—

Amateur Work: Misses E. and L. Hare.

Inventions: Messrs. J. S. Tully and W. M. Ayres.

General Exhibits: Messrs. St. George, Ernest Spencer, A. W. King, and A. W. Bowen.

The polytechnic class prizes have been awarded to the following gentlemen (in order of merit):—Messrs. J. J. Ayling, G. F. Davis, F. Velasco, and A. W. Bowen.

The names of successful students at the Guilds' examination will be posted up in the Hall, and, with the kind permission of the Editors, also published in this Journal.

In conclusion, and on behalf of many students, I sincerely thank the Editors and Publisher for the valuable space they have allowed our *Notes* to occupy.

E. H. Farmer.

FROM DEPTFORD TO WEST MOULSEY DIRECT;

BEING THE ACCOUNT OF AN AËRIAL TRIP IN THE BALLOON "SUNBEAM" ON WHIT TUESDAY LAST.

"I DON'T think I shall put in an appearance quite so early tomorrow," were almost my parting words to Mr. William Dale, on the evening of Whit Monday, after a glorious voyage and safe descent at Brentwood in Essex. Accordingly it was getting on for half-past five o'clock on the following afternoon when I entered the gates of Sayes Court Grounds, at Deptford, to find the above-mentioned gentleman busy over the inflation of the "Sunbeam"—a fine new balloon of elegant shape and made of very light material, each gore being no less than seventy feet in length.

The inflation having been completed at about 6.15 p.m., we took our places in the car—a commodious basket five feet long, three feet wide, and about three feet deep. "Try the balance," said Mr. Dale. "Does she lift? Yes; too light. In with another bag of ballast. How now? Still light. Here, empty out half that other bag and give me in the remainder. That's beautiful! Steady now. Let go!"

How I delight to hear these two last words! They tell of coming calm after the storm, and are no sooner uttered than a dozen strong hands are released from the car, and in a few moments we have the satisfaction of seeing the noisy crowd, which had been pressing around on all sides, gradually recede to a more respectful distance as the "Sunbeam" rises majestically into the air. The musical strains of "Up in a balloon, boys!" become more and more faint as we are borne aloft, and soon we are far above the bustle and clamour of the busy scene beneath, gratified to feel that neither letters nor telegrams, however urgent, can now disturb our meditations as from our high perch we gaze with enchantment upon the vast extent of landscape which presents itself to our view in all directions.

Some 1,500 feet below lies a marvellous network of railways, such as I have never witnessed on any previous occasion. One gets quite bewildered in the vain attempt to trace them; and the fact that each has its own particular mission to fulfil, and that the little moving objects which appear like caterpillars slowly threading their way hither and thither in various directions along their courses are in reality trains freighted with human lives as valuable as our own, is one difficult to realise. But our course lies upwards and onwards, and as we pass over Dulwich frequent consultations of the barometer reveal to us the fact that we are steadily balanced in space at an altitude of 2,100 feet—about the highest attained on this journey.

The "Sunbeam" is certainly behaving admirably—very differently to what she had done ten days previously when on her first voyage she carried us rapidly into the clouds, then through them into the sunshine above to a height of 7,450 feet, and having half suffocated us with gas, descended with a speed which necessitated our parting with all the ballast we had in the car in order to check her downward course. However, circumstances are different now, and here we are, a crew of four all told—Messrs. W. Jaggers and H. Burney (who are making their first ascent to the upper regions on this occasion), Mr. Dale, and myself—enjoying the scenery with comfort and ease from a more convenient elevation.

How beautifully the towers of the Crystal Palace stand out down there in the lovely blue haze which hangs over the landscape! But we cannot linger. Our course, as shown by the compass, is S.S.W., and we soon find ourselves over Wimbledon Common. Shortly afterwards the river Thames comes into sight, and after consulting the map and taking our bearings, I give my fellow-travellers to understand we are about to cross straight over Kingston, and, as we are going direct for Moulsey, we shall just nicely have a station to return from if we make that place our landing point. Mr. Dale agrees, and brings the balloon down to a lower altitude as we pass over Kingston. We continue sinking as we approach Hampton Court, the Maze of which appears as on a plan beneath our feet. Crowds of people line the streets in all directions, and accord us a hearty welcome as we glide slowly over their heads. But the balloon is falling too rapidly, and must be raised if we are to clear the town without mishap; so, while Mr. Dale stands by in readiness to open the valve as soon as the proper time for so doing shall arrive, at his request I take up a bag of sand and pour half the contents thereof over the side of the car upon the heads of whoever may happen to be beneath, little thinking as I do so that on calling in at a dairy for a draught of milk on returning through the town, I shall be accosted by the young woman in charge, with the remark—"I think you must be the gentleman who had the pleasure of dropping sand into my eye just now!"

Meanwhile Mr. Burney, who is watching the barometer, assures us that the balloon has taken an upward turn, and so we cease throwing out ballast, and having cleared the village, make preparations for the descent. "That will be our field," says Mr. Dale, pointing to a nice open space not far distant, as he tugs away at the valve-line. I bend over the side of the car watching for the rope which hangs beneath us to touch the ground, which is the signal for letting go the anchor. It is a question whether we shall be sufficiently low to catch the hedge we hope to do; but, seeing the rope just graze the top of it—"Over now; quick! you have it!" I cry.—"Just missed!"—the latter remark following the fall of the grapnel. But no matter; its pointed flukes soon take hold of the turf, and in a few moments more our journey is brought to a successful termination.

There is no lack of willing hands to render us the necessary assistance for emptying the balloon of its gas and packing it into the car we have lately quitted, and a short time afterwards the "Sunbeam," having been hoisted into a cart, is jogging along merrily to the Hampton Court station.

Judging from the amusing remarks which frequently reach the ears of an aëronaut as he descends to the ground, it would appear that a certain air of the mysterious attaches itself to his personage. "They be the ones!" "Wonder how they liked it!" "Guess they found it pretty cold up there!" "Heard him say we looked like emmets!" &c., are specimens of what he often hears, and the curiosity of the good people of Moulsey certainly proved no exception to the rule, though from the kindly reception accorded us, we all agreed when seated in the train on our way home, that if ever our flight lay across the same district again, we could wish for no better place at which to effect our descent.

CECIL V. SHADBOLT.

FOREIGN NOTES AND NEWS.

REPRODUCTIONS OF OBJECTS OF INTEREST IN THE IMPERIAL ROYAL AUSTRIAN MUSEUM OF ART AND INDUSTRY AT VIENNA.—PRINCE LICHTENSTEIN.—DR. LOHSE ON A SUGGESTION FOR A SIMPLE MECHANICAL PRINTING PLATE, AND ON THE KEEPING QUALITIES OF DRY PLATES.

THE directors of the Imperial Royal Austrian Museum of Art and Industry at Vienna have commissioned Herr Angerer to publish, by *some* photomechanical process, reproductions of original drawings and representations of art and industrial objects of interest which are to be found in its rich collections, both amongst those on permanent and those only on temporary exhibition. The first part of this valuable work has now been published.

Prince Lichtenstein is diligently occupied at present with anthropological studies. He is taking the portraits of typical individuals of the European and Asiatic races, and is about to enlarge his studies of heads to life-size by means of a large euryscope.

Amongst a number of miscellaneous notes Dr. O. Lohse writes as follows to the *Wochenblatt*:—"The hardening action of bichromate of potassium may be used to produce a very durable sort of writing. This is a well-known fact, but it seems to me that it has hardly been sufficiently utilised. If indian-ink be rubbed down in a solution of bichromate of potassium, and then be used for drawing or writing by daylight upon sized paper, the sheet of paper may be placed for hours in boiling water without the writing being in the least affected. Some experiments which I made in this direction a long time ago led me to think that it might be possible to produce easily by this process a sort of printing plate. Suppose, for example, that one were to draw with bichromated indian-ink upon a thin sheet of gelatine, and, having affixed the reversed drawing to a glass plate, remove the undrawn or unwritten part of the gelatine with warm water, one would obtain a relief which could be rolled with colour or printing ink." Dr. Lohse has, however, not yet found time to try whether his idea is really workable.

With regard to the keeping qualities of gelatine plates: the same gentleman writes that he has several batches of commercial gelatine plates lying by him at present which were bought in November, 1879. Of these one set procured from an English firm remains unchanged, while, when he has occasion to develope plates taken from the other sets, all stored in the same way in a perfectly-dry place, he finds that they grow black at the edges. His inference is that the way in which the plates are prepared exercises a paramount influence upon their keeping qualities.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 5	Sheffield	Freemasons' Hall, Surrey-street.
,, 5	Halifax	*Courier* Office, Regent-street.
,, 6	Benevolent	181, Aldersgate-street.
,, 6	Edinburgh	Hall, 5, St. Andrew-square.
,, 6	North Staffordshire	Town Hall, Hanley.
,, 7	London and Provincial	Masons' Hall, Basinghall-street.
,, 7	South London	Society of Arts, John-st., Adelphi.
,, 7	Bolton	The Baths.
,, 7	Leeds	Mechanics' Institute.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 24th instant, the chair was occupied by Mr. A. Haddon.

The CHAIRMAN said that he had a batch of plates which, developed in the ordinary manner, gave green fog. By adopting the plan recently revived, of using no restraining bromide in the developer and but very little ammonia, the green fog was avoided.

Mr. A. J. Brown said that green fog came on towards the latter part of the development, and the use of bromide, by necessitating a longer stay in the developing solution, was favourable to its production. If a plate were taken out of the developer early and fixed it would always be found free from green fog.

The Chairman inquired whether anyone had succeeded in getting entirely rid of the yellow colour which permeated the entire film when soda was used to develope with instead of ammonia. Acid, alum, or chrome alum removed the stain temporarily; but when this was thoroughly washed out and the neutral condition of the film restored the yellow colour returned.

Mr. J. B. B. Wellington showed some photographs of animals grazing, and other instantaneous subjects, taken with a spring shutter.

Mr. A. Collier exhibited an instantaneous shutter working by means of a revolving plate, a segment of which had been cut away to give the exposure.

Mr Harrison said that the principle of opening on one side and closing from the other was the right one, and that, except for shutters working between the lenses, it was wrong to have the shutter opening and closing in the centre, as by this means the concentration of the light upon the middle of the picture, naturally too great, was still more exaggerated.

The question of the competition in gelatine plates (the discussion on which had been adjourned from the previous week) was then considered, and the following regulations were separately discussed and decided upon:—That the competition shall be for speed and quality in gelatine emulsion plates, and shall be open to all. Each competitor is to supply six plates of his own manufacture, of the size $6\frac{1}{2} \times 4\frac{1}{4}$. Every plate is to be marked with the competitor's private mark, and enclosed in an envelope bearing the same mark so legibly inscribed as to be readily visible in the dark room. The plates are to be delivered to the Curator, accompanied by an additional envelope bearing the same private mark and containing the competitor's name and address, together with a statement of the general principle—such as boiling, use of ammonia, or precipitation—upon which the emulsion has been made. Formulæ may be given or not, at the competitor's option. The Curator shall retain one plate of each make, and shall deliver the remaining five to a member of the Association to be chosen for the purpose of exposure. Each plate is to be exposed in four divisions, the exposures to be in the ratio of one, two, four, and eight. One plate of each make so exposed shall be developed by the member making the exposure, one of each by the Curator, and the remaining three shall be returned to the competitor to be developed by himself. The plates developed by the member exposing and by the Curator shall be delivered, together with those developed by the competitor and any prints therefrom—which prints must be made from the plates direct without any touching upon or marking of the negative—to three judges who shall be appointed at a future meeting. The envelope marked with the private mark corresponding with that upon the plate considered to excel the others shall be given to the Chairman of the meeting, who shall read out the name of the successful competitor. The other envelopes containing names shall be destroyed by the Curator. The private mark to be used shall consist of four Roman letters not in alphabetical sequence, direct or inverted, and not forming any word.

Mr. Harrison showed a dark slide, made some years since, for giving four consecutive exposures upon a quarter plate. The slide itself was kept in contact with the back plate of the camera by a spring, and this plate had stops placed upon it in such positions that moving the slide as far as possible towards each corner brought the four parts of the plate into proper register with the opening for exposure.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 4th May, when the chair was occupied by the President, Professor H. W. Vogel, who commenced the business of the evening by reading certain specifications of patents and other intimations. He then laid on the table the illustrated catalogue of the newly-opened art exhibition at Berlin.

Herr Anschütz sent a number of instantaneous photographs of horses—some originals and some enlargements.

Herr Moll forwarded a new description of dropping-bottle.

A provincial member complained that when using Henderson's cold emulsion he had frequently to contend with a number of small transparent spots, regarding which he begged advice.

The Chairman remarked that he had several times experimented with this emulsion, and in order to save alcohol he had formed the emulsion into nodules and washed it in the usual manner, after the example of M. Audra. The emulsion worked excellently, but it was none of the most sensitive. The needle-pricklike spots in question he ascribed to dirty washing water, but he himself had never met with them.

Herren Reichard and Kuntze remarked that similar pinholes were frequently to be met with in many commercial emulsion plates. They took the opportunity of pointing out that flaws in the films of commercial plates were frequently occasioned by faulty packing, and it was recommended that the emulsion should be poured upon the hollow side of the plates, so that the films need not come into contact when packed.

Herr Haberlandt showed a washing apparatus for gelatine plates, which consisted of a zinc box in which zinc grooves are placed. These grooves are movable, and can be placed so as to hold different sizes of plates. The water flows in at the top and out below.

The Chairman thought that the salts contained in the gelatine were less easily removed than was generally supposed. He had experimentally coloured a gelatine plate with iodine and washed it under a tap to see how long it would take for the yellow colour to disappear, and it required four hours. He was convinced that an equally-long washing was required in order to absolutely remove the soda.

Herr Haberlandt was accustomed to wash his gelatine plates three-quarters of an hour. From the circumstance that they showed no flaws when intensified with mercury he concluded that they no longer contained soda.

Herr Roloff agreed with the former speaker. He had once experimentally washed one half of a plate well and the other half imperfectly, and then intensified it, when the imperfectly-washed half turned yellow. Latterly he had been in the habit, in order to render the soda harmless, of placing the plates, after they were fixed and rinsed, in a very dilute solution of *eau de javelle*, and then of washing them as usual. He had not yet remarked any harm to ensue by the use of *eau de javelle*.

The Chairman did not consider the circumstance that no flaws showed immediately upon intensification as a sufficient proof that the plates had been washed enough, as the flaws might appear all the same after the lapse of some time. He considered the iodine test for perfect washing more reliable:—Let some of the water with which the plate is being washed drop off into a little iodine water; if the latter be deprived of colour there is still soda present, and the more soda the greater the discolouration. The iodine water may consist of—iodine 1 part, iodide of potassium 5 parts, water 1000 parts. The mercury intensifier is always somewhat ticklish to deal with, as plates intensified with it, even when well washed, become darker afterwards. He had lately been experimenting with a non-mercuric intensifier. The fixed and washed plate was laid in iodine water (iodine 1 part, iodide of potassium 5 parts, water 50 parts), by which the silver is converted into iodide of silver. It is then washed superficially, after which the plate may be variously treated. Thus, the iodide of silver may be converted into sulphide of silver by laying the plate in a solution of ammonia sulphide. It then assumes a great intensity and a brown colour, as when intensifying with uranium. This intensification has the drawback of giving off a strong smell of sulphuretted hydrogen, which would likely be harmful to the silver pictures. Besides, the degree of intensification is too little under control. Another way is to coat the iodised and washed plate with the ordinary silver intensifier, expose to daylight for a moment, and then intensify like an ordinary collodion plate. The avoidance of faults is, however, not easy by this method. An iodine solution also offers an interesting aid to weakening a too-powerful plate by treating it with hyposulphite of soda after it has been washed and iodised, so that the iodide of silver formed is dissolved again. For this purpose the iodine water consists of iodine 1 part, iodide of potassium 10 parts, and water 500 parts. In this way individual parts of a plate may be weakened by coating the parts in question with the iodine water by means of a sable pencil, and then laying the plate in the hypo.

Herr Kuntze remarked that he preferred to use Dr. Eder's intensifier, particularly for under-exposed plates, as by that means he got beautiful details, but he had to admit that plates so treated were not very permanent.

Herr O. Lindner thought it was important, whenever possible, to develope plates so that they should neither need to be intensified nor weakened.

Herr Reichard considered that very difficult, as the behaviour of plates in the fixing soda was not always the same, and some went back more than others; yet he generally managed so that he had almost never to intensify but often to weaken, which he generally did by Herren Prümm and Becker's method. This method he considered particularly applicable to reducing over-exposed plates, but hardly to be recommended for under-exposed ones, as the already defective details of the shadows were apt to become lost altogether. He considered a good reducing medium quite as important as a good intensifier, and begged the Chairman to make further experiments in that direction.

Herr Schaarwächter remarked that *under-exposed* plates went back most in the fixing bath. In order to reduce gelatine negatives he laid them in a mixture of one part of *old* ferrous oxalate developer with one part of a freshly-prepared 1:10 or 12 solution of fixing soda. This method gave him better results than that adopted by Herr Reichard.

Herr Lindner described Herr Lohse's method of thinning gelatine negatives with bichromate of potassium:—The plate is dipped in the solution and placed for a short time with its back to the light, and then washed until the yellow colour disappears, which takes several hours. By this treatment the film is rendered so firm that it can be dried, without injury, pretty hot over a flame.

Herr Fähling said he had seen the cherry-coloured fabric shown at a recent meeting used for a dark-room window, where it answered admirably.

Herr Lindner recommended the so-called "negro pencils" for retouching where powerful work was required.

The meeting was shortly afterwards adjourned.

Correspondence.

RESTRAINERS.

To the Editors.

Gentlemen,—There is an error in your report of the late technical meeting of the Photographic Society of Great Britain, which perhaps you will allow me to correct.

In relation to the hypothesis which was mooted that the restraining action of bromide of ammonium and of bromide of potassium respectively might be ultimately connected with their combining equivalents, or, as I took it, to the amount of bromine present in equal weights of each, I remarked that it need not be assumed that this restraining action depends upon the bromine present in these salts, seeing that so many salts which we have every reason to believe chemically

neutral or inactive act as powerful restrainers—as citrates, sulphites, nitrates, &c.

I did not consider that the "alkaline element" might *per se* be the restrainer, but that the salt, *taken as a whole*, might exercise restraining action, but not by virtue of its bromine. It is evident that in your recent impression "bromide" is a misprint, and your reporter doubtless intended *bromine.*

Apropos of the subject: it seems very evident to me that a free halogen, such as "iodine," is *not* "the thing" as a restrainer; indeed it would appear that it is best to use a substance incapable of destroying the invisible image. Of these substances there are, doubtless, many; and it would be a simple matter to press them into use to the entire exclusion of haloid salts.—I am, yours, &c.,

Southampton-row, Holborn, W.C., HERBERT B. BERKELEY.
May 26, 1883.

COLLODIO-BROMIDE EMULSION.

To the EDITORS.

GENTLEMEN,—It is to be hoped that your article on *Collodio-Bromide Emulsion*, in last week's issue, will be the means of directing the attention of experimenters to this valuable process. I quite endorse your remarks that the experience gained in developing manipulations during the last four years will be of material assistance, and I would add that not a little will also have been gained in another important direction, viz., the precaution necessary to guard against the actinic rays during development. The exceedingly sensitive plates manufactured by Colonel Wortley suffered terribly from this want of precaution at the hands of many operators, resulting, as usual, in the plates being blamed instead of the cause.

That surprisingly good results can be obtained from collodio-bromide, and with much shorter exposures than are generally thought possible, I can testify, though I cannot yet go quite so far as to recommend it for studio work. It is only fair to add that I have tried collodio-bromide simply, and not in conjunction with gelatine, as recommended by Mr. E. Banks.

There is a use for collodio-bromide emulsion which I am surprised has not been put more into practice by professional photographers, namely, for rapid printing. The ease, simplicity, and rapidity by which proofs can be struck off, developed, toned, and fixed should, in numerous instances, be most valuable to photographers, especially during the gloomy winter weather which prevails in towns, and the advantage of superior tones must certainly recommend it over gelatino-bromide.

Permit me to supplement your caution respecting the use of a suitable pyroxyline, as to the storage or keeping of this article, especially as some operators may probably have a small supply which they have had by them for a considerable time, and the use of which might, possibly, lead to disappointing results. Pyroxyline—particularly high-temperature pyroxyline—should not be kept closely packed in jars or bottles, as is very frequently done, as it is liable to undergo decomposition.—I am, yours, &c., J. B. PAYNE.

Newcastle-on-Tyne, May 28, 1883.

IRONING SILVER PRINTS.

To the EDITORS.

GENTLEMEN,—In a recent article on the above subject the experience of correspondents was requested, I write, therefore, to say that it has been my practice for many years to iron my prints—originally with the intention of making them flat and smooth. Finding, however, that the iron when above a certain temperature had the effect of modifying the tone, I sometimes avail myself of its use for this purpose also. Strange to say, my experience in this respect is diametrically opposed to your own. I apply it to prints that are already too black from over-toning, when the coldness is changed to a warmer tint. With every sample of paper operated upon I have found this the invariable rule.

In reference to the question—"Does ironing contribute to the permanence of prints?"—I have no very conclusive evidence to offer, though my impressions favour the affirmative. It is, at anyrate, a good test for imperfect elimination of hypo.; for, if insufficiently washed, an unmistakable odour of sulphur is brought out by the heat.

May not the injurious sulphur be thus extracted in a gaseous state? It would be worth while, perhaps, to make a comparative series of experiments, which, however, would require the test of time before drawing from them any definite conclusions.—I am, yours, &c.,

Cheltenham, May 26, 1883. G. S. PENNY.

DECOMPOSED GELATINE.

To the EDITORS.

GENTLEMEN,—The interesting observation of Dr. J. Nicol seems somewhat to confirm the value of a suggestion I ventured to make in your issue of the 16th February.

In view of what Dr. Nicol has remarked it will, I think, be desirable to experiment with solutions of superheated gelatine on new and unboiled emulsion. The superheating of the plain gelatine solution is best done in sealed tubes heated in an air bath to about 108° C. A tube of three-quarters of an inch diameter can be used with safety. Combustion tube is suitable.—I am, yours, &c.,

Manchester Laboratory, 18, *Exchange-street,* PHILIP HOLLAND.
May 25, 1883.

ASTRONOMICAL PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—A second perusal of what I said in Part II., as to the possibility of using an eyepiece, will show Mr. Allsup that I referred to the moon; the entire paragraph refers to the moon. That I had not overlooked the matter will be seen in Part III., where I refer to the value of enlarged images when photographing the *sun*, and it was to photograph an eclipse of the sun that Mr. Allsup used an eyepiece. Instead of an image 1⅝ inch diameter Mr. Allsup could have made his picture of any size to which he could adapt the necessary apparatus.—I am, yours, &c., A. BROTHERS.

Manchester, May 26, 1883.

To the EDITORS.

GENTLEMEN,—My apologies are due to Mr. Brothers for my too hasty perusal of his article of the 11th instant. On reading his subsequent paper I at once perceived that I should have read his remarks as applying to lunar photography only.—I am, yours, &c.,

Old Charlton, May 28, 1883. W. J. ALLSUP.

GROUPS OUT OF DOORS.

To the EDITORS.

GENTLEMEN,—In reference to the instructions for taking photographs of groups, given in last week's *Portraiture for Amateurs*, I would suggest the following easy plan for arranging the group, so as to get good definition of all the figures:—

The field in which objects are in exact focus appears to be that of the inside of a sphere whose radius is equal to the distance of the objects from the optical centre of the lens. Therefore, place a chair at a convenient distance—say eight to twelve paces—in front of the camera, and in the seat put a child's chair or other suitable article over which a newspaper can be thrown, so that the title of it *(upside down)* will occupy about the position of the face of a person sitting in the chair. This should then be focussed until the title, date, and other large type can be read on the focussing-screen by means of a magnifier. Then get some one to hold a piece of string close under the lens, and taking the other end in your hand you can exactly arrange your sitters in a semicircle so that they shall all be equidistant from the lens.

This plan of focussing a newspaper I have found to effect a great saving of the sitters' patience.—I am, yours, &c., J. DOWNES.

1, *Brunswick Villas, Tooting, May* 28, 1883.

DECOMPOSED GELATINE IN EMULSIONS.

To the EDITORS.

GENTLEMEN,—In the last number of your valuable Journal, in the article on *Decomposed Gelatine*, the able author states that decomposed gelatine in an emulsion increases the sensitiveness of the plates.

Permit me to say that the fact is well known on the continent during the last three years, it having first been published in the *Photographisches Archiv* (1880, page 56) by Dr. O. Lohse, of Potsdam. In his opinion partial decomposition, or, perhaps, the *ammonium*, effects a great increase of porosity of the gelatine, whereby a rapid film may be obtained.—I am, yours, &c., GERMANICUS.

Dusseldorf, May 26, 1883.

PLATINOTYPE PRINTING AND THE POSTAL PHOTOGRAPHIC SOCIETY.

To the EDITORS.

GENTLEMEN,—Some misapprehension seems to have been caused by the wording of the report of the committee meeting of this Society, as sent to you and published last week, in reference to platinotype printing.

There is no disposition on the part of this Society to put those printing in platinotype at any disadvantage; but in this particular instance the member who offered the prize for "a portrait of a member taken by himself" made it a condition that it was to be printed in some other way, and the committee did not think that on this ground so generous an offer should be refused. As a matter of fact many members print in platinotype, while others use carbon and silver.—I am, yours, &c.,

May 29, 1883. H. H. CUNNINGHAM, *Hon. Sec.*

EXCHANGE COLUMN.

I will exchange Lancaster's wide-angle lens, quarter-plate, quite new, pocket telescope, and changing-box, for a half-plate bellows-body camera, or offers.—Address, A. CHAMBERS, Gordon-road, West-hill, Hastings.

Wanted, in exchange for Dallmeyer's *carte* lens, a good cabinet or whole-plate lens. Send specimen print and address.—Address, PHOTOGRAPHIC COMPANY, 26, Congreve-street, Birmingham.

Wanted, in exchange for a double case hunting cylinder watch, capped and jewelled, a half-plate bellows-body camera, must be in perfect order for dry-plate work.—Address, W. F. WEARE, 21, High-street, Wincanton.

I will exchange four well-made troughs, by Jarman, for batteries—each has twelve divisions quart size, lined inside with paraffine, and glass—for anything useful in photography.—Address, C. AYLING, 61, Toronto-terrace, Brighton, Sussex.

I have a good 5 × 4 single view lens, also a mahogany bellows-body camera, folding tailboard, swing-back, rising front, for plates up to seven and a-half inches either way; what offers in exchange? Wanted, posing-chair and accessories.—Address, H. J. C., 2, York-street, Covent-garden.

I will exchange any of the following or the lot:—Four valve euphonium, baritone horn, flugel horn, field bugle with chromatic attachment, for anything useful in photography, or magic lantern slides. Particulars on application.—Address, LUKE J. HEALY, chemist, Drogheda, Ireland.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Henry Cooper, 17, The Drapery, Northampton.—*Two Photographs of the Rev. R. B. Hull.*

Thomas Bourke, 17, King-street, Perth.—*Photograph of the Right Rev. George Rigg, Bishop of Dunkeld.*

James Downey, 17 and 19, Elden-street, South Shields.—*Photograph of Roman Stone, known as the "Regina Monument."*

Q. B.—Yes; the No. 2 lens will do quite well.

CONSTANT READER (Attleborough).—Messrs. Hunter and Sands are the makers.

BANGOR inquires after a work on frame-making. Can any of our readers assist him?

NEW SUBSCRIBER.—You will find two articles on the subject in our ALMANAC for the current year.

H. DEVON.—A lens of the quick-acting portrait form, known as "baby lenses," and have a ratio of about $\frac{f}{3}$.

W. BASSANO.—Your letter to hand as we go to press. The negatives have not yet arrived, so we must postpone reply..

A. S. WILLIAMS.—Very good, indeed. It is a charming little picture. Your query is answered in our article on *Portraiture for Amateurs* this week.

Two "CONSTANT READERS" and some other correspondents have not conformed to our rule by sending their names and addresses; hence their communications remain unanswered.

A. CORNWELL.—As the plates frill so badly in the fixing-bath, immerse them in a solution of alum as soon as they are developed and rinsed. This will, doubtless, get you out of your difficulty.

C. J. W. TRUSCOTT.—You will, doubtless, be able to procure the material at any india-rubber warehouse. You can patent your invention, if it be original. Registration will be no protection whatever.

BELL.—We have no means of knowing if the "club system" has yet been introduced into the town named. There are few towns in the United Kingdom where it has not found a place in some form or other.

A. OLGIVIE.—A decided case of red fog. Try the use of less ammonia in the developer. If you employ the ferrous oxalate developer, we have little doubt you will be able to use up your stock of plates with satisfactory results.

SALOP.—With a lens of the "rapid" type you ought to experience no difficulty in obtaining good negatives of well-lighted subjects with a drop shutter if you employ fairly-sensitive plates. The examples enclosed are clearly much under-exposed.

S. S. W.—You must not believe all you read in the daily papers with regard to photography—they are often hoaxed. They are continually reporting that someone has just discovered the means of producing photographs in natural colours.

F. R. S.—If you read the article again you will find that we did not say that *all* lenses of the single form would give good definition with an aperture of $\frac{f}{12}$, but that many will give fair pictorial definition with such an opening. Much, of course, must depend upon the quality of the instrument.

R. STEPHENSON.—Seeing that you cannot get the picture you require with lens No. 1 and that you can with No. 4, why not use it? Theoretically, the lines at the margin of the picture will not be perfectly straight, but unless they come near the extreme edge of the plate the error will scarcely be noticeable.

INVENTOR.—Many patents have at different times been taken out for that plan of colouring photographs. There is no novelty in rendering the picture transparent and then colouring it from the back. If you patent your plan the patent will not be worth a shilling. You may possibly register the name under the Trades' Mark Act.

A. G. BROPHY (Varna, Bulgaria).—1. A weak developer will give a stronger image than an energetic one, all things being equal.—2. We have never tried the lens mentioned.—3. It is generally understood that the iron solution is added to oxalate solution, and not the oxalate to the iron—the solution to be stirred while the addition is being made.

"BOGUS."—Notwithstanding what you say to the contrary, we have very little doubt that the firm mentioned by you *do* make all the portraits they publish copyright before they issue them. If you pirate them you may depend upon it they will take proceedings against you for recovery of the penalties you incur for the infringement of their copyright.

INQUIRER.—Eosine may be procured from most operative chemists. Messrs. Hopkin and Williams, Cross-street, Hatton Garden, we know supply it.

SIDNEY B.—That form of lens has a very round field; hence it cannot be worked with a large aperture unless on a very small plate. To make it cover the size you require with good definition at the corners the stop employed must be very small. However, for many purposes you will find it a very useful instrument, though not so good as some of the more modern forms.

C. W. W.—As you do not give the radii of the curves, or even the form of the lens, we cannot state the exact position for the stop. If, however, it be a meniscus, somewhere near three inches in front of the concave side will be about the proper position. This will be some little guide to you, but the exact position you will have to determine by experiment. The stop must be very small with the lens you propose to employ.

☞ Among the other articles in type which we have been compelled to hold over till next week are—*Photography for Beginners, Chaps. V. and VI.; Where to Go with the Camera;* and *Transatlantic Jottings.*

STEINHEIL'S LENSES.—Messrs. Negretti and Zambra have been appointed sole agents in this country for the well-known lenses of Steinheil and Sohn, of Munich.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday next, the 6th inst., the subject for discussion will be—*On Outdoor Portraiture.*

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The next meeting will be held at the House of the Society of Arts, on Thursday next, the 7th inst., at eight o'clock. The following, from the question box (postponed from last meeting), will be discussed:—"When large pictures are required, is it better to take them direct, or to take small negatives and enlarge them?" Mr. E. W. Foxlee, Mr. G. Smith, Mr. W. Brooks, and several other gentlemen, have promised to take part in the discussion.

AËROSTATION.—In another column we publish an interesting account of Mr. Cecil V. Shadbolt's latest balloon trip undertaken with the object of securing photographs, though on account of the unfavourable weather it proved a blank day. In a private letter Mr. Shadbolt informs us he has made already three ascents this month, which, though unsuccessful so far as photography is concerned, he intends following up by many more during the season. We have little doubt as to his ultimate success, and hope that his pluck and perseverance will be amply rewarded.

INTERNATIONAL PHOTOGRAPHIC EXHIBITION, BRUSSELS.—We beg again to remind our readers of this forthcoming exhibition, to be held under the auspices of the Association Belge de Photographie, commencing on the 15th August next, and remaining open till the 1st October. Although the date for intending exhibitors giving notice as to their intention to exhibit was announced as the 1st June, when also the amount of space required was to be stated, we believe the exhibition authorities will afford some latitude in the case of foreign exhibitors and grant a slight extension of time. It is, however, imperative that such notice should be immediately forwarded to Mons. A. Geruzet, Secretary, Rue de l'Ecuyer, 27 bis, Brussels. The exhibition promises to be most successful in all respects.

OBITUARY.—A well-known face and figure have disappeared from scientific and photographic circles in London. Mr. T. J. Pearsall, one of the most regular attendants, not only at the meetings of the various photographic societies, but also of most of the regular scientific bodies, and an occasional contributor to our columns, has just died at the age of 79, after a few weeks' illness. The deceased gentleman was a chemist by profession, and was for some years laboratory assistant to the late Professor Faraday. He subsequently filled the post of chemist in one of the largest Bristol sugar-houses, and, later still, acted as secretary and manager for an important literary institute—one of the earliest of its kind in Yorkshire. During the past few years he had lived upon a small annuity purchased from the proceeds of a subscription raised on his behalf under the auspices of the Society of Arts, and to the success of which the personal efforts of the late Mr. P. Le Neve Foster greatly contributed. In spite of his advanced age Mr. Pearsall was remarkably active in his habits, and rarely missed a scientific meeting of any importance or a photographic gathering of any description, even to the Saturday afternoon outdoor meetings. He had acted as librarian to the Photographic Club since its commencement, and it was his absence from two or three successive meetings of the Club that first attracted attention to his illness. The funeral took place on Wednesday last. His voice and face will be greatly missed at the meetings of the Photographic Society of Great Britain and the South London Photographic Society, while the Club will experience some difficulty in finding a successor possessing his energy and willing to devote an equal amount of attention to the duties of librarian.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1205. Vol. XXX.—JUNE 8, 1883.

AUGMENTING THE SENSITIVENESS OF COLLODION EMULSION.

In our last number Mr. William Brooks, and this week Mr. W. T. Wilkinson, have addressed themselves to the subject of increasing the rapidity of collodio-bromide emulsions, each, however, adopting a distinct line on which to travel in search of the desired object. Without supposing that either or both of the suggestions of these gentlemen will accomplish to the fullest extent what is required, we have little doubt about their steps being in the right direction; but, at the same time, we feel sure that a much more thorough alteration in the system hitherto in vogue will have to be made before dry collodion plates can hope to rival gelatine in rapidity combined with quality.

We have frequently expressed the opinion that the superior sensitiveness of gelatino-bromide over collodio-bromide depends more upon the physical characters of the respective media than upon any chemical combinations of an organic nature that may occur between either of them and the silver salt. Were the matter of sensitiveness dependent solely upon the formation of an organic compound of silver, then nothing would be easier than to adopt the suggestion of Mr. Wilkinson—which, by the way, is far from being new—and form the silver bromide in the presence of gelatine or other highly-organic substance, and afterwards emulsify it with collodion. In the case of washed emulsion this method would have the additional advantage of economy, inasmuch as the first quantity of solvents which are usually wasted would be replaced by a small quantity of gelatine and some water.

But, alas! for human aspirations! Repeated trials upon almost the identical lines laid down by Mr. Wilkinson have proved that the vehicle in which the sensitive salt is ultimately suspended has a very important effect in modifying the sensitiveness of the resulting films, and that quite independently of the manner in which the bromide is formed. Thus, a quantity of silver bromide, precipitated by Captain Abney's plan published just four years ago, was, after washing, divided into two portions, one of which was emulsified in gelatine, the other, after washing with alcohol, in collodion. This experiment was performed before the introduction of the standard sensitometer, so that no precise indication can be given of the difference in sensitiveness; but it is not too much to say, from exposures in the camera and by contact printing under a negative, that the difference was *at least* twenty to one in favour of the gelatine emulsion, while as regards quality the collodion emulsion was simply useless.

We might have rejected this result as entirely untrustworthy had it been a single first experiment—not, perhaps, too carefully carried out; but, as a matter of fact, it only corroborated in many points numerous previous trials of various precipitation methods, with the sole difference that it showed with remarkable clearness that sensitiveness does not necessarily follow the formation of the silver bromide in the presence of gelatine or any other organic substance.

We have only to look at the matter from another point of view to see the reasonableness of this latter assumption. If, as Mr. Wilkinson supposes, the organic nature of gelatine causes the sensitiveness of silver bromide to be greater when formed in its presence than when formed in contact with collodion, the difference can only arise from the formation of an organic gelatino-silver compound. What, then, is to prevent our increasing the sensitiveness of our gelatine emulsions in a similar manner by increasing the proportion of silver nitrate employed, and so augmenting the quantity of organic compound, instead of, as we now do, taking every precaution to prevent the silver acting upon the gelatine? Again: though the value of the organic silver compound in collodion emulsion has long been recognised, its virtues have usually been supposed to lie in its power of giving density, and not rapidity of working.

On the whole, therefore, we are forced to believe that, however promising Mr. Wilkinson's single experiment may have been, a very great deal remains to be done before the process he sketches can take rank as a practical one; but, as we have said, it is, at least, one step in a right direction. If we can by precipitation from a separate medium, or by any mode of preparation which will at once facilitate the removal of the by-products from the silver bromide and avoid the waste of costly solvents, we have removed one of the objections against collodion emulsion—its supposed expense. But this, we imagine, will leave us no better off—if even we are as favourably placed—in the matter of securing greater sensitiveness. We have still to master the difficulty which causes the same bromide of silver to be twenty times slower emulsified in collodion than it is when emulsified in gelatine. The method of "cooking" the bromide in the modern fashion, in the presence of gelatine previous to its transference to the collodion, will prove a great simplification of the process of attaining sensitiveness, besides greatly curtailing an operation which formerly occupied days to accomplish; but, that having been said, we fear the presently apparent advantages of Mr. Wilkinson's process have been exhausted.

Mr. Brooks's suggestion of the employment of ferrous oxalate development is more practical. One drawback of collodion is the difficulty of using a powerful *alkaline* developer, on account of its injurious action on the developed image. Ferrous oxalate supplies the power without the danger, and so we come one step nearer utilising our plates to the best advantage.

PORTRAITURE FOR AMATEURS.

In our last article we gave some hints on the selection of the most suitable situations from those available for posing our groups when portraits, as likenesses, are the chief consideration. We shall now give a few more on the same topic, and then make some suggestions which may be of assistance when taking pictures where portraits, as such, are of secondary importance.

A rustic or garden seat when placed before a background of shrubs or trees is a very ready means of obtaining successful grouping. In this case the centre figures may be posed sitting while those at the side are standing, which will bring them a little more forward, so as to suit the curvature of the field of the lens. Grottoes and ferneries, as a rule, form very artistic backgrounds for groups. A rustic arbour, also, looks very effective in a photograph, and is a desirable acquisition for our present purpose, if one be available. In arranging a group with this as an accessory or background, the same precautions with regard to posing the figures—so that the faces are all equally illumined—must be observed as in the case of a porch or verandah, explained last week. When the arbour is not

covered with foliage, or only slightly so, the figures may advantageously be posed within, the centre ones being seated at the back; in this case it will be seen that the conditions required by the lens, in order that it may be satisfactorily worked with a large aperture, are to a great exent fulfilled. When the figures are arranged within the arbour care must be observed that no shadows of the lattice work are allowed to fall upon any of the sitters' faces, or the result will, of course, be unsatisfactory from a portrait point of view.

An artistic and, at the same time, very natural picture, in the case of a rustic arbour or alcove where the foliage surrounding it is not too dense, may frequently be obtained by posing the sitters at a tea table. The white cloth on the table will then act admirably as a reflector to diffuse and reflect the light upwards on the faces, and thereby materially soften the shadows. In this case the negative should be fully exposed and by no means over-developed, otherwise the table-cloth will come out too dense and print so white as to overpower the other portions of the picture.

A seat placed beneath a tree will serve admirably for posing a group of a few figures only, and some charming effects of lighting may in this manner be obtained with a little judgment. But a large number of persons are rarely successfully dealt with under the circumstances except by very skilful hands, unless the tree be a very large one, owing to the difficulty of obtaining even illumination over the whole. When the size of the tree will permit of even illumination over a fairly-large area the group may well be arranged at a tea table. A large cedar or cypress tree may often be advantageously utilised for grouping under and obtaining strong effects of light and shade, by reason of the density of the foliage; but in this case considerable difficulty may be experienced in getting even illumination over more than two or three figures. The nearer the sitters are posed to the trunk of the tree, as a rule, the stronger will be the shadows, and the more they are placed in the open the more general will be the lighting. If the branches of the tree spread over a large area the density of the foliage will frequently enable the space beneath to be utilised as a studio for single figures. We remember some few years back seeing some capital portrait studies that were produced under the shadow of the spreading branches of a large cypress tree.

A rope fixed as a swing to a stout branch of a tree makes a very capital accessory about which to arrange a group of figures, particularly if there happen to be a good background for the picture. In this case the figures seated in the swing should always have one foot on the ground, in order to steady themselves, otherwise it will be next to impossible for them to remain absolutely still, owing to the elasticity of the branch to which the rope is attached. A swing or, as it is now generally termed, a "trapeze" is, just at the present time, a very fashionable accessory in the studio, and the number of pictures of celebrities in the shop windows in which it is included will enable the amateur to arrive at a conclusion as to how one might be made available by himself in his pictures. There are few gardens nowadays, where there are children, in which there is not a swing of some form or other, and this can usually be utilised as an accessory by the amateur portraitist.

In the foregoing hints we have assumed that portraits are the chief desideratum in the picture, and have therefore treated the subject accordingly; but there are instances where the pictorial character of the photograph is of greater importance than the actual likeness of the persons included therein. In advising on the choice of situation for working, we mentioned that direct sunlight should be avoided when satisfactory likenesses were imperative. Very charming pictures, in which are groups of figures, may be obtained in full sunshine; but then any attempt at actual portraiture had better be avoided, and the attention chiefly directed to pictorial effects alone, for it is rarely that any person can assume and retain a natural expression with the sun shining directly upon the face. Although this part of the question scarcely comes within the scope of the present series of articles, we shall nevertheless give a few hints on the subject.

Excellent sunlit pictures are to be obtained by arranging the figures with any of the backgrounds or accessories before enumerated, but care must be taken that all are equally illumined—that is, as far as the faces themselves are concerned; for it is clear that if one face be in shadow while others are in the direct rays of the sun there can be no harmony in the resulting picture. An arbour, with the sun shining through the lattice-work on to the figures, is very effective in a picture. Groups of croquet, lawn tennis, and Badminton players, or cricketers in their light suits, may well be taken in full sunlight—indeed, will look pictorially better and more in keeping with the occasion if so portrayed.

One error the novice is likely to commit in taking groups in full sunlight is under-exposing, as he imagines that, because the subject is strongly illuminated, a short exposure only is required. This is a mistaken notion, as in all instances—unless the negative be what in ordinary landscape work might be considered much over-exposed—there will be no harmony whatever in the picture, as the strong cast shadows will be opaque instead of transparent, and thus the picturesque character of the sunlight effects will be destroyed.

Next week we hope to bring this portion of the subject to a conclusion.

WET *VERSUS* DRY AND EXTRANEOUS FOG.

By extraneous fog we refer to the dimming of the shadows from the effect of light entering camera or slide, or, in one way or another, acting upon the plate through the lens in a manner foreign to its legitimate purpose. From the earliest days of the art the tyro has been instructed to beware of the entrance of light into apparatus or dark room, and absurdly unnecessary have been some of the precautions taken in the latter respect; but long familiarity with actual working requirements has led to the laying aside of many wise safeguards that are actually necessary to the successful using of the sensitive dry plates of the present day. It is to one or two of these that we would draw attention, as also to some existing misapprehension of the relative danger of wet and dry plates.

There is, even in one of the cheapest form, little to fear of light striking through the camera itself upon the plate, though a defect in the bellows of the camera was once proved to be the cause of a very singular effect impressed upon a plate—the portrait of a gate in a hedgerow where none existed. It was shown to be caused by a hole in the camera acting as a lens and throwing a picture of a white painted gate upon the place where nothing but a hedge was anticipated. Considerable mystery, we may state, was supposed to surround the appearance.

If, however, we turn to the dark slide a different tale may be told. The change from the practice of "wet" to that of "dry" is still so recent that most practitioners who were votaries of the art before the advent of gelatine still retain in their practice the same instruments they employed when exposures were ten or twenty times longer than they now are. We do not hesitate to say that in many instances the result is fog; it may be slight, but still—fog. In others, again, this result is only prevented by painful precautions. We once heard the point well put by a gentleman who was assisting another at an emergency, the latter carrying his dark slide covered up with a thick cloth in constant fear of the entry of light. "Look here," said the friendly helper, "is this slide light-tight or not? If it be it is absurd to fuss over it so; if it isn't you had better get a new one." The case is just an example of what is constantly occurring. We lately saw a cure. The photographer had glued round the margin of the hinged back of his slide a narrow wooden lath so as to overlap about a quarter of an inch when closed. Upon the sides of the slide other laths were glued, so that when the back was closed the two laths were just touching each other, an effectual barrier to the entry of light being thus raised. Another point in which slides long in use for wet plates are now often found to be defective is at the hinged portion of the shutter, where it often happens that sunlight may shine through the thinned wood sufficiently to fog the plates, when a wet plate would be entirely unacted upon. The manufacturers have seen this, and some of them have in modern slides provided against the evil in various modes—one, for example, using leather as a hinge, while another has devised an ingeniously-contrived brass hinge of novel construction,

Then, again, in double slides far more accurate fitting is now needed than used to be the case when the term "dry," as applied to plates, was synonymous with slow-acting. The slightest warping of the sides suffices to prevent that intimate contact which alone will ensure absence of fog at all times and conditions of exposure to light to which the plate may be subjected.

Finally, we would examine the lens; and it is in regard to its position, relative to the entry of light, that so much misconception exists. Thus it is said that dry plates being so much more sensitive than wet, it is to a proportionate degree necessary to guard against internal reflections within the lens; as, for example, from the edges of the glass or the lens tube itself. A little consideration would plainly show that this is in the main an erroneous conception. Take, for example, a plate ten times more rapid than wet: any inner reflection from the lens would act with ten times the effect that would be produced upon a wet plate; but the lens would only be uncovered for a tenth of the time, so that the actual fogging effect of the reflection upon the plate is no more in one case than the other. Very much has been said of the sensitiveness to weak radiations that a gelatine plate exhibits; but practical workers know that it is very slightly different from wet-plate results, so that this consideration may be left out of the question. We must here, however, state that many lenses are in the studio worked when they are very capable of fogging a plate under favouring conditions.

Much depends upon the position and aspect of the studio. A high roof with tall buildings facing the lens opening will permit an extremely defective lens to be used, while the same instrument employed in a room where the sky above the end of the studio is embraced in the scope of the lens will certainly give veiled pictures with any but the most rapid exposures. A short length of black velvet ribbon of suitable width rolled up and placed within the lens so as to cover the blacked surface will, with some instruments, have a marvellous effect in brightening the shadows, though the necessity for it may only be seen under the conditions named.

Returning to the difference in sensitiveness of the two classes of plates as influenced by the lens: two conditions may be named where "dry" would suffer while "wet" would not. We refer in the first instance to the diaphragm slit. This may so cleanly fit the diaphragm that sufficient light may not enter to produce a visible veil upon a wet plate; but as, when waiting to expose with the slide of the plate-holder withdrawn, the plate is exposed the same length of time in either case to whatever trace of light may gain entrance, it follows that the effect of that light is increased just as much as the sensitiveness of the plate is exalted, and a very positive source of danger is thus introduced by dry plates, and one which we know has caused fogging in a large number of negatives.

The second point we refer to is the uncovering of the lens. In waiting for an exposure, using an ordinary leather cap or a sky-shade shutter (which, perhaps, even now is one of the commonest forms, notwithstanding the large number of instantaneous shutters in the market), the wet-plate worker, while his fingers are playing about the cap waiting for the suitable moment to arrive, is apt to let in upon the cap a slight gleam of light, or even in uncapping not to display sufficient celerity. In either case and with short exposures sufficient illumination of the cap may take place to cause fogging, several cases having been brought under our notice which might be distinctly traced to this cause.

It will thus be seen that, though the extra liability to fogging from extraneous causes may not occur so frequently in dry plates as is commonly supposed, there yet exist many points to which it is desirable that the attention o the less experienced should be drawn; and we trust that our remarks may be of use to them, while, perhaps, serving, with others, to orrect some existing misapprehensions.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter VI.—Distortion: Its Nature and Cure.

There are several kinds of distortion capable of being produced in photography. These include that of "violent perspective," caused by having the camera too close to the object to be taken, whether portrait, landscape, or building. This kind of distortion is seen in portraits in which the feet or hands are projected forward and represented on a scale of magnitude greatly surpassing that of the figure itself. The remedy for this consists in removing the camera to such a distance from the subject as to reduce all the parts practically to the same uniform scale of representation. The employment of lenses of too short a focus has much to answer for in the production of this distortion of perspective. In these cases the perspective itself is not necessarily false—it is only violent; but it conveys an erroneous idea. In landscapes it causes insignificant ponds in the foreground to become considerable lakes, and tiny rivulets to assume the magnitude of rivers.

There is also a very common form of distortion exemplified in the contraction of the scale of representation towards one margin of the picture. It is usually seen in photographs of buildings, and gives them an appearance as if they were leaning towards an imaginary central line for support. This may be termed the "distortion of convergence." It arises from no fault in the lens, but from the want of care or of knowledge in the photographer, who, desirous of including the whole of a building in his plate, has tilted his camera slightly upwards without utilising its swing-back to bring the plate into a perfectly vertical state; for one of the rigid conditions which govern the taking of a building properly is this—that, no matter how much the lens or camera may be pointed upwards, the plate itself must be perfectly vertical.

There are other kinds of distortion, but none that is justly chargeable to the lens save that very important one known as "curvilinear distortion," the chief characteristic of which is the curvature imparted in the photograph to lines that are quite straight in the original. This defect is produced solely by the lens, and no skill in the photographer can obviate it so long as a lens of that description is employed.

Every objective having its diaphragm between the lens itself and the subject to be reproduced will give distortion. No matter how perfect a landscape lens may be—how superb its definition or penetrative its range; though it may reproduce the finest line of the finest engraving with all the crispness of the original, and delineate the very structure of the stones of which an edifice is formed, yet it will not be either a copying or an architectural lens. These demand not only all the qualities mentioned but also something more, namely, absolute rectilinearity in projection. The appearance presented in a photograph taken with a landscape lens in which a building is made to cover nearly the entire plate suggests the form of a huge, wide barrel, owing to all the straight lines curving inwards towards the centre. In such a picture only two lines are quite straight—those which pass vertically and horizontally through the centre of the photograph. No matter how much the lens distorts, these centre lines are always straight; but, in proportion as we proceed towards the margin, we find them becoming more and more curved. As this defect is not much noticed near the centre, it follows that one may take a view of a house or church without any apparent distortion so long as its position is kept near the centre of the plate; but for copying a map, chart, or any kind of engraving in which accuracy is a *sine quâ non*, it is altogether unsuitable.

Having indicated the nature we shall now consider the cause of distortion. Bearing in mind what has been said in a previous chapter concerning the possibility of taking a photograph without any lens whatever, merely by transmitting the rays from the object through a pinhole aperture in front of the camera, we remark that any copy of a picture or representation of a natural object made by such pinhole will be quite rectilinear, for with such an arrangement the light passes in straight lines without refraction. Let us consider in what manner these rays are influenced by a lens so as to disturb rectilinearity of projection. It has been shown that the margin of a lens refracts in a greater degree than its centre; that, in short, one of a set of parallel incident rays is transmitted through the centre of a lens without undergoing any refraction at all, and that in proportion as the point of transmission is near the margin or towards the centre so does the ray thus transmitted become refracted in a

greater or lesser degree. All rays which come from a perfectly-square map or building are quite right while passing through the diaphragm and up to their passage through the lens, when they are brought under the influence of its dimensions, with the result already described. The square original becomes barrel-shaped in the photograph, because as the margin of a picture is taken with the margin of the lens, that margin, owing to its superior refractive power "condenses" the rays into a smaller space or bends them towards its axis, hus causing a given portion of the original to occupy a smaller space near the margin than it would do at the centre of the photograph.

This is the invariable result of employing a lens, such as a single landscape objective, in which the stop is in front. What, it might be inquired, would be the result if the objective were turned round so as to allow the light to pass through the lens before it reached the diaphragm? Simply this: that the nature of the distortion would be changed. There would be an expansion of the scale at the margins instead of a reduction as in the former case, and the resulting picture would have its marginal lines bent outwards like a pincushion, from which has arisen the term "pincushion" distortion, now recognised as the antithesis to the "barrel" distortion already described.

The nature and cause of distortion having been explained with all the fulness required in a popular disquisition like the present, we now come to speak of the various methods adopted for effecting its cure. During a long period it was the earnest aspiration of photographers to obtain a lens which would give freedom from distortion. The first note of deliverance was struck in the beginning of 1857, when Professor Petzval, the inventor of the portrait combination, introduced a lens subsequently known among other aliases as the "orthoscopic." Several claims were put forward on behalf of this lens, and the editor of one photographic journal (since defunct), himself a facile writer on mathematical optics, descanted in the most rapturous terms upon its numerous virtues—its entire freedom from distortion, flatness of field, equality of illumination, perfection of focus, and freedom from spherical aberration. The orthoscopic lens was to prove the panacea for every ill. It was everywhere spoken of; and, having become the fashion, there were some weak-minded photographers who scarcely dared venture to assert that any specially-fine picture they had taken had perchance been obtained by the aid of the old-fashioned landscape lens. To show in what manner fashions change, we may again cite the editor before mentioned, who, after a brief period, found that the once-idolised orthoscopic lens did *not* possess freedom from distortion; that its field was *not* flat; that in equality of illumination and perfection of focus it was not a whit better than the old landscape lens. And so the orthoscopic lens was deposed from its position of reigning favourite and wellnigh lost sight of. What is to be regretted is that the foolish claim implied in its name was ever put forth, because any careful observer could upon close examination have discovered that it did distort, although the distortion was of an opposite character to that previously experienced.

In a subsequent description of lenses we shall not be disposed to treat the orthoscopic (or orthographic) objective as defunct, because, when the absurd claim made for it upon its introduction has been set aside, it possesses special features and virtues of a marked order which will eventually secure for this instrument a recognition and patronage, doubtless, greatly exceeding that first accorded to it. In saying this we are fortified by the expression of opinion of one of the ablest mathematical and practical opticians of the present time, to the effect that in the orthoscopic lens, when subjected to certain modifications of structure, will yet, in all probability, be found the "lens of the future."

At the last meeting of the Photographic Club Mr. Washington Teasdale, of Leeds, exhibited a simple form of sensitometer which may prove useful to those who do not possess a more elaborate instrument. Rejecting all idea of a semi-opaque screen, the graduations of which may or may not bear a direct relation to one another, Mr. Teasdale adopts the plan of giving gradually-increasing exposures to different portions of the plate, the time measurements being made by means of a metronome. The apparatus itself consists of a light frame of pasteboard to hold the plate to be tested, with a shutter moving in close proximity to the front surface of the latter, after the manner of the shutter of the dark slide. On one edge of this sliding portion are a number of notches at equidistant intervals, which enable the operator to draw out the shutter successively to certain fixed points with certainty and rapidity. The question of standard light is left open. To use the sensitometer, the plate having been placed in position in the slide and the latter arranged with regard to the light, the shutter is withdrawn (say) a quarter of an inch for a certain time, when, by means of the notches at the side, it is further withdrawn another quarter, and so on until the requisite number of exposures have been made. The result will be a series of gradually-deepening tints, from which the operator may readily judge the quality and sensitiveness of his plates. In order to produce a series of tints in the form of isolated bands, Mr. Teasdale employs a shutter with a narrow slot cut in it of such dimensions that each movement leaves a portion of the plate unexposed, and so separates the successive gradations one from another. Some months ago we described a somewhat similar arrangement, in which, however, the regular withdrawal of the shutter was effected by forming it of a series of hinged strips, each of which as it was drawn out was folded over the end of the frame, so securing perfect regularity in the width of the tints without the least trouble

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The advantages of processes of permanent photography is very forcibly brought before us in learning that the handsome donation of photographs of Rome—three thousand four hundred in number—which Mr. John Henry Parker had presented to the Ashmolean Museum, has been rendered of still greater interest by a catalogue which he has compiled and had printed. As the photographs were the result of fifteen years' collecting it is fairly certain that some, if not all, of them are silver prints, and the thought naturally comes to our mind—What value will they possess at the end of another fifteen years? A well-known rector of a county town—an ardent photographer and admirer of photography at one time, and whom we have known for many years—used to be very proud of a large panoramic view of Rome, which was considered a masterpiece of photography at that period. The last time we saw it (some years ago) it was wofully yellow, and by this time we should imagine it has gone altogether. Silver printing is convenient and very beautiful for small portrait work, but no publication of permanent value should be illustrated by its treacherous assistance.

A photographer now usually accompanies all scientific and exploring expeditions, and the aid of his art or science is not the least valuable of the sum total contributed. Our readers will no doubt have heard of Baron Nordenskjold's expedition to Greenland, which sailed in the "Sofia" a fortnight ago. We learn that, besides a geologist, a botanist, a zoologist, and a hydrographer, there is attached to the expedition a photographer, Herr Kjellström. Much interesting work ought to come from his hands.

There are few photographers who have not been annoyed by having pictures spoiled by ink stains, whether from accident in their own establishments or through carelessly enclosing them in newly-written letters, the ink in which has "set-off." As a rule it is considered useless to attempt to clean the stain off, though cases arise in which it would be very desirable if the means to do so were at hand. According to the *Printing Trades' Journal*, however, a chemical is employed to remove ink stains which might answer with some photographs, though we have not tried it. The material is pyrophosphate of soda, which does not dissolve cellulose, and yields a colourless compound with ferric oxide. To use the material a few drops of tallow are allowed to fall upon the spot, which is then to be washed with a solution of the salt till both tallow and ink disappear. We should be inclined to try the experiment without the aid of the candle.

In using gutta-percha solution as a varnish for certain purposes, the photographer may be inclined to purchase the so-called white gutta-percha, in the endeavour to obtain as colourless a product as possible. It would be useless to do so, as this substance is usually

made up largely of oxide of zinc—some samples, it is stated, containing so large a proportion as seventy-five per cent. If, however, a colourless gutta-percha is really required, it may be obtained by dissolving a good sample of ordinary "gutta" in methylated chloroform, and, after filtration, adding methylated spirit, which will throw down a white, bulky precipitate that can be easily dried, and so put in the solid form.

The production of pure water from melted ice or snow has often been recommended for its simplicity and certainty; but it would appear that the process is neither so certain nor simple as is supposed. At the annual meeting of the American Pharmaceutical Association a question to be discussed is the truth or fallacy of the idea that melted snow prepared in any month but April becomes ropy when kept, and experiments are desired in confirmation of either theory. Mr. G. Sloan, of Indianapolis, has undertaken the subject, and the result of his investigations will doubtless be interesting. It is placed beyond doubt that organic matter in the form of bacteria is not expelled from water by the act of freezing, an American physician, Dr. White, having shown that an outbreak of fever was traced to the use of ice brought many miles from a district where such fever in an endemic form was raging.

With regard to the distilled water—so important an item to the photographer—too much care cannot be exercised; Professor Forbes some years ago pointed out how distilled and medicated water were frequently contaminated most largely by lead, and we ourselves have been brought into contact with cases where supposed pure water contained lead in large quantities. Where water is distilled through a metallic worm it is essential that it should be made tin, and not tinned lead. In the instance we refer to such a worm had been used; the lead was laid bare in many places, and, in consequence, was largely dissolved. What the result may have been upon patients who had drank it in their medicines we know not, but we should not recommend its employment in photography.

THE POSITION OF THE INSTANTANEOUS SHUTTER.

A discussion of an interesting character, on the proper position for the instantaneous shutter, has taken place at a recent meeting of the London and Provincial Photographic Association.

The two positions placed in contrast were, on the one hand, the immediate vicinity of the lens, and the sensitive plate on the other. The question sought to be determined is this—Which position best fulfils the condition of allowing the greatest volume of light to reach the plate commensurate with the greatest brevity of exposure? The opener of the discussion entertained the impression that the vicinity of the lens secured the advantage in this respect, while others were of a different opinion.

It is not the first time this question has been raised. A little over twenty years ago, and subsequently, the subject was very fully discussed. When Mr. Mann exhibited and described his instantaneous shutter before the London Photographic Society, several remarks *apropos* to the advantage of position were elicited. The shutter referred to, we may explain, consisted of a mechanical contrivance by which two opaque plates, each provided with a rectangular opening, were made to pass over one another with great rapidity, each moving in opposite directions in a plane at right angles to the axis of the lenses, which were thus uncovered from the centre outwards, and again covered up from the edges towards the centre of the plates, still moving onward. At that time it was generally understood that the best position for an arrangement of the nature referred to would be between the lenses.

It is not so much, however, by the consideration of a shutter of the representative character referred to as by that of a horizontal slot in an opaque shutter that a clear understanding may be arrived at. By the typical shutter described the lens is progressively opened, and at one period only of the exposure is its effective aperture utilised. In the case of a slot in a shutter passing before or behind the lens and in close vicinity to it the effective aperture is greatly diminished, and the light which reaches the sensitive plate is lacking in intensity according to the extent to which the otherwise effective aperture of the lens exceeds that in the shutter.

But if we transfer the shutter with its narrow horizontal slot to the immediate vicinity of the sensitive plate, and allow it to be swept swiftly over its surface, we shall find that every portion of the plate becomes impressed by the full powers of the rays transmitted through the lens. The apex of the entire cone or pyramid of rays is at liberty for a restricted period to act upon the sensitive surface; whereas, if the shutter were nearer the lens, it would be a cone or pyramid of which the width of the slot in the shutter was the base.

It is a case of progressive opening of the lens *versus* progressive impression of the image. Even a shutter having a narrow horizontal slot driven with the greatest conceivable rapidity in front of a sensitive plate is not theoretically a perfect mode of obtaining a photograph of a moving object, because, however sharp the individual portions of such object might be rendered—and we know that they may be rendered *very* sharp indeed—still, from the fact that each portion, measured from head to foot or from one side to the other, was exposed before any other part and not simultaneously with it perfection in principle must not be claimed for it.

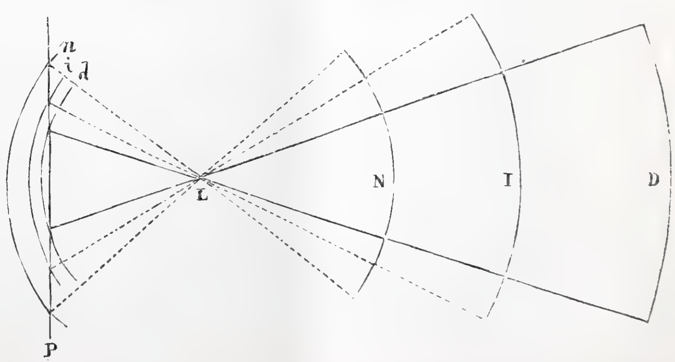
What the practical photographer has to aim at is the great amount of perfection *practically* to be obtained. We believe that this is to be best accomplished by a longitudinal aperture of considerable length driven with great velocity through a slot in the mounting of the lens.

ON FOCUSSING.

No. I.

No one who has examined a series of negatives (even if intended for the stereoscope) with a magnifier can have failed to remark that, though they may all appear very sharp to the naked eye, it is only by a rare exception that one is found in which even any part is really sharp when magnified. This real want of sharpness is, of course, of no moment—it is, indeed, a positive advantage; for extreme sharpness of detail in a picture is actually painful. If, however, a negative be intended for enlarging it may happen—and, indeed, frequently happens—that the enlargement is coarse. This is often due to want of care in producing the enlargement, but quite as frequently the original would have been all the better for the purpose if it had been a little sharper.

It will be, perhaps, as well to state at the outset that it is impossible for any picture to be absolutely sharp all over. There is no such thing as depth of focus, strictly speaking. Every lens has one definite focus for each separate distance, or, I should perhaps say, it would have if it were absolutely perfect. The true field of real focus is, of course, curved, so that equidistant objects would be in focus at some point of this curve. As the exigencies of practical photography require a plane surface upon which to represent the picture, advantage is taken, where possible, so to arrange the view that the real focus of objects on various planes shall be, as nearly as possible, coincident with the plane surface of the sensitive plate. Thus, as the conjugate focus is the further behind the lens as the object is nearer to the lens, approximate sharpness is obtained over a flat surface by arranging the group or view in a concave form in front. In this way the nearer objects in the margin of the picture have their conjugate foci in curves of longer radii, which are thus intersected by the plane surface of the plate, and are, therefore, in true focus at the same time as more distant objects.



L, is the lens. P, the sensitive plate. D, distant objects in focus on the curved line *d*. I, intermediate objects in focus at *i*. N. nearer objects in focus at *n*. A reference to the diagram will show how objects at different distances may be in true focus at the same time.

What is commonly understood by depth of focus is that a sort of average is taken, so that while possibly none is actually sharp yet all is sufficiently so to satisfy the requirements of pictorial definition. The more perfect—that is, the more rapid—the lens the less depth of focus; as, for instance, in the portrait combination, where, when used with full aperture, there is absolutely no depth of focus. Sharpness, in the photographic use of the term, only means

pictorial definition; and by stopping down the lens the picture is obtained practically "sharp" all over—that is, depth of focus is obtained at the expense of rapidity. Still it may well happen that, although the general effect may be sharp, yet no single object is absolutely in its true focus.

That the ordinary photographic lens is capable of giving microscopic definition is proved by an instance I have before mentioned of a negative taken by Mr. W. B. Woodbury in Java, when a distant market scene, which happened to be in the field of view through a break in the trees, though quite invisible to the naked eye, was found under the microscope to have every detail faithfully depicted. It happened that this particular part of the picture was in true focus. Even for enlarging such accurate focussing as that is not necessary; but, as more attention to that point is generally admitted to be desirable, it will, perhaps, be well to consider the causes of error and failure.

In the first place: there is the very possible and probable error of register of the focussing-screen and dark slide. This is a defect to which the most highly-finished dark slides are the more liable. However carefully the woodwork may be got out, the greatest care could hardly prevent some slight difference in the amount which has to be cleaned off for polishing. Machine-made woodwork should, theoretically, be perfect. In practice it is not so. A particle of sawdust getting between the work and the "fence" is quite enough to throw it out of register. Then it is quite possible that the lens may not be accurately achromatised. Neither of these errors—even if both acting in the same direction, and therefore accumulative—would ever be detected in ordinary landscape work; the small stop would put them both right. Indeed, if the stop were small enough the focussing might be done at random and the lens non-achromatic and yet good pictures be obtained, so wide is the difference between "focus" and "pictorial definition."

There is generally supposed to be another source of error. It is commonly affirmed that, if a picture be focussed with the full aperture and then a small stop inserted, the effect is to "set the focus back." Theoretically this is impossible. It must exist in practice or it would not be so generally believed; but the cause must be sought in some other direction. If the lens be aplanatic—that is, *capable* of giving a sharp picture on some one plane with full aperture—it is certain that the insertion of a stop cannot alter this focus. If the lens be not aplanatic, then the diffusion of focus caused by special aberration is reduced by the employment of a small stop and approximate sharpness increased. In actual experiments made for the purpose I have been unable to detect any difference in the position of the focus, whether full aperture or a small stop were employed.

The plan which I adopted, and which seems to be a fair test, was to arrange some printed matter on a series of steps each about an inch in front of the other, set up the camera very near, so as to obtain a picture of about one-third in diameter, and focus for the middle step with full aperture. The insertion of the smallest stop made no difference whatever that I could detect in the position of the focus; but the general sharpening of the image under these unfavourable conditions was such as fairly to surprise me, so great was the difficulty of determining the true focus.

This leads me to the last chance of error—that mysterious deficiency in our powers of observation known as "personal equation." It may safely be affirmed that, with the most perfect appliances, no two persons will do anything exactly alike. Personal equation steps in; one will always err in one direction, and another always in the opposite direction. Experience may modify and lessen it, but a remnant of error always exists.

The experiment of the printed matter on steps answers two purposes at the same time:—1. The *position* of the real focus with and without a small stop; and, 2, by taking a photograph, the accuracy of the achromatism of the lens. On photographing the printed matter on the steps I found, with the lens I was testing—a French lens of the rectilinear type—a slight but appreciable difference between the visual and the chemical foci when using the full aperture, but with the small stop all was so pictorially sharp that the *depth of focus* would have satisfied any but the most hypercritical.

The real difficulty in this experiment is that of establishing the position of true focus. We know, as a mathematical certainty, that the several steps cannot all be in true focus; yet to the eye, even when aided by a powerful eyepiece, they are so nearly equally sharp that "personal equation" alone will make it almost impossible for the most experienced observer to be quite certain of the real position. The ordinary ground-glass focussing-screen, though amply sufficient for everyday work, is not good enough for tests of this severe character. If, however, means can be devised by which greater certainty can be assured of establishing a true focus, it will at anyrate secure a good purpose in testing the achromatism of lenses, and may be useful to many who, like myself, believe in the superiority of enlargements from small negatives—not only on account of the less bulk and cost of the smaller apparatus, but in the quality of the larger pictures which it should be possible and practical to produce. In my next communication I will give the details of a plan which promises to assure this.

GEORGE SMITH.

COLLODION EMULSION.

For the past three years I have had the idea that if an emulsion of bromide of silver be made by the usual methods, either with or without ammonia, but *with* boiling carried on so far as to quite destroy the setting power of the gelatine, the emulsion, or what may be better termed "the precipitate" of bromide of silver, may be allowed to settle, the decomposed gelatine poured off, and the bromide washed by decantation, using warm water for at least one change. When all the by-salts are got rid of the last traces of water may be absorbed by two or three changes in methylated alcohol in a high state of purity. This having been accomplished, the bromide of silver may be poured into suitable normal collodion, which will then form a beautiful emulsion ready for use, and of a sensitiveness just in proportion as the same bromide of silver would have given if it had been added to a fresh lot of gelatine.

In my experiment in this direction I used too large a quantity of collodion for the amount of bromide of silver, and the film was much too thin; but, from the results obtained from even that sample, I am convinced the process is quite practicable, and as soon as time will permit I hope to submit specimen negatives from an emulsion prepared as above, but making better calculations as to quantities.

With Mr. Brooks I am inclined to favour the ferrous oxalate developer for collodion, as the difficulty with the alkaline pyro. has always been the risk of the ammonia attacking the image and weakening the action of the light—a tendency which the soluble bromide also has, so that really the two agents, acceleration and retarder, destroy as well as make the image; whereas with the ferrous oxalate the bromide need only be used where the too energetic action of light requires destroying, so as to bring the image into harmony throughout.

I have only in this brief note given a general outline of the direction in which I think the resuscitation of collodio-bromide will be most successful, namely, in forming the sensitive compound in one organic medium like gelatine, and using that compound upon the plates in one comparatively inert-like collodion, leaving intending experimentalists quite unfettered by a formula, which formula will, however, be communicated in due course. In the meantime I should like the theory to be discussed for guidance.

In a note contributed by me to a contemporary in 1881 I pointed out that, from the practice photographers had even then had with the alkaline development, it would be well worth their while to give collodion emulsion a trial, even if only upon the ground of latitude in exposure, which is so much greater with collodion than with gelatine; but I have no doubt that the difficulty and expense of making the emulsion deterred many from acting upon the suggestion then thrown out.

W. T. WILKINSON.

ON MEN AND THINGS.

The plea of "A Bewildered Amateur" for a more trustworthy mode of estimating the sensitiveness of dry plates than by comparing them with wet plates is a just and reasonable one; but I am afraid his proposal that makers shall state the "approximate time in seconds" that their plates may require would scarcely bring us much nearer the desired end. Lens, subject, light, and even locality vary, perhaps, quite as much as do the plates, and it is obviously impossible for any maker of commercial plates to estimate all these at their correct value for each individual exposure. If, however, some reliable standard can be established by which to measure their rapidity, then the consumer of dry plates will be in a position to make his own calculations or to exercise his own judgment with a sound basis to work upon, and all faults, if any, will then rest with himself.

* * *

It is to be feared, however, that, even if the required standard were discovered, universal satisfaction would not be the result, for there is a class—and that not a small one—of amateurs and others who are loth to blame themselves for anything, and who find consolation in blaming their failures upon somebody else—preferably the plate-maker. These would find their chief solace gone; and the

naked truth that they themselves, or their want of knowledge and experience, were the sole cause of their want of success would probably soon drive them out of the ranks of photography—a not undesirable consummation, perhaps. The fact is, that the practice of photography has now become so easy that scores and scores have been attracted to it who possess not the slightest knowledge of, or aptitude for, the really important and delicate operations involved. These purchase their cameras, lenses, and plates, read their developing instructions and act accordingly, departing in never so small a particular from the regulation number of drops or grains there stated. The one "fly in the pot of ointment" is the exposure, which, unfortunately for them, cannot be "made by machinery;" thence it happens that the wonderful automaton working photographer cannot be relied upon to work with the same regularity that has marked other marvels of mechanical skill.

* * *

Is collodion really to be revived? So it would seem from the hopeful expressions which have appeared in the Journal during the past few weeks. Not, however, in connection with the bath and all its concomitant troubles; for few, I imagine, who have once shaken off the trammels of wet collodion will willingly return to the practice of that beautiful but troublesome process. If collodion emulsion, however, as appears to be hoped, can be made sufficiently sensitive, there is little doubt that many who now use gelatine will prefer the simple collodion process; while, on the other hand, there will most likely be found others who will prefer to adhere to gelatine. Tastes, of course, differ in regard to the advantages or disadvantages of most processes, and what one individual may consider the advantages of collodion emulsion over gelatine may be classed as objectionable by another.

* * *

Very few of those who prepare their own plates will, I imagine, dispute the greater simplicity of the operations involved in the use of collodion emulsion as compared with gelatine. No glass rod required in coating; no heat; no levelling stand; no elaborate drying-box; no decomposition of the films or refusal to "set" in hot weather; no filtering, blistering, or green fog during development; no prolonged washing to remove hypo.; no "clearing solution;" no difficulty in intensifying; no necessity for a risk of over-intensification and subsequent reduction; and, finally, no danger of ruining the negative by contact with silver paper. If that is not a programme sufficiently strong to convert the most ardent "gelatinophil" I don't know what is!

* * *

On the other side we shall have set the extra cost of pyroxyline, ether, and alcohol over gelatine and water, and also, perhaps, the deleterious effects of the fumes of the solvents. As regards increased cost: this, if reckoned out, will be found to amount to practically nothing, especially if the solvents be economised to the best advantage; while, if this be set against the saving of time and special apparatus, to say nothing of the gain from the decrease of spoilt films, the user of collodion plates will find himself the gainer. With regard to the deleterious fumes, few—even amongst manufacturers of plates—will be so continually exposed to these fumes as to become narcotised, at least to any inconvenient degree. There are, I am aware, constitutions which cannot bear the slightest touch of ether; but these are, of course, out of court in this discussion. One important point requires notice, namely, the difference between the fumes of collodion emulsion and bromo-iodised collodion. The former consist of ether and alcohol pure and simple; the latter contain, in addition, bromine and iodine, and perhaps several pungent decomposition products likewise, so that we have not to look forward to the inconvenience as in wet-collodion working.

* * *

A careful consideration of the question *pro.* and *con.* will, I think, convince anyone that, given the rapidity, collodion emulsion will be a formidable rival to the now all-powerful gelatine. Many other points could be raised in its favour and also against it, no doubt, but I think the balance would be *for* it. However, pending the increase of sensitiveness we desire, it is not desirable to "count our chickens" too closely.

ARGUS.

PHOTOGRAPHY FOR BEGINNERS.

IN SIX CHAPTERS.

CHAPTER V.—HINTS ON ALBUMENISED PAPER AND ARTISTIC PRINTING.

In giving a description of how to print we assumed the sensitised paper to have been purchased ready for use. There are, however, some brands of paper upon which it is very difficult to obtain the rich, brilliant tones so much admired, more especially after the paper has been prepared for some time. It is, therefore, considered desirable that everyone should know how to make it for himself, even although it may not be expedient for him to do so. The operation is simple. A solution of nitrate of silver is poured out into a flat dish, a sheet of albumenised paper is floated on it, face down, for two or three minutes, and then suspended to dry in a darkened room. It is now ready for use. This comprises the whole operation, which we shall describe with more detail.

Albumenised paper is preferred to other kinds on account of keeping the print on the surface and thereby securing brilliance. It consists of plain paper of a fine quality which has received on one side a sizing of albumen containing chloride of sodium or ammonium. It may be procured everywhere from photographic dealers, is sold at a cheap rate, and keeps good for a long period. It may be had in various tints to suit any special requirement. A faint rose tone is a favourite with many for portraiture.

The silver bath is composed in the following proportion:—

Nitrate of silver	50 grains.
Distilled water	1 ounce.

This is designated a fifty-grain bath. Some prefer it stronger, others much weaker, from which it will be seen that *precise* strength is not of vital consequence. If too weak, the prints will lack vigour.

Pour this solution into a flat, square dish, and having, by finger and thumb, taken the sheet of paper by opposite corners, bend it in a curved form, then lower the centre down upon the solution, continuing the lowering until the corners are also down. No air-bubbles will form if the operation be conducted in this manner. After three minutes raise up the sheet carefully, employing for this purpose a pair of horn or ebonite tweezers, as the liquid would stain the fingers. Get rid of the superfluous fluid by drawing the face of the paper across the edge of the dish, or over a glass rod kept for the purpose. Suspend the sheet by wooden clips in a dark room until quite dry, and then cut up into pieces of the size desired.

Paper prepared in the manner described, and used within a day after preparation, tones rather better and more quickly than much of the ready-sensitised paper.

The tyro will at first be apt to be dissatisfied with the skies of his landscapes, and may wonder by what means experienced photographers manage to obtain the gorgeous skies and clouds which lend such a charm to a picture. These are obtained by a second operation.

It is necessary to have secured from six to a dozen cloud negatives, either by photographing them from nature or engravings or by purchase. The print, after being taken from the printing-frame —in which state the sky will most probably be a plain white—is laid, face up, upon a flat, padded board, and one of the sky negatives placed over it. Having protected the landscape by a mask made of brown paper the whole arrangement is in this manner exposed to the light for a brief period. For sky negatives print quickly as a rule, and deep printing must be carefully avoided.

A graduated sky, without clouds, is obtained in a more simple manner. The print is laid out flat on the board as before, and a plate of clean glass placed upon it to keep it flat. It is then covered by a sheet of cardboard and brought to the light, when the cardboard is slowly and steadily moved down from the top of the sky to the horizon line, or top of the landscape portion, upon reaching which the card is moved upwards again as steadily as before. This imparts the graduated appearance the sky presents on a clear, cloudless day, being darker above than near the horizon.

Masking of the nature described, or *post*-printing-frame exposure, may frequently be employed with great effect to subdue portions of the subject that are too glaring or luminous. It is also sometimes desirable to do the opposite of this, namely, to keep portions of a picture somewhat lighter than would be obtained from the negative if used pure and simple. A piece of tissue paper cut to the proper dimensions and form and pasted upon the back of the negative effects the desired result. In this way mountains which might print too dark may be imbued with all the atmospheric effect necessary. Indeed, if thought desirable, the more distant of them may by this means be made to retire almost into invisibility. By working judiciously on the tissue paper with a black pencil very artistic effects may be produced.

CHAPTER VI.—ENAMELLING PRINTS.

A great charm is often imparted to a photograph of small dimensions by enamelling. This gives it a surface like glass, the texture of the paper being obliterated.

Having obtained a plate of glass quite free from any surface defects, rub it over with a solution of wax in ether, and then polish the surface with a piece of clean linen. This will leave a delicate

coating of wax, the object of which is to facilitate the removal of a collodion film that is to be applied. Instead of waxing the plate, the same result is obtained by dusting the surface with powdered French chalk and rubbing it well, afterwards wiping it clean off.

Next coat the plate thus prepared with plain collodion. Some manufacturers prepare a special collodion for enamelling, which it is better to procure. After the collodion has set, it in turn receives a coating of gelatine solution, one ounce of gelatine having been dissolved in twelve ounces of water. The best way to make this solution is to place the gelatine in the water while cold, allow it to steep for one or two hours, and then apply heat, by which solution immediately takes place. This is spread evenly over the plate of glass, a slip of paper serving to bring it up to the edges, after which the plate is placed on a level table till the gelatine has set sufficiently to admit of its being reared up on edge to become quite dry.

It is advisable to prepare several plates at a time, and these should be of large dimensions, so as to admit of a considerable number of small prints being placed on each at one operation. The pictures to be enamelled should receive a coating of gelatine similar to that which was applied to the glass. This is best done by means of a clean sponge, by which every part will be coated with entire freedom from air-bubbles, which sometimes appear when the gelatine is applied by floating the paper on its surface. The picture must then be dried.

Next pass a wet sponge or flannel over the surface of the glass plate until it is quite wet; and at the same time wet the prints by immersing them in cold water for a few seconds. Now lay the prints, face down, upon the prepared surface of the glass plate, arranging them so as to utilise all the surface in the best manner. Rub them in close contact with the glass by means of a rubber squeegee, taking care, while doing so, not to disturb their position. It will be safer when performing this operation to interpose a thin sheet of rubber cloth between the squeegee and the prints, by which immunity from harm is ensured. It is now placed aside to dry, which must be quite thoroughly done and which may take a whole day—certainly several hours.

When quite dry a sharp knife is inserted under the edge of the print and passed round its margin. The print is then raised from off the glass; it comes away freely, and has firmly attached to it the collodion film which was formed upon the glass plate. This is the whole secret of producing the beautiful enamel surface on prints.

TRANSATLANTIC JOTTINGS.

Our contemporary across the water (the New York *Photographic Times*) has some useful hints and working formulæ anent wet collodion and its application to the production of transparencies. It is quite refreshing to come across articles on wet collodion which are not behind the time, for the process is still used in making those most beautiful of all photographs—transparencies upon glass. The formula for collodion is as follows:—

Iodide of cadmium	65 grains.
Iodide of ammonium	25 „
Bromide of cadmium	19 „
Bromide of ammonium	11 „
Alcohol	5 ounces.

This quantity is to be added to fifteen ounces of plain collodion of eight grains of pyroxyline to the ounce strength, and solvents in equal proportions—the whole to be coloured to the tone of deep sherry. This collodion has the advantage of being fit for use immediately after mixing. The developing solution:—

Protosulphate of iron	15 grains.
Acetic acid	1 drachm.
Alcohol	1 „
Water	1 ounce.

A ten-grain solution of cyanide with a crystal of iodine is used to clear any shadow not perfectly brilliant, and the toning is done by bichloride of platinum, the warm tint imparted by sulphide of potassium not being recommended from its want of permanency.

Here is a new form for a squeegee:—A small wooden lath, triangular in section, and a piece of rubber hose, or "tubing," as we term it. Slip the tubing tightly over the lath, and a squeegee with three working edges is produced. This seems to us a capital idea. Authors: the Artotype Company.

The Artotype Company would appear to have a very extensive business, and the editor describes, among many other things, a camera twelve feet long. We have heard a photographer speak of a camera sufficiently large to kennel a St. Bernard dog in. This would hold a small tea party!

Among the articles often brought before one or other of the cameras at the Artotype Company's establishment are coins and watches. To photograph the former they are merely placed *horizontally* upon a sheet of glass, and a camera with a mirror attached (at 45°) to its lens brought into position. There is no trouble of slipping or rolling by this plan, and where many such objects have to be photographed it is to be commended. We need not point out how much wider in scope a mirror is than a prism. Watches have sometimes to be photographed, a number at a time, upon their edges to show their works. The difficulties of standing them upon a sheet of glass would be too much like the trick of a conjuror with his plates; but a small lump of specially-made putty keeps them *in situ* as well as if they were screwed down. We do not quite see the use of the glass, unless to be able readily to alter the tint of the ground without having to disarrange the carefully-composed groupings of the pieces.

For imparting a glaze to their mechanical pictures, so as to resemble albumenised paper, the Artotype Company use a solution of shellac in water made by the aid of borax. We do not know if borax be superior to ammonia for the purpose, but it is a fact that borax with shellac is used for a variety of non-photographic purposes.

Mr. H. J. Newton—whose name we have often mentioned in connection with the carbonate of soda developer process—has been reading a paper upon carbonate of soda before the Photographic Section of the American Institute. In the course of his lecture he stated that a new source of supply of this substance had been found in Spain, and that, therefore, "it was a satisfaction to photographers to know that the supply would be equal to the demand." We knew the process was in great repute, but we had no idea it had attained these proportions. In the discussion upon the subject of the lecture photographers were reassured upon another question—Mr. Jahr stating that "he saw no reason for certain fears that the supply of ammonia might in time run short."

A very interesting extract from the *New York Times* is given, describing the photographing the stage of the Madison-square Theatre. The stage was "set" for the second act of the play, "A Russian Honeymoon," all the members of the company except one being artistically grouped about the stage. Three cameras were at work, and about a dozen exposures given when the electric light was at its brightest. Gelatine plates enabled a complete success to be secured.

The Scovill Company have also brought out another camera for the purpose of enabling a picture to be taken with the plate either upright or horizontal without re-arranging the slide. What would appear to be a far superior method to that described last month is adopted, the back of the camera being made to revolve without any special adjusting. This seems an excellent idea, and, as far as can be seen from a mere illustration, superior to the existing English method.

PHOTOGRAPHY IN RELATION TO COLOUR.

[A communication to the Photographic Society of Great Britain.]

In the observations that I venture to place before you this evening, I am not sanguine enough to imagine that there is much of what is absolutely new to communicate to an audience so thoroughly well up in almost all branches of the photographic art as the members of the parent Society.

Whatever of novelty may exist will arise more from the point of view I take of the subject, and from the practical bearing it has upon the principles and practice of photography. The position of photography is a little difficult to define. It is allied on the one hand to science, and on the other to art, without exactly belonging to either. If we analyse its operations we find that a man can scarcely take a high rank as a photographer unless he possess a considerable amount of the artistic faculty; whilst it is equally certain that no amount of artistic faculty will compensate for a lack of knowledge to comprehend, and of power to use, the tools with which the photographer works.

But, putting aside for the present the means employed to produce photographs, let us concentrate our attention upon what it is that photography undertakes to do for us. Photography will furnish transcripts in monochrome of works of nature, works of art, and illustrations of the thousand-and-one things and incidents, commonplace or otherwise, that interest us.

Were the objects so represented monochromatic, the work of the photographer, both in its artistic and scientific character, would be rendered much less difficult; but this is eminently not the case. Nature does not employ monochrome. Myriads of reflecting surfaces, of different capacities and textures, present to our senses an infinity of colour-gradations changed and modified by play of light and shadow; and it is of as much importance to have the power to reproduce this

shifting phantasmagoria as it is to have the power to recognise the artistic capabilities of its combinations.

Many valuable papers have been read before you, giving the behaviour of different kinds of sensitive surfaces when subjected to the solar beam as dialysed by the spectroscope. My object this evening is to bring before you quite a different set of observations. The practical photographer has to do, as a rule, with surfaces that reflect colour; and it is important to know in what manner the usual and ordinary colours seen and used by us every day, and observed by us in the colouring of natural objects—I say it is important that the action of those usual and ordinary colours should be clearly understood, and whatever weak points may appear in their reproduction duly noted with a view to discovering that kind of chemical sensitive surface which will give in monochrome the same relations of power, depth, and brilliancy that the colours themselves afford to the optic nerve of the eye.

Upon this occasion a comparison of the photographs you hold in your hands with the colour-subject before you will enable you to take stock of the actual position of photography with respect to the reproduction of colour, and quite accidentally it has happened, as being extremely relevant to the subject, that I have the honour to read this paper before you when your walls are covered with the admirable exhibition of works of art, transcripts in colour that we have the privilege of seeing around us, and that we shall doubtless have the pleasure of inspecting at the close of our labours this evening.

First, let me direct your attention to the screen of coloured bands imposed upon black velvet, and arranged upon a convex surface; this arrangement has been photographed with a side light in such a manner as to give you the relative value of each colour in light and in shadow. The upper group of nine colours—violet, indigo, blue, green, yellow, orange, red, ruby, and crimson—follow in the same order that they appear in the solar spectrum; they are not intended as reproductions of the colours of the spectrum, but simply as the ordinary colours produced in a commercial way for actual use in the costumes and decorations worn in everyday life. My arrangement, then, for the present paper is to show you bands of commercial colours so disposed as to follow each other in a certain sequence, and capable of being photographed in light and shade with bands of black and white as standards of comparison.

The charts present this arrangement photographed in five different ways, three being from wet-plate negatives, and the remaining two from dry-plate negatives. Those from the wet collodion are lettered A B D; those from the dry plates C and E. One of the points I wished for information upon was the relative sensibility of iodide and bromide of silver with respect to colour. The photograph A was made with eight grains of ammonium iodide to each ounce of collodion. B had four grains each of ammonium iodide and bromide to each ounce. D had six grains of ammonium iodide and two grains of ammonium bromide to each ounce. The photograph C was made with a gelatine dry plate containing bromide of silver, with a trace of iodide, and stained to a very decided tint with eosine. The photograph E was made with a gelatine dry plate exactly the same as C, but *without* the addition of eosine.

Let us first of all consider the relative sensibility of the collodion plates compared with the gelatine plates. The collodion negatives had all the same time of exposure, namely, twelve minutes, with a rapid rectilinear eleven inches equivalent focus, ⅝ in. stop, in a room lighted by a large window, and developed with protosulphate of iron in the usual way; the two dry plates had forty-five seconds' exposure under the same conditions.

Considering that it has been generally understood that bromide of silver is more sensitive than iodide of silver to colour-radiations, especially the greens, I was not prepared to find that the collodion containing no bromide gave a very good and harmonious presentment of all the colours (photograph A), and that the photograph containing but two of bromide to six of iodide (photograph D) gave in all respects a much better screen than photograph B, containing equal parts of bromide and iodide. I had better here explain that the collodion in all cases was made sensitive, and used the same day. I was quite aware that a collodion highly charged with bromide required theoretically a stronger nitrate bath, but I endeavoured to compensate for this by keeping the plates with more bromide in them a longer time in the nitrate of silver. It is possible that a stronger bath may so change the molecular arrangement of the bromide of silver as to make it more harmonious in its representation of colour; but this has to be worked out.

Let us now go through the representations of the colours themselves as given in the photographs. I am afraid we cannot avoid a certain sense of defeat when we see what an amazing difference there is in the effect of these colours upon the best of our sensitive surfaces in comparison with the effect of the same colours upon the retina of the human eye. Viewing as we do these colours by artificial light, we do not get their full value, but enough remains for us to make it only too obvious how very far we are from a true representation of coloured surfaces by photographic means.

Let me direct your attention to the first two colours—the violet and indigo. There is not much difference in their photographic values. In A they are about equal; in B the indigo is slightly the lighter of the two, and the same in C, D, and E. Next comes the blue—No. 3 on the scale. It is much lighter than the other two, but note how abruptly it falls off in shadow in A and B; it is better in D, very good in C, and perfect in gradation in E. Now we come to the green—No. 4. This is least satisfactory in D, very even but very dark in B, very good in A, and admirably rendered in E. Yellow—No. 5—is the next in order. It is presented by all the photographs as if it were the lowest tone of colour in the series; but see on the actual colour-screen how brilliant it is, eclipses in force all the other colours, whilst its effect on our sensitive surfaces is *less* than any other.

The behaviour of the next colour—the orange, No. 6—surprised me very much. I am aware that it is not a true orange; but it is the colour called orange, and the best I could get. To the eye this appears of a much lower tone than the yellow—lower in tone even than the red; but its actual value to the sensitive plate is much greater than the yellow—nearly equal to the indigo. The red, No. 7, and the ruby, No. 8, are about equal in value all through the five charts, the crimson being a little the more energetic of the two; whilst the ruby, No. 8, is slightly more powerful than No. 7. The next is a band of white introduced as a standard of comparison.

The lower group consists of seven colours, put together in no particular order, but selected because they were different to those in the upper section, being less positive in their colouring whilst they are all such as enter into articles of everyday use. First we have No. 10, light blue; this comes out with a very energetic action, surpassing the darker shade, No. 3, as one would naturally expect. The grey, No. 13, next to it, is about equal to the orange, No. 6, although the colouring power, so far as the eye is concerned, is far smaller; but the pink, No. 12, is the most energetic of the whole range, surpassing even the light blue, No. 10. The remaining four—light brown, medium brown, dark brown, and dark green, Nos. 13, 14, 15, and 16—are quite startling examples. They all come out pretty much alike; but note the differences in the actual colours themselves—differences much more apparent by day than by artificial light. Here we have a light brown, No. 13, coming out just about the same tint as the dark green, No. 16, and presenting scarcely any difference to the representations of its neighbours, the medium and dark browns.

We have now gone through our photographed representations of the sixteen coloured bands. We have seen that those colours which appear very bright to our eyes have very little effect upon our sensitive surfaces; and were pictures painted in colours such as these—did we find in natural objects colours such as these—then indeed our task of reproducing satisfactorily objects in colour would appear to be almost hopeless. Fortunately the wonderful old Dame Nature goes to work differently. She softens and harmonises her tints in wonderful gradation; has effects of atmosphere, of distance, tricks of light and shade, which delight the eye that has the power of noting them, and this it is that induces a certain harmony and consistency in our photographic transcripts. This wonderful teaching of Nature is not without its effect upon her special pupils, the artists, who essay to reproduce and poetise her varying aspects; consequently the pictures that we essay to copy have a certain degree of modulation in colour that makes them not impossible.

There have lately been produced some very fine reproductions of the splendid collection of pictures in the Hermitage of St. Petersburgh. It has been stated that their merit is due to some secret process involving an alteration or addition or some modification of the collodion process; but I am quite unable to believe that any modification of the collodion process will give the delicacy and softness of a dry plate, to say nothing of the enormous gain in sensibility in the employment of the latter. These splendid results from the Hermitage pictures are due, in my opinion, either to an uncommon adaptability of certain of these pictures to the photographic process, or to a very carefully-considered method of making the negatives and working them up by the hands of a skilled artist. That this is practicable with a dry plate is very evident to all who have employed the gelatine process to any extent. Let a negative be taken, fully exposed—over-exposed, if you will—exposed for the deepest shadows; let the plate be developed in such a way that it comes out thin and comparatively weak all over, so that, when printed, it is a negative in half-tone. Now it is easy to see how a skilled hand can work upon this—putting in lights, strengthening shadows, raising the tone of colours that have not made their adequate representation; and undoubtedly all this can be done and will be done, and it is perfectly easy and possible so long as you get the right sort of foundation to work upon.

Permit me a few words more to call your attention to a difficult colour-subject that I have been experimenting upon. It is, as you see, an interior—a village school. The patron has come down and is putting a few qestions to a nonplussed youth, whose robust build proclaims that his physical qualities predominate over his intellectual ones. He hangs down his head, totally oblivious that the schoolmaster is telegraphing the answer to the question by holding up two fingers and a thumb behind the back of the examiner; and the embarrassed boy is equally deaf to the friendly tip that is being whispered to him by one of his comrades seated behind him. This I photographed with collodion and also with a dry plate; the former had thirty minutes' exposure and the latter ninety seconds. They gave, I believe, respectively, the best

results that can be obtained. You will notice how much of the definition in shadow is visible in the collodion negative, whilst very well rendered in the gelatine one. I have provided a few prints from each negative, those from the collodion negative being marked C, the others D P. Observe in C that the black board on the right of the picture has come out *lighter* than the schoolmaster's coat, which is a dark green; you find that in those marked D P the proper relations are observed. Note that in D P the articles of crockery to the right of the window near the ceiling are brought out. The rafters are shown, the clock is quite distinct, all these points being lost or nearly invisible in the proofs marked C. There is also much more gradation and softness in the half-tones in the D P proofs, and the quality altogether seems to indicate that the gelatino-bromide plate is the most efficient means of photographing paintings known at the present moment.

In conclusion: I may say that the making of the various experiments necessary to enable me to read my paper before you this evening has interested me very much. I hope to be able to satisfy myself still further upon sundry matters upon which I am in doubt; and I feel sure that, from the large practical experience and the scientific knowledge possessed by many of my audience, a discussion upon photography in relation to colours will bring out many valuable suggestions, throw light upon many moot points, and be a valuable contribution to the proceedings of this Society. J. R. Sawyer.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

CORSICA.

Corsica is as yet ground untrodden, or nearly so, by the photographer; and, as it contains scenery well worthy the attention of those who do not object to rough it to some extent, when they are thereby enabled to enjoy a fine climate and do some good work, perhaps the Editors will be willing to give to their readers the following notes of a tour made by me, in company with another amateur, in the months of March and April of last year. I took with me an 8×5 camera with three double backs, made by Mr. George Hare, packed in two fairly-strong leather sling cases, fitted, in order to guard against the curiosity of the uninitiated, with lock and key. In another leather case I had a light-tight plate-box holding two dozen plates, back to back, and five dozen plates packed in dozens. The three cases were strapped together, and then weighed about as much as a small portmanteau. The plates I took with me were Swan's "10 times." Using Dallmeyer's 6×5 rapid rectilinear lens I found one second's exposure, using stop No. 4, quite sufficient when taking a landscape in sunlight.

My friend F. and I left London on the evening of the 19th of March, and travelled, *viâ* Dover and Calais, direct to Marseilles. Our custom-house examination took place at the P. L. M. station in Paris, into which we were run, traversing the Ceinture railway, after a short delay at the Gare du Nord. Continuing our journey about an hour later, travelling in the carriage in which we came from Calais, we reached Marseilles at midnight on Monday. We left Marseilles at five o'clock on Tuesday evening by an excellent steamer belonging to the Compagnie Transatlantique, and landed at Ajaccio, on the south-west of Corsica, about eight o'clock on the following morning.

Ajaccio is beautifully situated at the bottom of a deep bay, from the sides of which the mountains rise to a considerable height. It is a well-built town, but the houses here, as elsewhere in Corsica, are totally devoid of architectural beauty, rising to five or six storeys, and looking much in need of a coat of whitewash. The chief interest of the town is, of course, its connection with the early life of Napoleon. Here he was born and spent his boyhood. The house of his birth, his mother's tomb, and a grotto which was one of his favourite resorts are shown to all visitors to the island.

We put up at the Hotel Germania, now re-named the "Continental," as the French were supposed to shun it on account of its name. The house is clean and the people very civil, but the food was most inferior. I hear that a new hotel, the Bellevue, has been opened this year, and is superior in every respect.

There is a pretty English chapel, built by a Miss Campbell, who resides here for the greater part of the year, and whose name is well known throughout the length and breadth of the country. To her kindness in advising us where to go and what to see we owe much of the pleasure and photographic results of our stay.

One of the best points from which to photograph the town and bay is the Place d'Armes, near the Grotto of Napoleon, and having secured this and a few similar views there is little or nothing more worth taking in the immediate neighbourhood.

Having established our headquarters at the Germania we started for a six days' excursion in the country to the north of Ajaccio. We hired a small open carriage, with a hood, drawn by two stout ponies, for the tour, and employed the same on our subsequent journeys. Carriage hire varies from fifteen to twenty-five francs a day. This includes the driver, who has to keep himself and the horses. Of course a small *pour-boire* per diem is expected. As there are no railways open at present in Corsica all the journeys have to be done by carriage or *diligence*, and, as we wished to secure a photograph of anything that struck our fancy *en route*, we had to travel by private carriage.

Leaving Ajaccio early on the Monday morning after our arrival there we had a long day's drive to Vico, not going by the most direct route, but by the village of Sari. Unfortunately we passed through the finest scenery—that on the River Liamone—during heavy rain. There were numberless "shots" about here, but, of course, the rain rendered all photographic attempts useless. In Vico we gained our first experience of a Corsican village, and we were by no means favourably impressed. The streets were excessively dirty, and smells of every kind unsavoury abounded. Staggering under the weight of our *impedimenta*—for at every village inn you have to carry your own luggage upstairs—we ascended a cross between a ladder and a staircase, and were pleasingly surprised to find ourselves in a clean, if bare, *salon*, with four clean bedrooms opening off it. It is always prudent in Corsica to write or telegraph beforehand to secure bedrooms and dinner, as if you find the former unoccupied—and there are generally but two in every inn—you will most assuredly find nothing whatsoever to eat.

Vico is worth a plate or two, being finely situated among the mountains. The outline of one—the Sposata—is particularly remarkable. We spent the morning following our arrival in wandering about with our cameras, starting after *déjeuner* for Evisa, where we arrived in three and a-half hours, stopping occasionally to take a photograph. The Evisa hotel is one of the nicest at which we stayed in Corsica, and old Carrura, the landlord, was most civil.

From Evisa we visited the forests of Aitone and Valdoniello, only going a short way into the latter, as the cold was great, the ground there being covered with snow, whilst in Aitone the sun was shining brilliantly and the day very warm. The forest scenery of Aitone is very pretty, and anyone staying a few days at Evisa would find abundance of work for his camera. The trees are chiefly Lariccio, or Corsican pine, but there are fine Spanish chestnuts and silver fir mixed with them. At every turn of the road, which ascends one side of a valley pine-clad on either side, are numberless pretty "bits;" indeed, this forest and that of Bavella, visited afterwards, are two of the things not to be missed by anyone doing the island.

On the day following our visit to Aitone we drove to La Piana. The road descends rapidly from Evisa to the sea through wonderful rock scenery, and then ascends again through woods of Mediterranean heath and arbutus to the Calanche—a wild point, high above the sea level, the rocks taking many fantastic shapes, and being of a dull red colour. The road is cut in the solid rock and winds along the brink of deep precipices. Suddenly you leave the bare rocks behind you, and after a drive of ten minutes reach La Piana, situated on a green plateau overlooking the sea. Alas! that so near such lovely scenery the Piana hotel should be the hideous thing it is; but, if I again visit Corsica, even the occupants of my bed, and food of a character defying description, will not deter me from staying a few days to endeavour to do justice to the Calanche scenery. The day we passed at the Calanche was dull and hazy, and we did no good work.

Between La Piana and Ajaccio the scenery is uninteresting. We stopped for a night *en route* at Carghese—an old Greek colony, where the people still speak Greek, and possess a priest resembling a patriarch of old, with his long, white hair and flowing beard. They have, however, long since deserted the Greek form of religion and adopted the Roman. A long day's drive from Carghese landed us once more at the Germania in Ajaccio.

After a few days' rest we started for the Forest of Bavella. On the first day we only went as far as Cauro—a village high up in the mountains at the end of the Ajaccio Bay. From Cauro you have splendid views looking back to Ajaccio. There are many nice "bits" for the photographer here, notably a house with a gallery running out from the first floor to a large chestnut tree in front. This is at the village of Suarella, about half-a-mile from Cauro.

Our next day's drive took us to Bicchisano. After crossing a Col, 2,000 feet above the sea, we descended to the valley of the Tarano, through which we drove for several hours, the scenery being quite English in character; then up again 1,000 feet or so to our hotel, which was most comfortable.

Next morning we crossed a high ridge and then descended to the sea, lunching at the small, neat seaport of Propriano, and then up to Sartène, one of the largest towns in Corsica. Lear, in his book on Corsica, raves about Sartène. We left it as soon as possible; but, then, scenery that is suited for the pencil is not always possible for the camera, and we found nothing at all to do here. A drive of two hours and a-half next day brought us to St. Lucie di Tallano. I should advise anyone following in our footsteps to go there straight, as it is as near Bicchisano as Sartène.

Starting at six o'clock in the morning of the following day we drove to the Col di Bavella, about 4,000 feet in height, arriving there in five and a-half hours—a steady pull all the way. We had taken provisions for a night's stay, as we had an order allowing us to remain at a cantonnier's house close to the Col; but, unfortunately, the cantonnier and his family had gone down to the nearest village for the Easter

...sta, so we found the house securely fastened up and deserted. We had, consequently, to make the most of the twelve plates we had with us, but there was "food" for as many dozen. The view from the Col is superb. We look right across the island to the eastward, down a narrow valley deep sunk between towering serrated cliffs of a dusky red, clothed on their lower slopes with splendid specimens of the Lariccio pine. Far away the blue Mediterranean was visible, breaking on the white sand, with an island—Montechristo or Elba, I know not which—rising from the slight haze that overhung the sea. To the westward we look back over olive-clad hill and dale to the little Bay of Propriano, which we had skirted two days previously. No words can paint the beauty of the scene, and it only wanted the sublime grandeur of a severe thunderstorm, which broke over us during our stay and lasted for about half-an-hour, to complete a picture never to be forgotten. We expended our six plates apiece without going half-a-mile from the summit. We are told that all the way through the forest to the east coast you have a constantly-varying style of scenery, and I am sure any one might profitably spend several weeks in Bavella. However, we did not want to sleep in the open air, and so had to retrace our steps to St. Lucie, which, being all down hill, only took us two hours to reach. From St. Lucie we returned, *viâ* Propriano and St. Marie Liché, to Ajaccio, sleeping at these villages on our way.

We had intended to go to Bonifacio, but the journey there and back is long and uninteresting, although the town itself is, I believe, well worth a visit; and as the steamer—which leaves Ajaccio for Bonifacio once a fortnight, giving you all Sunday there and returning on Monday—did not start when we happened to be in Ajaccio we gave Bonifacio up.

We finally quitted Ajaccio twenty-six days after our arrival there, and drove through the island to Bastia. A railway is in course of construction, but it will not be finished for a considerable time yet. In tunneling under the highest point between the two towns a most absurd mistake was made, which caused great delay. The navvies working from the two ends of the tunnel drove their shafts in wrong directions and did *not* meet in the middle, and a great amount of work had to be done over again. Our first night out from Ajaccio we stopped at Vivario, at a most comfortable inn there. Our second night was spent at Corte, the ancient capital of the island. The town is built round the base and up the sides of a rock standing isolated in a plain with a fine backing of mountains. It is probably the only town in Corsica, which we saw, that is really worthy of the expenditure of a dry plate. The forest of Vizzavona, between Ajaccio and Vivario, is pretty, but very inferior to Aitone or Bavella. We reached Bastia on the evening of the third day from Ajaccio. This is the commercial, and by far the largest, town of Corsica. There is no scenery about it worthy of remark. From Bastia we crossed to Leghorn in one of the Rubbatino steamers in about six hours.

There is, I am told, much worth seeing in Corsica besides what we visited, but to see no more than we saw is well worth the journey. Of course the foregoing is merely a superficial sketch of our tour in the island, but it may possibly induce some other amateurs to follow in our footsteps. HENRY ERSKINE GORDON.

MEASUREMENTS OF THE WAVE-LENGTHS OF RAYS OF HIGH REFRANGIBILITY IN THE SPECTRA OF ELEMENTARY SUBSTANCES.

[Abstract of a communication to the Royal Society.

THE authors describe a method of taking photographs of diffraction spectra produced by a small Rutherfurd speculum ruled with 17,460 lines to the inch. The lines in the spectra were accurately measured by the aid of a microscope magnifying twenty-five diameters and a dividing engine.

The length of the spectra, which were taken on three different plates, was fourteen to fifteen inches, and the measurements were accurate to the $\frac{1}{2000}$th of an inch. From these measurements the wave-lengths of the lines were calculated. The spectra include lines with wave-lengths 4674 and 2024. They were produced by electric sparks condensed by a pane of glass coated with tinfoil.

Of the electrodes used *one always* consisted of cadmium, the other of the metal or the solution of the metal, or other elementary substance, the wave-lengths of the lines of which were to be determined; thus all the spectra were referable to the cadmium lines. Great accuracy is attainable by this method, and lines which have appeared identical or coincident in two different spectra have thus been proved to differ in refrangibility.

All the spectra were compared with spectra obtained with the prism spectroscope described by one of the authors in the *Scientific Proceedings of the Royal Dublin Society*, vol. iii., part III., April, 1881.

Great care was exercised in taking the photographs, lest any irregularity in the surface of the plates should lead to inaccurate measurements. Gelatine films on specially-selected *patent plate* glass were used, and such a precaution is quite necessary. The photographs were not varnished. A certain number of lines measured by previous observers have been compared with the new measurements. Taking the numbers given by Thalén, Lecoq de Boisbaudran, and Cornu for 150 lines in the spectra of magnesium, zinc, cadmium, aluminium, indium, thallium, iron, &c., a close agreement with their measurements affords satisfactory evidence of the accuracy of these determinations. Besides the wave-length a very careful description of the appearance of each line is given, together with its linear measurement indicating its position on a series of photographs obtained with the prism spectroscope, which series of photographs is presented with the paper. A distinction is drawn between those lines determined directly with the grating and others too faint to be seen on diffraction photographs, which were measured by the aid of the prism spectroscope and an interpolation curve nine and a-half metres in length. The total number of lines measured and described is 2,247, namely:—Magnesium 42, zinc 151, cadmium 141, aluminium 30, indium 104, thallium 70, copper 164, silver 124, mercury 80, carbon 20, tin 129, lead 86, tellurium 322, arsenic 112, antimony 211, bismuth 156, air 215, and iron 150.

A series of eighteen enlarged photographs, thirty-six inches in length, are presented with the paper, on which each line has its wave-length written over it.

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THE CARBON PRINTING PROCESS.

[A communication to the Bristol and West of England Amateur Photographic Association.]

AT our last meeting I gave a brief history of the carbon process, with a view to bringing before our members the simplicity of carbon printing by single transfer for the production of transparencies on glass, which I originally intended as the subject of my short paper; but, it being necessary in tracing out the gradual advances of carbon printing to touch at certain points on double transfer, I have been led to depart from my original intention and go rather more fully into the subject. I propose to describe more fully the working of the process, both by single transfer for transparencies, single transfer from reversed negatives for prints on paper, and also the double transfer process for prints from ordinary negatives.

The working of the process is under five operations:—1. Preparation of the tissue. 2. Sensitising. 3. Exposure. 4. Transfer. 5. Developing.

PREPARATION OF THE TISSUE.

As excellent tissue can be bought ready prepared from the Autotype Company, and, the preparation on a small scale being a rather expensive operation, I think it is in all cases advisable to buy rather than take the trouble of making tissue. As, however, amateurs often like, for the sake of the experience gained, to go through every part of the operations themselves, I will describe a simple and easy method by which I have prepared small quantities of tissue with fairly satisfactory results. I may add, however, that it can be bought at a quarter of the price which it will cost to make it on a small scale. The paper should be a firm, fine surface paper, not highly sized. I find a paper sold at the artists' repositories, and known as "double elephant," answers the purpose well. A thick solution of gelatine is now prepared of about one part of gelatine to four parts of water. To this is added a small quantity of sugar to prevent the tissue becoming too brittle when dry. The dissolved gelatine is now intimately mixed with indian ink ground up into a thick paste with a muller, one part of the dry indian-ink being used to twenty-five parts of gelatine. The coloured gelatine is now poured into a square porcelain dish and kept warm by standing in an outer dish of hot water. The pieces of paper, cut to the required size, are then floated or drawn over the surface of the mixture, and then laid aside till dry.

In preparing tissue on a large scale paper in a continuous band is used instead of in sheets. The ends of a long roll of paper are pasted together and the paper suspended on two rollers, one being attached to the ceiling of the room and a second one mounted over the tray or vessel containing the gelatine pigment. By turning a handle connected with the roller the band of paper is drawn over the surface of the gelatine, and becomes coated with a film of the necessary thickness. After drying the tissue will be ready for use, and may be kept for years without deteriorating if carefully stored in a dry atmosphere.

The tissue is now ready for sensitising. This is done by immersing the paper in a solution of bichromate of potassium, which operation should, of course, be performed in a yellow light. The sensitising bath is made by dissolving one ounce of bichromate of potassium in from thirty to fifty ounces of water, the strength being regulated according to the density of the negative. A weak solution increases contrast, and a strong solution gives softness and delicacy. I find that one ounce of bichromate to thirty-five ounces of water a suitable strength for negatives of fairly average density. The paper, being cut to the required size, is carefully brushed over with a soft dusting-brush to remove any particles of paper or dust. It is then immersed, film down, in the bichromate solution, and, after remaining a minute or two, may be reversed, and any small air-bubbles removed by means of a soft dusting-brush. After remaining in the solution from three to four minutes it is withdrawn and placed face downwards on a sheet of glass, and the superfluous moisture removed by means of a squeegee.

It is then suspended by means of wooden clips till dry, or may be placed, surface uppermost, on pieces of cardboard bent into the form of an arch. This method of drying I find preferable to suspension by clips, as the curvature of the cardboard counteracts the tendency of the tissue to curl inwards when drying.

The drying is best done in a well-ventilated and moderately-warm room, care being taken that the temperature is not too high, or the gelatine will melt and run in streaks on the surface of the paper. The exposure or printing is done in the ordinary printing-frames, but care should be taken to select those with fairly-strong springs, as the carbon tissue is thicker and less pliant than the albumenised paper. As the action of the light is invisible, and the progress of printing cannot be seen as with silver printing, it is necessary to regulate the exposure by means of a photometer or actinometer. The most simple form of instrument consists of a square tin box with a double lid. In the centre of the outer lid is a small, circular opening, in which is inserted a disc of glass, painted to correspond with the colour which albumenised paper assumes after exposure to light. In the centre of this glass disc a small strip is left uncoloured, under which a small band of sensitive albumenised paper is held by the pressure of the cover when closed. After exposure to light for a certain time the paper under the transparent part assumes the same depth of colour as the painted portion of the glass. The paper is then drawn forward and a fresh surface exposed, the exact amount of exposure given to the tissue being thus ascertained. The exposure necessary will, of course, depend on the density of the negative; but, having once found the amount of exposure necessary for any given negative, it is an easy matter afterwards to ensure the correct exposure.

The photometer made by the Sciopticon Company possesses some advantages over the form of actinometer just described. It consists of a small brass box with a glass cover, underneath which is a circular disc divided into six equal portions coloured with a series of graduated tints, and with a circular opening in the centre under which passes a small band of sensitive paper, which gradually assumes in succession the various tints of the graduated scale. The advantage of this form of photometer is that it needs less attention than the other, as six successive tints are obtained without shifting the band of paper, whereas with the other form the paper requires attention and shifting after each tint. The requisite number of tints being given to the slip of sensitised paper, the print is removed from the printing-frame and is ready for transfer—either to the plate of glass or the single transfer paper. In transferring to paper a piece of the single transfer paper is cut rather larger than the print to be developed thereon. The exposed tissue, together with the transfer paper, is placed in a dish of cold water, and allowed to remain for about half-a-minute to a minute. The proper time can be judged by the tissue, which first has a tendency to curl inwards; after soaking a sufficient time the corners turn in an opposite direction. When this occurs both should be withdrawn from the bath in contact with one another, and placed on a slate or piece of glass. It is now covered with a piece of waterproof cloth or oilskin, and the squeegee passed steadily and firmly over the surface. After remaining in contact for ten or twenty minutes the print is ready for development.

The development is effected by soaking in warm water heated from 80° to 100° Fahr. In the course of a short time the pigment will be noticed to be oozing out at the cut edges of the tissue, and the paper shows an inclination to peel away from the transfer paper. It must then be taken hold of, and carefully lifted or peeled off under water. The coloured gelatine remains on the transfer paper, no image or picture being apparent. The dish should now be gently rocked in each direction and a little more of the warm water added, when the soluble portion of the gelatine will be dissolved, leaving the picture firmly attached to the transfer paper. Should the picture appear too dark and heavy it indicates over-exposure, or, if without half-tone in the lights and wanting in depth, the exposure has been insufficient. In case of over-exposure the defect can be remedied by increasing the temperature of the water. I always find it advisable, when there is any doubt as to the correctness of the exposure, to commence development at a low temperature and gradually increase it by the addition of warmer water as may be required. The development being effected, the print is finally passed through a second bath of clean warm water and then immersed in a solution of alum, which removes any remaining trace of the chrome salt and hardens the gelatine, thus ensuring the permanence of the picture.

For transparencies the operations are performed in a precisely similar manner, but a plate of glass is used as a support instead of the transfer paper. It should also be borne in mind that a considerably-longer exposure is necessary in the case of a transparency than is required for a print to be developed on paper.

It will be evident that in case of development by single transfer, on either glass or paper, the result will be a reversed copy of the original negative. This is, of course, rectified in the case of a glass transparency by viewing the picture through the glass; but for paper prints a reversal of the image is requisite, which is obtained by means of the double transfer process.

The whole of the operations for double transfer up to the point of development are precisely the same as single transfer; but, as the paper or glass upon which the picture is developed serves only as a temporary support from which the image has to be *re*-transferred to paper, it is necessary that the temporary support—either glass or paper—should be waxed to prevent the adhesion of the film.

The waxing solution is made by dissolving six drachms of resin and two drachms of pure bees'-wax in one pint of turpentine. A small portion of this solution is poured on the temporary support and well rubbed in, and then finally polished off with a small pad of flannel. The picture is then developed as before described. It is immersed in the alum solution, and after washing in cold water is ready for the final transfer. The paper to which it has now to be transferred is known as "double transfer paper," and consists of a good quality of paper coated with an enamel composition insoluble in cold water, but becoming soft and slimy if heated to a temperature of 120° or 130° Fahr.

Pieces of this paper are cut to the required size and immersed in cold water for about half-an-hour. It is then immersed for a few minutes in warm water till it becomes soft and slimy; then placed, face down, on the surface of the picture, and the squeegee applied with a slight pressure. After standing to dry for a few hours a knife is run round the edge, and the finished print is readily detached from the glass.

E. Brightman.

STUDIES OF AND EXPERIMENTS WITH GELATINE EMULSION.

First Section.

I shall here communicate a number of observations upon gelatino-bromide of silver taken from detached notes in my note-book of experiments. In this way these studies and experiments were put together, and by their publication I hope to be useful to the practical photographer.

Sensitometer Tests.—The estimation of the sensitiveness of plates by means of Warnerke's sensitometer has become pretty general, and the way of using the sensitometer has been several times described; but little is yet known of the relation of the sensitometer numbers to the sensitiveness of wet plates. In consequence of a series of experiments I consider an emulsion plate which shows the number 10 of Warnerke's sensitometer as equal to the average sensitiveness of a wet plate.* From that the following table arises:—

Sensitometer Number.	Sensitiveness.	
10	1	that is equal to a wet collodion plate.
11	$1\frac{1}{3}$	times as sensitive as a wet collodion plate.
12	$1\frac{3}{4}$	,, ,, ,, ,,
13	$2\frac{1}{3}$	,, ,, ,, ,,
14	3	,, ,, ,, ,,
15	4	,, ,, ,, ,,
16	5	,, ,, ,, ,,
17	7	,, ,, ,, ,,
18	9	,, ,, ,, ,,
19	12	,, ,, ,, ,,
20	16	,, ,, ,, ,,
21	21	,, ,, ,, ,,
22	27	,, ,, ,, ,,
23	36	,, ,, ,, ,,
24	48	,, ,, ,, ,,
25	63	,, ,, ,, ,,

Of course the developer has an influence upon the sensitiveness of a plate. When possible I use an oxalate developer without any addition or pyro. developer, to which I add ammonia every thirty seconds until fog begins to appear. The duration of the development is from three to four minutes. The sensitometer number is read after fixing, the plate being held far from the eye against the sky or a piece of ground glass. *The sensitometer test should never be applied when the gelatine plate is wet,* because there is no constant relation between the sensitiveness of wet and dry plates. One should pay attention to the gradation of the field of the sensitometer, and the density should decrease gradually. To determine the gradation one should not develope longer than a negative would require.

Influence of the Temperature of the Developer Upon the Sensibility.—I repeated my experiment of the year 1880 upon the influence of the temperature of the developer upon the sensitiveness, principally on account of Herr V. Schumann's opinion† that a developer of 30° C. gave less sensitiveness than one of 5° C.

Some iodo-bromide emulsion (with four per cent. of iodide of silver) was cooked for half-an-hour;‡ this emulsion worked quite free from fog with a ferrous oxalate developer (made of a mixture of ferrous sulphate

* I may remark here that a wet collodion plate cannot be directly sensitometrically compared with a gelatine plate, because the relative sensitiveness to phosphorescent light is different from that to daylight. Amongst gelatine plates considered by themselves the relative sensitiveness to both kinds of light is sufficiently equal for *practical purposes*, as I have convinced myself that a gelatine plate which was ten times more sensitive than another in the sensitometer also proved about ten times more sensitive by daylight. Gelatine plates whose sensitiveness is like that of a wet plate show in the sensitometer the number 10

† *Photo. Archiv*, 1881, page 202.

‡ According to my formula given in *Theory and Practice of Photography with Gelatino-Bromide of Silver*, 1883.

and potassic oxalate), and the negatives were developed in two minutes. The results were—

A.—*Ferrous Oxalate Developer.*

Temperature of the developer	4 to 8° C.	16 to 17° C.	26 to 28° C.
Duration of development 1 minute	3° Warnerke.	8° Warnerke.	13° Warnerke.
Duration of development 2 minutes	9½° ,,	10° ,,	15° ,,

B. *Pyrogallic Developer* (pyrosulphate with ammonia)* :—

Temperature of developer	1°—2° C.	26°—28° C.
Duration of development, ¼ minute	6° Warnerke.	10° Warnerke.
,, ,, 3 minutes	14° ,,	15° ,,

In both cases the development at the higher temperature took place more rapidly, and in the given time resulted in greater sensitiveness and greater intensity. This difference was particularly striking at the commencement of the development, while, when the development was more prolonged, the difference was greatly smoothed away.

Cold ferrous oxalate developer produces great intensity of the picture either with difficulty or not at all, but cold pyro. developer gives abundant intensity, especially when more ammonia is added.

Emulsion with Carbonate of Silver and Ammonia.—If carbonate of ammonia be added to a solution of nitrate of silver at first a white precipitate (carbonate of silver) arises, which redissolves in excess of the ammoniacal salt. In this way, even when cold, a great deal of carbonic acid is evolved. A good solution is got by heating for a short time—say until the frothing up has passed—in a roomy alembic, nitrate of silver one part, glassy carbonate of ammonia one part, and water 200 parts. The clear solution apparently contains $Ag_2\ CO_3 : 4\ NH_3$ (the chemical analysis is not yet finished). It is surprising that the photographic effect of the solution is not different if the carbonate of ammonia be already efflorescent; but one has only to use more of it.

The solution of carbonate of silver oxide and ammonia is treated exactly like the solution of nitrate of silver in caustic ammonia (so called "silver oxide of ammonia"), which I have described in my book upon *Gelatine Emulsion.* The advantage of the former over similar solutions consists in no free ammonia being present in it, and, therefore, in there being considerably less danger of fog. The character of the negative is good, but the sensitiveness a trifle less than where there is free ammonia yet practically the difference is scarcely perceptible.

Different Restrainers in the Ferrous Oxalate Developer.—Latterly I have tried, with the best results, Wilde's iodine tincture as a restrainer in the ferrous oxalate developer instead of bromide of potassium. It is, as is known, prepared by dissolving one part of iodine in 200 parts of alcohol, and diluting the solution with 200 parts of water. I use to every 75 c.c. of potassic oxalate solution and 25 c.c. of the ferrous sulphate solution ten to twenty drops of the iodine tincture. A slight fog would be quite checked by it without the sensitiveness suffering, and the negatives are softer than with bromide of potassium.

The following experiment shows the value of the iodine tincture :—A gelatine plate gave with ferrous oxalate developer, without the bromide restrainer, twenty degrees by Warnerke's sensitometer, and strong fog; with one drop (1 : 10) of bromide of potassium solution, twenty-one to twenty-two degrees Warnerke's appeared without fog; and with ten drops of the iodine tincture twenty-four to twenty-five degrees Warnerke's appeared quite clear. Strong fog is not so well removed by the iodine tincture as by bromide of potassium.

A New Restrainer for the ferrous oxalate developer I found in chloride of iron. Two to twenty drops of an iron chloride solution (1 : 10) to every 100 c.c. of the ferrous oxalate developer kept the negatives very clear without injuring the sensitiveness, and imparted great harmony to the negatives. It is surprising that the lights do not increase, as with bromide of potassium. J. M. Eder, M.D.
—*Correspondenz.*

* According to my formula given in *Theory and Practice of Photography with Gelatino-Bromide of Silver*, 1888.

A DAY IN MID-CHESHIRE WITH THE LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

Tabley Hall, Holford Hall, Peover, and Knutsford.

[A communication to the Liverpool Amateur Photographic Association.]

Any account of the last outdoor meeting of the Liverpool Amateur Photographic Association must of necessity be short, and to a certain extent unsatisfactory. If *photographic results* are the only purpose of our excursions we must admit that we might have done better; but if social enjoyment and a day in the country count for anything we had a good time.

It was possible to find suitable subjects for the day's work, both notable, interesting, and picturesque. It was also within easy compass to make the requisite arrangements for reaching them, and likewise for "feeding internal fires;" but it was just a point beyond the powers of the nominal guide for the day to turn the Sun from his course or to still the relentless wind, and in those two items we have the cause of any ill success.

Leaving Liverpool Central Station at 9-30, we reached Knutsford about 11-0; and, as we were several members short of the number who had announced their intention to be present, we decided to exchange the comfortless 'bus provided for a more luxurious open barouche.

The unpromising morning doubtless deterred one or two from joining the excursion; but as we drove out of Knutsford across the common the sun shone brightly at intervals, and our drive to Tabley Old Hall was unusually pleasant. On leaving Knutsford we soon struck an old country lane shaded by high hedges and overhanging trees, with glimpses of park-like land between, passing here and there whitewashed thatched cottages perfectly smothered by the bloom of the fruit trees in their surrounding orchards, giving promise of many pretty pictures had the "atmospheric air" been more favourable. Still along the quiet and shady lanes, the banks carpeted with primroses and wild flowers, and the plantations beyond blue with wild hyacinths, until a turn of the lane brings us before another cottage so picturesque and fascinating to the artistic eye that all hands dismount to reconnoitre. Soon the majority of cameras were at work, and "Lord de Tabley's favourite model cottage" (as we were informed) made one of the bright spots of the day's work.

We shortly reach Tabley Old Hall and church, standing upon an island in the mere—an old embattled Elizabethan brick house with stone dressings, and a black and white timbered interior of porch or hall, showing traces of a still older erection. The interior of the hall contains a most curious fireplace, surmounted with fantastic carvings, *once* brilliantly gilt and coloured, antique furniture, and stands of armour. Here we find not only far too much wind but also the sun on the wrong side of the house, consequently but few plates were exposed, and these with varying success. But I am afraid certain gastronomic claims interfered considerably with the enjoyment of the beauties of Tabley, and longing desires were directed to a certain snug little hostelry where it had been decided that a frugal lunch should be despatched. Leaving the Old Hall and the woodland glades surrounding it shining in all their beauty in the midday sun, we drive back to our country inn, and there, while discussing the "Cheshire" and quaffing (good old word that!) the "October," were joined by another member, who had been indulging in the solitary game of hunting the hounds and here ran them to earth.

Thus recruited, we were soon *en route* again, this time for Holford Hall—an old manor house of the Cholmondeley's, about a mile and a-half further on the high road. This picturesque old pile is now used as a farm, as are many of the old Cheshire halls, and is considered one of the four finest specimens of old timber manor houses in Cheshire. The other three I take to be Carden, Moreton, and Bramhall.

The portion at present remaining encloses a courtyard on two sides, one side of which has its upper storey supported on wooden pillars, this arrangement being somewhat unique. This interesting and antique house is completely surrounded by a moat, now dry, and used as an orchard, crossed by the stone bridge, with recess and stone seats, shown in the photograph. Again we found the sun right in the eye of the camera, and, although plates were exposed as a matter of duty, no great success was anticipated.

Again we collect and move on our pilgrimage, aiming for the old-world village of Peover Inferior, and drive straight to the church. This is an almost unique specimen of timber and plaster churches, with stone tower, date 1582. The church has been carefully restored, and has certainly lost nothing by the proceeding, contrary to many so-called "restorations." Here, fortunately, the light was right, and the wind which, according to Southey, "Had blown a gale all day, at evening it had died away," and the cameras found full occupation. Regret was expressed that, owing to the lateness of the afternoon and the weak light from the small windows, no photograph could be secured of the beautiful and interesting interior of the church, with its carved black oak pillars, pulpit, and sides, all dressed in flowers and garlands. The day being now well advanced it was decided to forego visiting the Elizabethan Hall at Peover Superior, and to drive back, past cosy farm-houses and orchards loaded with bloom, through the radiating avenues of Toft Park, direct to Knutsford.

After a tea of country fare in country style, we had a "shot" at the old Rose and Crown Inn, in the main street of the town. Then, packing our traps in varying style, we strolled down to the station, comfortably catching our trains, reaching Liverpool about 9.15 p.m.

A. W. Beer.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

APPLICATIONS FOR PATENTS.

No. 2,495.—"Manufacture and Treatment of Photographic Paper;" a communication from C. Cros and A. Vergerand.—*Dated May* 18, 1883.

No. 2,677.—"Changing and Storing Photographers' Backgrounds and other Movable Scenery;" a communication from W. E. Lindop.—*Dated May* 30, 1883.

Meetings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 31st ultimo, the chair was occupied by Mr. J. T. Taylor, editor of *The Photographic Times* (New York), now on a visit to this country.

Sympathetic reference was made by several members to the decease of Mr. T. J. Pearsall, who was formerly a frequent attendant at these meetings, and whose death was announced in last week's issue of The British Journal of Photography.

The Chairman said he had brought for their inspection one of the latest of the many developments of the inventive genius of Mr. Flammang, chief superintendent of the workshops of the American Optical Company, owned by the Scovill Manufacturing Company. Having completed certain devices by which the large plates in studio portrait cameras could, at the last moment and without disturbing the camera, be made to assume either a vertical or a horizontal position, Mr. Flammang then sought to do the same for the portable camera of the amateur. In this he had succeeded, to an extent so perfect and by means so admirable, that he (the Chairman) much regretted that he had not one of the properly-constructed appliances for the purpose with him, or they would have been delighted with it. As he had constructed for his own use, during his stay in England, a rough imitation of the more perfect American piece of apparatus he had brought it to show them, feeling sure that a body of intelligent, practical, professional and amateur photographers would not be slow to recognise its merits, even when pointed out through the medium of a home-made and not very elegant piece of wood and brass work. "Here" (observed the Chairman, after he had erected before them an 8 × 5 landscape camera) "is the camera firmly fixed upon its stand, ready for taking a landscape in the usual or horizontal way, but at the last moment it is found that the church spire, ravine, or other object about to be taken will form a better picture if the plate be placed in the vertical position. Without a moment's loss of time or the manipulation of a single screw, the camera is now seen placed side upwards and quite as rigid as before." Suiting the action to the word, he (the Chairman) raised up one side of the camera, which rotated upon pivots on the opposite side of the top of the stand, until it had attained a position of a right angle, beyond which, owing to the opposing influences of two strong cords, it could not go. The camera now stood erected, quite rigidly, he said, outside of the camera top; but seeing, as was pointed out, the centre of gravity was yet a long way inside the base of support, stability was still ensured as a matter of course. The Chairman said that he hoped before he left England to be in a position to show them an American-made appliance, both the design and workmanship of which they would not fail to appreciate.

Mr. A. L. Henderson proposed to have a stud set on to one of the lower corners of the camera. This stud should work in a slot cut in the top of the stand, and would allow the camera to be placed either vertically or horizontally, at the same time that the camera would remain on the top of the stand and not overhang the side of the stand, as in the plan shown by the Chairman.

Mr. Brown then read some remarks which he had prepared upon the proper position for an instantaneous shutter. He held that it was of no consequence in a shutter working behind the lens whether the shutter was close to the lens itself or to the plate, and could not agree with Mr. Cowan that in the former case the plate was not receiving the whole illumination from the lens during the time that the exposure took place. He illustrated his observations by a diagram on the black board.

Mr. W. E. Debenham said that Mr. Brown's diagram represented only those rays which passed through the centre of the lens, and would only be truly descriptive of a lens with a very small opening in the stop plate. With the instruments, however employed when instantaneous shutters were used, the central aperture was large. He pointed out the absence of lines in Mr. Brown's diagram which would show rays other than those passing through an extremely small stop.

The Chairman drew a diagram showing that with full aperture the whole of the back lens was employed over a considerable portion of the field, and that to use a shutter close to such a lens was in effect, as Mr. Cowan had said, to employ a weaker illumination during a longer time than when used close to the plate.

Mr. Brown read a statement by M. Leon Vidal as to the rapidity of the fall of a drop shutter, to the effect that the time occupied with an opening of thirty millimetres—equal to about one inch and three-sixteenths—was the $\frac{1}{163}$ part of a second, and remarked that it was totally incorrect.

Mr. A. Haddon said that M. Vidal appeared to have taken the known amount of fall during the first second and divided that by the ratio of the length of drop used, ignoring the acceleration which was constantly going on, and which made the speed at the end, or middle even, of the second enormously greater than at the beginning, when the fall was in the case of the shutter actually going on.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Society was held on Thursday, the 31st ultimo, at the Free Library,—Mr. B. Boothroyd, President, in the chair. The minutes of the April meeting having been read and confirmed,

Mr. J. H. T. Ellerbeck explained that the pictures shown by him at the last meeting were not by himself, but by Mr. B. J. Edwards, the maker of the plates, and were taken with that gentleman's own shutter.

The Chairman announced that the invitation to the members of the Association by Mr. L. Hughes, to spend a day at Conway, had been accepted for Monday, June 18th; but that the Council had decided not to allow Mr. Hughes to bear the expense of the transit of the members to Conway.

Mr. G. F. Chantrell was elected a member of the Association.

Mr. Ellerbeck (who was good enough to act for the Honorary Secretary in his absence through indisposition) read a letter from Mr. Craddock, kindly enclosing for the Society's album some pictures from paper negatives of thirty years ago. Prints from these negatives had been exhibited in the Great Exhibition of 1851, and had attracted the notice of the late Prince Consort, who had written to Mr. Craddock for copies. The prints were very fine specimens of landscape and architectural photography, and, apart from their own intrinsic excellence, were remarkable from the fact that they had not been toned but merely fixed and washed. The tone, notwithstanding, was an exceedingly good one, consisting of a rich warm brown. Cordial thanks were accorded to Mr. Craddock for his interesting communication and for his valuable contribution to the Society's album.

Mr. A. W. Beer then read a communication on the subject of the Association's May excursion to Knutsford and neighbourhood. [See page 331.] Prints from negatives taken on this occasion were exhibited by Messrs. Tyrer, Ellerbeck, Beer, and Rutter.

Dr. Kenyon exhibited Boça's chronometrio shutter, and made some remarks explanatory of its action, speaking in terms of commendation of its accuracy of exposure.

Mr. W. H. Kirkby thought that its action would involve vibration of the lens at the moment of its greatest opening.

Dr. Kenyon said that nothing of the kind occurred in practice.

The following exhibits were also made:—By Mr. Rutter: negatives on Pumphrey's films, with prints from them. Mr. Ellerbeck: Smith's brattice stand, which, in its combination of exceeding lightness with perfect firmness, was much admired. Mr. Twigge: two fine enlargements in carbon, by the Autotype Company, of one of last year's prize pictures by him, of a view at Coniston, and one of Pull's Ferry, Norwich, also by himself. Mr. Tyrer: beautiful platinotype prints on the textile fabric recently introduced by the Platinotype Company. Mr. Dodd, Middlesborough: several prints from negatives taken on plates of his own manufacture. The Chairman: a Harvey's drop and flap (Phœnix shutter) made on Mr. Roberts's principle. Mr. Ellerbeck: a so-called "detective" camera, working in an ordinary courier bag, with an exposure of one-fiftieth of a second, this being made by lifting up for a moment the flap of bag and by a spring letting of the shutter. To regulate the focus, to the pinion of lens was attached a needle which pointed to a dial having a record of distance, which has to be judged by the operator. Several street figure studies, &c., were passed round illustrating its purpose.

A cordial vote of thanks was passed to Messrs. Coltart, Beer, and Kenyon, also to others who had exhibited, and the meeting was adjourned.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held at the Studio, on Wednesday, the 23rd ult.,—Mr. T. Davey in the chair.

A letter, regretting absence, having been read from the Hon. Secretary, and the minutes of the previous meeting having been confirmed,

The Chairman called upon Mr. E. Brightman to read the second part of his paper, *The Carbon Printing Process.* [See page 329.]

The Chairman inquired what was the so-called "safe edge" and its object in carbon printing.

Mr. Brightman explained that the safe edge consisted of four narrow strips of semi-transparent paper pasted on the edges of the negative, its object being to prevent a thick film of gelatine at the edges of the print. It being found in practice that a dense deposit of the insoluble gelatine at the edges is liable to induce frilling of the film, with a thin border the tendency to frill is avoided.

The Chairman inquired whether any preparation was used to cause the film to adhere to the glass in transferring.

Mr. Brightman replied that the film when moistened would adhere to any non-porous substance by atmospheric pressure, on the same principle as the leather-sucker used as a toy by schoolboys; but in some cases, with tissue in which a difficulty was found in securing perfect adherence, the glass plates might be previously coated with a thin film of gelatine rendered insoluble by chrome alum.

Mr. Brightman's paper was listened to with evident interest, and a vote of thanks was unanimously passed to that gentlemen, after which the meeting was adjourned.

Correspondence.

June Meeting of the Photographic Society of France.—Presentation of Photographic Proofs by M. Roussilon. — A New Rectilinear Lens, with Changeable Focus, by M. Français.—Gillot's Phototypographic Proofs.—Other Phototypographic Prints by M. Meisenbach, of Munich, presented by M. Vidal. —M. Audra on Instantaneous Photography. — Discussion on the Best Dry Shutter.—M. Davanne on Alum in the Hyposulphite of Soda Bath.—Presentation by M. Vidal of Gelatino-Bromide Plates Tinted with Eosine.— M. Lugardon's Collection of Instantaneous Subjects. — Herr Wild's Restrainer, &c.

The usual monthly meeting of the Photographic Society of France was held on Friday last, the 1st instant.

M. Roussilon, of the establishment of MM. Goupil et Cie., presented some very fine phototypographic proofs, which were very much admired. The artist keeps the secret of his process to himself. The proofs were printed upon very fine paper, highly glazed, but without

any title printed at the same time upon the margin. Whatever may be the process employed, it appears to require great care in manipulating. In fact, what is required in a phototypographic process is that the picture and the title be printed off at once; in short, a process with which one can only print the pictures without the title will not go down with the modern photographer.

M. Français presented a new rectilinear lens with changeable focus, and very good proofs to show the value of the different optical combinations.

M. Davanne presented a number of phototypographic proofs produced by M. Gillot, and he (M. Davanne) gave a description of how these proofs had been obtained.

M. Vidal presented a very fine collection of phototypographic prints made at Munich by Herr Meisenbach. The results leave nothing to be desired. Herr Meisenbach by his process can reproduce nature, and his productions show a sharpness in the texture of the image which we seek in vain in other processes. He prints, no doubt, upon a coloured or tinted paper, finely chequered, in order to have the blacks and whites so well defined.

M. Audra had made many experiments in instantaneous photography, but without meeting with great success. He perceived that the drop shutter (guillotine) which he used, when allowed to fall naturally, did not permit great rapidity of exposure. That was the fault to which must be attributed his want of success.

M. Vidal remarked that the time taken up by the fall of the drop shutter could easily be calculated, as the distance which any body passes through in falling freely in space is 4m. 90 for the first second. It results that the trap of a drop shutter, just the size of the diameter of a half-plate lens (60 m.m.), will go over that distance in $\frac{1}{80}$ of a second, and in $\frac{1}{40}$ of a second if the opening, instead of being 60 m.m., should be double, or 120 m.m. Evidently this rapidity is not sufficient, because for objects in motion a rapidity of $\frac{1}{250}$ to $\frac{1}{300}$ of a second is often required.

M. Martin was of opinion that the rational place for a drop shutter is in the exact position occupied by the diaphragm, either for the single lens or the double lens. It is only in that position that no part of the image is cut off. A gradual darkening takes place, but all the reflected rays fall upon the sensitised plate.

M. Davanne informed the Society that he had been experimenting with the formula of the Marquis de la Ferrounays. He had saturated a hyposulphite of soda and alum solution with silver bromide; he then plunged a gelatino-bromide plate in the solution, and left it forty-eight hours, but no sign of fixing had taken place. The plate was passed round among the members. Practice thus confirms the theory which was given by M. Davanne at a former meeting—that there is a limit to the fixing energy of the hyposulphite of soda bath as soon as this product is saturated with a silver salt.

M. Vidal exhibited his experiments with gelatino-bromide plates containing eosine. These plates were prepared by MM. Clayton and Tailfer. The sensitiveness to certain rays has been greatly modified by employing the eosine, especially for the yellow.

The isochromatism, without being perfect, is progressing by the means proposed. We can now obtain the respective value of violet, blue, green, and yellow rays. As to the red rays: they are still refractory, but it is to be hoped that ere long they will be subdued, so as to give every satisfaction to artists, who will then be enabled to see their pictures reproduced by photography with all the real effects of light and shade.

M. Vidal gave a warning to the Bank of France that it is now very easy to imitate their bank notes by means of eosine plates. He (M. Vidal) had reproduced a bank note in a very satisfactory manner by covering the note with a very thin film of yellow gelatine. The blue lines of the bank note are of a bluish-yellow tint and are very non-actinic, whereas the yellow comes out admirably, and the negative leaves nothing to be desired.

M. Gobert, an official of the bank, followed M. Vidal through all his explanations, and said that this subject merited all the attention of the governors of the Bank of France.

M. Lugardon, of Geneva, was present at the meeting, and exhibited some very remarkable instantaneous proofs of birds, dogs, horses, and other animals. The developer which gave him the most satisfaction for these instantaneous pictures is that of Herr Wild, which permits the development to be continued for more than half-an-hour without inconvenience.

Dr. Eder says that the formula of Herr Wild is very good, and that he obtained by its agency more softness and detail in the shadows than by the use of potassium bromide. Herr Wild takes one gramme of iodine and dissolves it in 200 c.c. of alcohol; he then adds 200 c.c. of water to the whole. Five to ten drops of this solution is added to the 50 c.c. of the ordinary oxalate of iron developer.

25, *Rue des Apennins, Paris, June* 5, 1883. E. STEBBING, *Prof.*

RESTRAINERS IN THE DEVELOPER.—SULPHITE OF SODA.

To the EDITORS.

GENTLEMEN,—In my letter of last week, in which I corrected an error in a certain report given in your columns, I am made to "make confusion worse confounded" by the insertion of still further errors, which certainly should not have crept in.

For "ultimately connected" *read* "intimately connected." For "to the amount" *read* "with the amount," that being an error of *mine.* For "sulphites" *read* "sulphates" (I do not believe that sulphites possess any restraining action).

Now it may be that no one will take the trouble to read either this or my former "correction;" yet, as one does not care to appear to write absolute twaddle, I ask you to insert this letter.

Perhaps I may at the same time allude to a remark in Mr. S. Fry's communication upon *Hot Weather Development.* He says:—"We may bear in mind that sulphite of soda was announced as a complete remedy for green fog." I have never observed such a statement, and do not think such an one has been made publicly. I myself certainly stated that the use of it prevented the staining of the film by oxidised pyrogallol—that is to say, the yellow-brown stain, for the curing of which acid and alum is generally used. And I further hold the opinion that the cause of green fog is in the plate and not in the sulphite; but I have not considered the sulphite to be a "remedy for green fog," and I do not think that it has ever been put forward as such.—I am, yours, &c.,

29, *Southampton-row, June* 4, 1883. HERBERT B. BERKELEY.

BRISTOL (TRIENNIAL) INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—Will you kindly make it known that, in accordance with the decision arrived at nearly three years ago, the above exhibition will be a triennial event. This is the year for again holding it, and prize lists may now be had, the general arrangements being already in hand.

We have not only promise but evidence of a large number of entries, and we anticipate an exhibition equally successful with the last.

I write this, as it may be well that, in the face of suggestions for exhibitions elsewhere, it should be generally known that the Bristol exhibition takes place in December next; for I think all secretaries are agreed that many exhibitions in the same year are not desirable.—I am, yours, &c., H. A. HOOD DANIEL, *Hon. Sec.*

June 6, 1883.

EXCHANGE COLUMN.

I will exchange a breech-loading central pocket revolver for a Cadett's pneumatic shutter, if perfect.—Address, KEENAN, Britannia Villas, Twickenham-green, S.W.

Some hundreds of THE BRITISH JOURNAL OF PHOTOGRAPHY (some volumes complete), *Liverpool and Manchester Photographic Journal,* &c., &c., will be given in exchange for anything useful and valuable.—Address, J. L., 9, Monkton-terrace, Jarrow-on-Tyne.

Wanted, a whole-plate portrait lens, with rack and pinion, in exchange for a double-draw marine binocular glass, by Keyzor and Bendon, object glass one and three-quarters of an inch, case (worn) and strap complete.—Address, H. ELLIS, 17, Trinity-street, Ryde.

I will exchange a Dallmeyer's triplet, for whole-plate groups or 10 × 8 views, &c., for a good half-plate portrait lens or a good square whole-plate bellows-body camera for studio or field, swing-back preferred, Cadett's inside shutter, &c.—Address, SAMUEL PHILLIPS, photographer, Waddon, Croydon.

I will exchange two porcelain dishes, 24 × 19, printing-frame, plate-glass front, 18 × 22, a quantity of opal glass, various sizes, two Johnson's head-rests, and a twelve-inch glass bath in mahogany case. Wanted, a Victoria camera, with lens, or tourist camera, with lens, or offers.—Address, H., 70, High-street, Islington, London, N.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Thomas Protheroe, 36, Wine-street, Bristol.—*Four Photographs of Ferns.*

Frederick Argall, High Cross, Truro.—*Two Group Photographs of the Bishop of Truro and Family.*

Alexander Nichol, 70, Lauriston-place, Edinburgh.—*Photograph of the late Dr. William Chambers, LL.D.*

R. W. C.—Received as we were going to press. We will reply in our next issue.

A. MARK.—The quantity of silver will be sufficient if the proportion of bromide is right.

J. W.—The defect is a common one, and cannot be avoided when it has once attacked a plate.

R. W. S.—You cannot do better than treat your hppo. residues by the method given in a leading article last week.

PLUTARCH.—The firm ceased to exist some years ago. We are not aware if there be any successor to the business, but we think not.

C. B.—If a solution of cyanide of potassium will not remove the stains, we fear you will not succeed in getting them off with anything.

Stephen Taylor.—Reduce the strength of the sensitising bath to one ounce of the bichromate to a pint and a-half of water. That will be quite strong enough during the summer months.

W. Gaddum.—The late Mr. T. Sutton invented a camera such as you mention, but we believe it is not an article of commerce at the present time. Any camera-maker will doubtless make one to your order.

R. J. J.—Clearly the plates you are employing are not sensitive enough for the shutter. All the views are under-exposed, but would have been good had the plates been more sensitive so as to have yielded fully-exposed negatives.

Retoucher.—Dragons' blood is a very good material for tinting a matt varnish, except that the colour is exceedingly fugitive, and will fade even while a dozen or so proofs are being printed from the negative. Aurine is a far more permanent colour, and is freely soluble in spirit of wine. This will probably answer your purpose.

R. Benyon.—The flatness of the prints is due to the paper being sensitised on too weak a silver bath. Twenty grains to the ounce is certainly not strong enough for any paper that we have hitherto tried—that is, if bold and vigorous prints are required. It is useless your attempting to obtain a purple tone with such paper.

H. Solter.—Your proportion of potassium bromide is about correct. Nevertheless, from an examination of the sample of emulsion sent we have little hesitation in saying that the result is due to the presence of excess of silver, which, under the influence of heat, has acted upon the gelatine to produce the red colour. Have you made a mistake in weighing?

W. R.—The lens is not quick enough for the class of subject, which forms a very severe test and requires the most rapid instruments obtainable. The second lens you name would be, with full aperture, perhaps four or five times quicker, but the definition would not be nearly so good. The fog you complain of is simply the result of forcing the under-exposed plates.

John Henry Knight.—The fault in the print enclosed is that it appears to have been over-toned. Perhaps the sample of paper you are using does not suit your method of working. Try another make. It is quite possible that the negative is too weak, but of that we cannot judge without seeing it. You must bear in mind that unless the negative be sufficiently vigorous it will be impossible to obtain brilliant prints, whatever paper you may employ.

W. Bassano.—Your experience is somewhat curious, as the opaque spots, when moistened with water and gently rubbed with a soft material, become quite transparent. The spots appear to be in some way due to the surface of the varnish being abraded, and thus allowing contact to take place between the silver paper and the gelatine film, which we can only imagine contains some slight trace of hyposulphite of soda, though your washing appears to be carefully performed. For a backing to the plates try plain collodion strongly tinted with aurine.

Received.—Edwin Banks. Thanks. In our next

Photographic Club, Ashley's Hotel, Henrietta-street.—The subject for discussion at the next meeting of the Club, on Wednesday next, the 13th instant, will be *Outdoor Portraiture*, postponed from last Wednesday in consequence of pressure of other interesting matter.

Photographic Society of Great Britain.—The *last* meeting of this Society for the present session will be held on Tuesday next, the 12th instant, at eight o'clock, in the Gallery, 5a, Pall Mall East, when papers will be read by Mr. J. Spiller, F.C.S., on *Collodion and Pyroxyline: the Question of Permanence*, and by Captain Abney, R.E., F.R.S., on *The Effect of Pressure on Sensitive Salts of Silver;* also, communications from Messrs. J. B. Spurge and J. R. Sawyer.

Disastrous Fires.—A fire of a destructive character broke out on Monday morning last, at a quarter past one o'clock, at Elm-grove, Hanover-street, Peckham, upon large premises owned and occupied by Mr. W. Griggs, printer and photolithographer. The outbreak was discovered in a large building, two floors high, and eighty feet long by fifty-five feet deep, which was used as engine and boiler houses, workshops and stores. This got so thoroughly ablaze that the efforts of the fire brigade could not prevent its total destruction. The private residence of Mr. Griggs, Elm House, was also nearly burnt out, and the roof was destroyed. The entire edition of a work by Sir George Birdwood, on the "Taj at Agra," which was on the eve of publication by Mr. Quaritch, has been consumed. The book was printed in the same style as Mr. Vincent Robinson's work on "Eastern Carpets," from drawings lent for the purpose by Lord Northbrook. These original drawings, by a native artist, are safe; but the expense of reproducing them in the perfect manner for which Mr. Griggs is distinguished is too great to hope for another edition being undertaken to make good the one that has now disappeared. Also the whole stock of the "Portfolios of Industrial Art" has perished. Mr. William Griggs was himself the publisher of this work, which was very largely patronised by the Science and Art Department of the Committee of Council on Education. Fortunately the greater part of the "Shakspere Quarto Facsimiles," published by Mr. Griggs, and of which Mr. Quaritch is the agent, had been transferred to Mr. Quaritch's charge, and only a portion which had remained at Peckham was destroyed.——On Monday last, also, a fire broke out in the art gallery of Mr. W. W. Winter, photographer, Derby, destroying not only some choice photographs but also several valuable paintings.

Oxford University Museum.—On Friday evening last, the 1st instant, a *conversazione* was held by the Oxford University Junior Scientific Club. There was a brilliant gathering of ladies in evening dress and gentlemen in academical attire. At quarter-past ten an exhibition took place, in the large lecture theatre, of the fresh-water *Medusa Limnocodium*, from the Royal Botanical Society's lily tank. This is a kind of fresh-water jelly fish, almost transparent, about a quarter of an inch in diameter. Ten or a dozen of these were put in a glass tank and thrown on the screen by the oxyhydrogen lime light by Mr. Wm. Brooks, of Reigate, and formed very interesting objects from a scientific point of view. While they were on the screen a lecture on the habits of these creatures was delivered by Mr. Hickson. Their movements caused no little amusement, as they passed across and about the screen. At times they appeared like an umbrella opening and shutting, sometimes turning inside out. One or two other living specimens of a different class were also put upon the screen; after which Mr. Brooks exhibited a series of his instantaneous slides, made by the collodio-bromide process as worked by him. Almost every slide as it was placed on the screen was loudly applauded. One slide was greatly admired, and—namely, a panoramic one—which, as many expressed themselves, seemed endless. The meeting broke up at a very late hour, all present being apparently delighted with what they had heard and seen.

The Greenwich Observatory.—The annual visitation of the Royal Observatory took place on Saturday last, when the Astronomer-Royal (Mr. W. H. M. Christie) presented his report. Among other matters of great general scientific interest the report states that a very valuable addition has been made to the instruments by the generous gift by the Misses Lassell of the Lassell two-feet reflecting equatorial (with which Hyperion was discovered in 1848), the exceptional qualities of which are well known. The instrument has been erected in the south ground, where it commands a nearly unobstructed view of the sky to about 5° of the horizon. Preparations were made for observing the transit of Venus on December 6, but clouds completely hid the sun from view during the time of the transit. The spectroscopic observations of Sirius during the past winter tend on the whole to confirm the impression that the rate of recession of this star has diminished progressively since 1877, and that the motion is now on the point of being converted into an approach. Photographs of the sun have been taken on 200 days, and 339 have been selected for preservation. There were seven days on which the sun's disc was observed to be free from spots. In November a group of spots of very unusual size appeared. The photographs, on a scale of eight inches to the sun's diameter, recently obtained in India were so successful that the Solar Physics Committee recommended the general adoption of this scale, and he (the Astronomer-Royal) proposed to have a photoheliograph altered from the four-inch scale accordingly. The proposal to fill up gaps in the Greenwich series with Indian and other photographs had been carried out, and a record of the condition of the sun on 279 out of the 302 days in the interval between December 22, 1881, and October 19, 1882, is now presented. In regard to magnetic observations, a great improvement has been made in the photographic registrations by the substitution in June of Morgan and Kidd's argentic gelatino-bromide paper, with ferrous oxalate development, for the old process.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For two Weeks ending June 30, 1883.
These Observations are Taken at 8.30 a.m.

May	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
24	30·13	W	60	57	119	82	52	Bright & Calm.
25	29·97	W	63	56	106	76	53	Cloudy.
26	29·60	NW	59	57	98	60	55	Raining.
28	30·09	W	59	51	114	71	48	Bright & Calm.
29	30 03	SW	64	57	123	73	51	Coludy.
30	30·21	NW	56	51	90	65	49	Bright & Calm.
31	30·25	W	61	53	117	72	49	Fine.
June 1	30·07	SE	60	53	107	72	49	Hazy.
2	30·10	W	64	59	106	73	51	Hazy.
4	30·01	E	58	54	117	77	49	Overcast.
5	29·88	NE	62	56	115	75	50	Cloudy.
6	29·86	E	56	51	108	68	46	Cloudy.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1206. Vol. XXX.—JUNE 15, 1883.

THE EFFECT OF PRESSURE ON THE SENSITIVE SALTS OF SILVER.

The discussion which followed Captain Abney's interesting paper on the above subject at the meeting of the Photographic Society of Great Britain, on Tuesday evening last, elicited such contrary opinions that we were induced at once to repeat the experiments detailed, with a view, if possible, of judging which presented the strongest probability of correctness.

From the report of the meeting in another column it will be seen that Captain Abney holds that mechanical pressure produces the same effect on a sensitive film as does the impact of light, and that a reduction of silver follows the application of a developing solution on those portions which have been submitted to pressure. Mr. L. Warnerke, on the other hand, holds a diametrically-opposite view, namely, that pressure *destroys* the sensitiveness of the film to light. In support of his case, Captain Abney exhibited a number of plates upon which certain words had been inscribed with a hard, blunt point, applied with considerable pressure, sufficient to indent or abrade the surface of the gelatine very slightly, but not to scratch through it to the glass. Without exposure to light these plates were developed in the ordinary manner with alkaline pyro. and ferrous oxalate, when the characters appeared as sharp, black lines of reduced silver. Portions of the plates immersed in potassium bichromate previous to development showed subsequently no reduction of silver, but simply the light surface scratch, the "image" having been destroyed by the oxidising action of the bichromate, as is the case with light-impressions, thus proving that the chemical change, however produced, is similar, if not identical, in both cases.

We proceeded to repeat the experiment for our own satisfaction, using a glass rod drawn out to a fine point, which was rendered smooth by fusion. The plates were thoroughly dried by exposing them for some time to the heat of a water-oven in order to harden the surface, and various characters were inscribed thereon with different degrees of pressure—from the heaviest the film would bear to the merest touch scarcely sufficient to mark the surface. In all cases *where the surface was scratched or abraded* the figures deveoped with the greatest readiness and appeared with a density proportionate to the degree of pressure applied, the heaviest touches showing strongly at the back of the plate.

The fact that the lightest touches which failed to abrade the surface refused to develope raised the question as to whether pressure or friction was the active agent, and direct pressure without friction was therefore tried. A sharply-cut coin, a metal ring, and a cross cut out of thin sheet ebonite, were separately laid upon sensitive plates with plain glass superimposed, and submitted to powerful pressure in a joiner's wooden clamp. In no case did development produce any reduction of silver, though the pressure was sufficient to cause a mark on the sensitive film before development.

In order to test whether *abrasion* or the possible electric disturbance caused by *friction* was the active agent, a thin film of gelatino-bromide—a stripped sensitive film, in fact—was laid over the plate and characters formed, and lines ruled with very heavy pressure. The result was that the markings were visible before development as *bright* lines and not *scratches*, the surface being quite free from abrasion. On very prolonged development no deposit of silver was formed, though figures inscribed on the bare film, as in the first experiments, came up distinctly. On the contrary, an opposite action appeared to be set up; for, in consequence of the prolongation of the development—pyro. being employed in these cases—a considerable amount of green fog appeared, upon which the characters inscribed through the second film showed by transmitted light as *clear lines*, thus lending some support to Mr. Warnerke's side of the question.

A plate was then exposed for a moment to weak diffused daylight, so as to fog it, and was written upon as before, and also submitted to pressure under a ring of metal; through the fog which appeared, on developing, the scratched characters stood out bold, dense, and clear, while not a sign of the pressure produced by the ring was visible.

These results are sufficiently remarkable, and tend to show that neither friction nor pressure without abrasion will produce any reduction on development. It seems probable that the minute particles abraded by the glass point are placed in a state of molecular excitement, which brings them within range of the reducing action of the developing solution, and these on reduction transmit the action downwards, and laterally from atom to atom in the manner which Captain Abney himself has explained some years since. Since the above was written we have learnt that Captain Abney's experience in some of these respects differs from our own; at anyrate, here is a nice little puzzle for those who may be interested in such matters.

PORTRAITURE FOR AMATEURS.

Before bringing that portion of the subject—the selection of the most advantageous situations for obtaining portrait groups—to a conclusion it will be as well to mention one not before alluded to, namely, a conservatory. Groups taken in conservatories cannot be classed as outdoor portraiture, yet this series of articles would scarcely be complete without allusion to the results obtainable within them.

If the conservatory be a small one not more than two or three figures in the group should be attempted, neither should the essay be made even if it be large, supposing the building be well filled with plants, and the roof (as it generally is) covered with vines or trailing plants, as these cause the light to be much broken up as well as materially diminished. The chief difficulty in working in a conservatory or greenhouse is in obtaining even illumination on the faces; but when this can be overcome admirable pictures may be obtained, as the play of light and shade caused by the strong light shining between the plants and creepers, when properly dealt with, produce most charming effects. However, considerable skill as well as judgment is required in order to obtain them, and the novice will do well to gain some experience with outdoor portraiture before attempting to work in a well-filled conservatory. Frequently a conservatory may be utilised when it is impossible to work out of doors—as, for instance, when it is raining or the wind is high; because the wind, as in landscape photography, if strong will always prove a source of trouble in outdoor portraiture by its causing a movement in the drapery.

Assuming that the student has read our former articles on taking outdoor portrait groups, we shall here recapitulate a few of the

practical hints previously given, so as the more strongly to impress them on the memory. In posing the group always arrange the figures in such a manner that the sharpest focus possible with the full aperture of the lens shall be obtained; then introduce the stop, using one with the largest opening that will enable sufficient definition to be obtained, bearing in mind that in many instances microscopic definition may advantageously be sacrificed in order to curtail the exposure, particularly when many persons have to be included in the picture, and several of them happen to be juveniles. It is seldom, even when the most rapid plates are employed, that the light is so good that an instantaneous exposure will permit of a fully-timed negative being obtained, and, unless a very brief exposure can be given, there will always be a risk of some one or other of the sitters moving.

In all cases the amateur should well consider and determine in his own mind beforehand how the group should be posed, so as to place each sitter in such a position that no necessity may exist to alter them afterwards. Much after-alteration always becomes wearisome, and often gives rise to jocularity on the part of one or more of the company, thereby causing a titter, if not a laugh, amongst the others just at the moment of exposure, thus spoiling the negative. No pains should be spared to secure a good negative at the first attempt; for it is seldom that a second essay is, on the whole, much superior, provided the former one had been well considered beforehand. However, it is always a good plan to secure a second negative, if a double slide be available, without altering the pose, and, if possible, without the sitters being cognisant of it, giving a slightly-different exposure, so that, as a rule, one satisfactory negative at least will be secured. In arranging the group the figures should be placed as closely together as possible, without conveying the idea of their being crowded in order to accommodate the lens. If it be possible to give the sitters some occupation at the time of sitting it will materially conduce to destroying the formality one so frequently sees in portrait groups, and, at the same time, add to the artistic character of the picture. This can the more easily be accomplished when working out of doors than in a studio, as there the space is often too circumscribed to permit of much scope in this direction.

One fact cannot be too strongly impressed upon the mind of the student, namely, to give a full exposure to the negative; for, unless this be done, it is perfectly impossible to obtain satisfactory results in portraiture out of doors. It should be the motto now, as it was in the old collodion days—"to expose for the shadows and let the lights take care of themselves." In no case is this so essential as when taking groups in full sunlight. If this axiom were acted upon more than it is at the present time far better results, both in portrait and landscape photography, would frequently be obtained. Sufficient has already been said with regard to the necessity of securing even illumination over all the figures, or, rather, over all the faces; for sometimes the cast shadows from one figure may be successfully utilised for subduing the prominence of a conspicuously-light dress of another.

However carefully the sitters may be arranged or the situation chosen for operations, there are, unavoidably at times, instances where one or more of the figures are not in harmony with the remainder, or that the background is not in unison with the figures. Probably it may be too dark and lacking in detail from under-exposure. This frequently happens when the background is composed of dark foliage, such as ivy, and had the attempt been made to avoid it by prolonging the exposure the figures themselves would in all probability have been overdone. To meet such cases as this we shall give a hint or two on "vamping up" or "dodging" the negative, so that fairly-presentable impressions may be obtained from it. Let us take a case, for example, of a group in which some of the faces are thinner than others in the negative, or some of the dresses are so dense that in the resulting print they become obtrusive. If we coat the back of a negative with a somewhat opaque matt varnish, we shall, of course, make it print more slowly generally; but, if we then scrape away the varnish in certain places, those portions which are left unprotected will require the original time, while in those protected the printing will be retarded. From this it will be seen that there is a great power at our command if judiciously employed.

Supposing, for example, we have the negative of a group in which some of the dresses are too dense while some of the faces are too thin, or, on the contrary, perhaps too strong: we first coat the back of the negative with a matt varnish, and then carefully scrape away with the point of a penknife those portions where the image is too dense. This done, it is as well to take a print and judge the result before proceeding further. Having seen the result of our manipulations in the print we now turn our attention to the shadows, or to those faces which print too heavily. These we treat by taking a paper stump (such as those employed by artists in crayon work), and apply with it a *very* little finely-powdered plumbago to those parts which are too thin, taking care to use only a mere trace of the powder, as its effect is very pronounced indeed. By this means the printing density of any portion may be materially strengthened, and thus inferior negatives may frequently be made to yield tolerably-good prints. If by chance any portion still prints too white the negative may be further backed with thin mineral paper and those portions cut away; but this will seldom be required unless the negative prove very inferior. In the case of the background being too dark and the figures about right, the negative should be coated with the matt varnish as before, and it should then be scraped away from them, leaving the background protected. Then (if found necessary) with the stump and plumbago the deepest shadows may be still further softened or the lights strengthened, and the whole thereby rendered harmonious.

For the present we must take leave of the subject, trusting that our practical hints will prove of service to the novice in portraiture, for whom they are specially given; but at an early date we shall again recur to the subject, and give some useful suggestions as to how a studio may be extemporised or an inexpensive one constructed.

DIFFICULTIES WITH SENSITISED PAPER.

At this period of the year difficulties are apt to arise in connection with sensitised paper that try the patience and skill of the printer to an extent which does not occur through even the severest winter seasons. Many of these troubles being the direct result of great heat, it is scarcely likely that a complete remedy can be found short of reducing the temperature of the room the paper is prepared in—an almost impossible contingency in most cases; but some remedial measures may be certainly taken with advantage.

Perhaps the evil that should stand foremost in the list is the yellowing of the paper. After a long existence and most persistent repetitions by standard authorities, it is now generally known that there is little use in the method of adding a drop or two of acid to the bath. Whatever happen, it must, apart from the adoption of citric acid method, be kept neutral or alkaline, or there will be no tones to be obtained in the prints; to remedy yellowness other means must be adopted. The method of washing the paper and then printing with ammonia-fumed pads gives excellent results; but it entails too much trouble to become a practicable working process.

Directly after sensitising and drying the paper should be put in the coolest place available, and, where it is possible, it should be kept under pressure until the moment it is required. These simple precautions (not always attended to in the press of work) materially influence the purity of the whites of the prints after the day's work is ready for toning, as, though the fixing will remove a portion, it will not take all the yellowness away.

We would here call attention to a point to which we have not hitherto seen attention drawn. It is the great inferiority of wooden boxes to metal or earthenware for storing the prints or sensitised paper in. Using any simple and handy receptacle without a specially tight-fitting cover, we have experimented and found a most marked difference in the colouring of the whites of paper kept in each, the difference being greatly in favour of the metal.

The strength of the bath must be closely watched, as it is liable to greater fluctuation, owing to evaporation, &c., at this summer period of the year than when the weather is colder. The floating argentometer may be used with quite sufficient accuracy for this

purpose, though for a bath in which collodionised plates are dipped it is obviously useless. The appearance of a print floated for a long time upon too strong a bath is familiar to the experienced printer. Nothing looks more disagreeable, yet nothing is less difficult to remedy. A difference of ten or fifteen degrees of temperature in the floating bath (and such a variation may easily occur) is quite sufficient to make the ordinary time of floating protracted enough to produce paper that will tone in the disagreeable way we refer to. The remedy is obvious: either to reduce the strength or the time of floating; and to produce the highest class of results with uniformity these precautions cannot be ignored.

During warm weather—and, indeed, at all times, though mainly in warm weather—an annoying difficulty is apt to arise in the shape of the liquid running into "tears" upon the face of the paper while drying; and, at the present time, when so much highly-glazed albumenised paper is employed, we hear far more frequent complaints than was formerly the case. "Prevention is better than cure;" but when a batch of paper is sensitised before the evil is noticed it is evident that to save that batch curative measures alone can be used. When the evil is observed to appear it is desirable at once to blot off each piece that has been sensitised, whether all show the evil or not, and to take means to prevent its recurrence; for, when once these "tears" form, their traces never entirely disappear. In the white of a vignette they appear as pale grey spots—sometimes not visible till the print is mounted—and in plain prints they decline to tone in a similar manner to the surrounding parts.

For curative measures there are three courses open, one of which, or all combined, will usually effect the desired end:—Firstly: most printers like to sensitise in a room in which there is a fire, to enable the paper to dry more quickly; when the fire is left unlighted it will often happen that the evil is at once stayed, and the extra time needed to dry the paper can be well afforded at this period of the year. Secondly: the strength of the bath may be reduced, or, thirdly, the time of floating increased. As these two remedies are mutually dependent we link them together. Paper that with three minutes upon the bath will run into tears all over will often be entirely free from them if permitted to remain for five minutes. Such a length of time, however, would ruin the toning qualities; hence the bath would have to be weakened, and in doing this a fresh cure is introduced, so that a slight weakening combined with a small increase of time of floating may entirely prevent the disagreeable effect occurring.

We have laid some stress upon this latter phase of the subject, having heard so many complaints lately—caused not only by the warm weather, but, we believe, to the increased consumption of a more highly-glazed sample of paper.

To sum up we would say:—To avoid many evils use no fire in the sensitising room; keep the paper after sensitising cool and under pressure; and watch the indications of the argentometer, keeping the strength of the bath reduced and the time of floating sufficiently protracted to allow the bath to get a good hold of the paper. There will then be comparatively few sensitising difficulties.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter VII.—Portrait Lenses.

By a portrait lens, or combination of lenses, is meant one having an aperture so large in comparison with its focus as to admit a volume of light of sufficient intensity as to enable portraits to be taken in the subdued light of a studio in the briefest possible period of time.

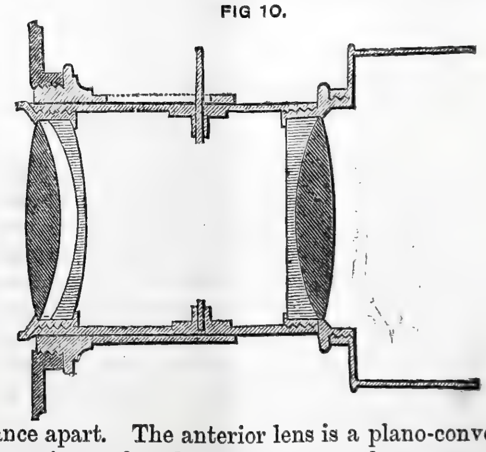
Being aplanatic, a portrait lens is capable of defining sharply without any diaphragm, although, as we shall eventually show, a diaphragm is indispensable for securing its full advantages. It may be urged that any lens by which a portrait is capable of being produced may be entitled to the designation of a ' portrait lens," but in technical language the term is only applicable to those of a certain description, between which and the original landscape lens there are now so many grades as to render somewhat difficult the drawing of a hard and fast line.

The portrait combination is a triumph of optical skill, and in its original and general form is an emanation from the mathematician Professor Petzval, of Vienna. The history of its inception may be told in a few words:—In 1840 Professor von Ettingshausen, having returned from a visit to Paris, where the daguerreotype process was engaging the attention of the scientific world, remarked to Petzval that Daguerre, with whom he had been in direct intercourse, made use of a lens having a small diaphragm, by which a great loss of light ensued, and inquired if he (Petzval) could not devise a better form of lens. Acting upon this hint Petzval instituted researches, and the year following (1841) gave to Voigtlander—at that time an optician of small means but good reputation—the formulæ for two objectives, both of them working without a diaphragm. One had a large aperture and short focus, and gave great concentration of light over a large area; the other had a longer focus, and was capable of covering a large field. The former was the now well-known and universally-used portrait lens, the other being the orthoscopic, which was allowed to lie *perdu* for several years afterwards. A becoming distinction not having at that time been recognised between actinic and visual achromatism, the lenses of early times had what has been succinctly designated a "chemical focus"—a fault which is now eliminated from the productions of every lens manufacturer of eminence. Thus much by way of remark on the early history of the portrait combination.

The leading distinction between the portrait and other lenses is implied in the term "angular aperture." This it is which determines rapidity. Angular aperture has no relation to actual size or diameter of lens, except so far as such relates to focal length; hence a lens only one inch in diameter may be a much quicker-acting instrument than one of three inches, because of its aperture being larger in proportion to its focus. In making choice of a lens for rapidity of action care must, therefore, be taken to select one of short focus in proportion to its actual diameter. The acting angular aperture of a lens varies with every different stop that is used; and it is frequently necessary to reduce this aperture considerably—not for the sake of weakening the light and thus protracting the exposure, but in order to confer a greater degree of penetrative power, for "depth of focus" is in the inverse ratio of large angular aperture. When a comparison of lenses is made in order to determine which is the better, both should be as near as possible of similar diameter and focus; because two lenses may be of the same diameter—say three inches—but one of them having a focus of six inches and the other of twelve inches, the difference between the two as regards rapidity will be this—that the one of twelve inches will necessitate an exposure four times longer than that required by the other in order to obtain equally-exposed negatives. Again: two lenses may have the same focus, one of them having a diameter of three inches, while that of the other is only one inch and a-half. The former possesses four times the intensity of the latter, and will work in a fourth of its time. A just comparison cannot be made between two lenses of the same focus but dissimilar dimensions, unless both are stopped to the same extent.

The portrait objective consists, as shown in the adjoining diagram (*fig.* 10), of two achromatic lenses of dissimilar form mounted at

FIG 10.



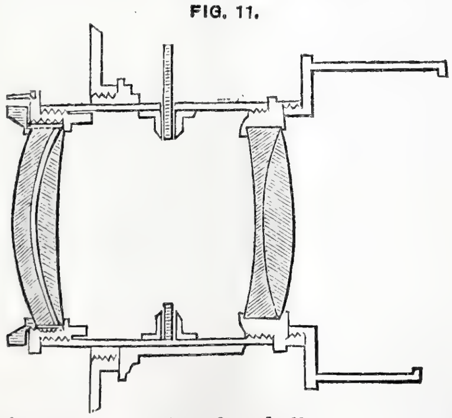
some distance apart. The anterior lens is a plano-convex, or, more usually, a meniscus of such a slight external concave curvature as to seem to a cursory observer to be plane. Its component parts are a crown glass double-convex, attached by transparent cement to a

plano-convex flint lens. The posterior lens is a double-convex composed of a bi-convex crown and a concavo-convex of flint glass. The inner curves of these are not concentric, as in the anterior lens. They are usually mounted so as not to touch each other, and when tested as a whole will be found lacking in the power of bringing rays to a sharp, or even moderately-sharp, focus.

The back combination of a portrait lens fulfils a twofold function: it shortens the focus, and thus aids in conferring intensity of illumination; it also distributes over a flat field the image formed by the anterior lens, which, without the correcting influence of the back lens, would be sharp only over a very limited area. This is the principal function of the back lens, and it performs it because of its excess of negative spherical aberration—a property that will be observed readily if the posterior combination be employed as a magnifier in the examination of any printed matter, when it will be found that the focus of the centre is shorter to a considerable extent than that of the margin. Seeing that this property of negative aberration is modified by the distance apart of the elementary components of the posterior lens, it is frequently possible to convert a bad lens into a good one by a slight adjustment of this portion of the objective. Many portrait combinations have the back lenses placed loosely in the cell, with a flat ring of brass between to keep them apart. An objective of this class, four and a-half inches in diameter, intended for 15 × 12 negatives, which performed very badly in consequence of its roundness of field, the centre of the picture only being sharp, had the separating ring of the back components entirely removed, and with marked advantage. This posterior combination was now found to have its negative aberration greatly increased, for the separating ring was half-an-inch in width. Now, as the anterior lens of the objective was of much shorter focus than the back one, it was considered necessary, in consequence of the now increased negative aberration of the back, to bring the front and back lenses much closer together. Accordingly, after a few trials the tube was shortened to the extent of an inch and three-quarters, with the gratifying result of the objective working in an exceedingly satisfactory manner, and taking a sharp portrait on a 15 × 12 plate—the full size it was intended to cover. This incident is mentioned because a bad lens was converted into a good one without a necessity being experienced for regrinding any of the surfaces.

A form of back lens, differing from that of Petzval, was introduced several years ago by Mr. J. H. Dallmeyer, in which both the forms and the relative positions of the components are reversed. Its nature will be ascertained from the diagram (*fig.* 11), in which

FIG. 11.



the back lens is seen to consist of a shallow meniscus formed of a concavo-convex of flint (the convex side being nearest the ground glass) and a meniscus of crown. The two lenses are so constructed that when placed as closely in contact as possible the objective will give sharp definition, but when separated in even a very slight degree spherical aberration is introduced to any desired extent, thus lowering the definition. This form of back combination is now adopted by some of the leading continental opticians, who burnish the two lenses in one cell, thus discarding the advantage conferred by separation of the constituents.

All portrait objectives of any pretensions to the highest quality are now fitted with diaphragms. At first these were inserted in the hood of the lens, and kept in their place by a ring the width of the hood. It then occurred to Mr. Lake Price to slit the tube so as to drop in one of a series of loose diaphragms between the lenses; but the invention is now associated with the name of Dr. Waterhouse, who further simplified the system.

We have spoken of angular aperture as the great requisite towards rapidity in a portrait lens; but there is another which, while less essential, is still of great importance. We refer to quality of glass. Both crown and flint optical glass are sometimes apt to be a little "off" the colour even when made, and it is a well-known fact that discolouration occurs in lenses by merely exposing them to a strong light. This will be more specially alluded to in a subsequent chapter.

Intelligence has at last arrived of the doings of the various parties sent out to observe the eclipse of the sun of the 6th of last month, a full account, so far as information has reached this country, being published in another column. It is at least satisfactory to learn that success appears to have been general, and though the reports from our own party on some of the operations are of a dubious character, this may arise from excess of modesty rather than from approximate failure. It is more than satisfactory to photographers, however, to find that their art has proved of such inestimable value in these observations, and Messrs. Woods and Lawrance are to be heartily congratulated on the successful issue of their labours. We expect by next mail the continuation of Mr. Lawrance's account of the doings of the English party from the point at which he broke off in his last.

Detailed accounts are now published giving particulars of the American transit of Venus observations, and from them we learn that Professor Brackett and his assistants took no fewer than a hundred and ninety-one photographs, of which forty were first-class, thirty worthless, and the rest of all grades of excellence.

Every year a visitation of the Royal Observatory at Greenwich takes place, the one this year occurring on the 2nd instant. The report of the Astronomer-Royal to the Board of Visitors is published, and contains much matter interesting to photographers. Spectroscopic and photographic observations have for some years past formed an important department at the Observatory; but for a portion of the last twelve months spectroscopy has had to yield to photography, a period of maximum sun-spot activity having absorbed all available observational vigour. Our readers are aware that famines and commercial panics have been shown to depend upon the state of the sun as regards spots, and meteorological predictions as opposite as the poles have been founded upon the presence or absence of spots; further than this, we believe, "sun-spottery" has not yet gone. Last year the sun was photographed on two hundred days, a wet-plate process having been used up to the beginning of December; but since that date gelatine has been employed, greatly to the convenience of the workers, the results being quite equal on an average, it is stated, to the old method.

Mr. Christie also reports a great improvement in the registration of magnetical phenomena by the substitution of Messrs. Morgan and Kidd's argentic gelatino-bromide paper with ferrous oxalate development in lieu of the old photographic process.

Our contemporary, *La Nature*, has an article upon instantaneous photography, illustrated by two engravings from photographs by Mr. F. J. Martin, of Edinburgh—one of a bather in the act of taking a "header," and the other of a couple of lawn tennis players, the ball in mid-air being plainly shown in the original picture. The article contains also an extract from a communication by M. Ch. Grassin, describing his *modus operandi* in taking some extremely-rapid views of a steamship and of breaking waves—a huge wave from a furious sea breaking upon the shore being represented with admirable sharpness. M. Grassin states that the exposures were made with a shutter of his own invention, and occupied

›m a hundred-and-fifth to the hundred-and-tenth of a second, ›ile to another view was given the sixty-fourth of a second. There here an exactitude of measurement that we should like to see oved before accepting the result as an accomplished fact; but e editor promises a description in a forthcoming number of a ›ecial shutter, by the aid of which equally curious pictures have een taken.

HE value of photography in art processes could not be better ›own than in the involuntary testimony exhibited in the various ›counts in the newspapers of the loss sustained by the deplorable re at Mr. Griggs's studios. It is stated that the work he has been › the habit of doing has been of such a special and high-class ature that, until his premises are rebuilt, the same class of work vill have to be sent to Paris to be executed.

WE have before us a very successful achievement in a branch of photography which is but little practised, in spite of the facilities afforded by rapid gelatine plates and the general adoption of electric lighting, namely, the representations of theatrical scenes and *tableaux* on the stage. Such attempts have already been made on several occasions in this country with but partial success, owing, doubtless, to the expense and trouble of making the necessary arrangements for lighting and the very brief periods of leisure that the hard-worked artistes can spare from their more strictly professional duties. It has been reserved for Mr. B. J. Falk, of 949, Broadway, New York, aided by the enterprise of the proprietor of the Madison Square Theatre, to show what can be done in this direction, the picture before us bearing no evidence of having been taken under any but the most favourable conditions. The scene depicted is the closing *tableau* in Act II. of "A Russian Honeymoon," and includes about thirty figures besides stage accessories, exactly as presented to the audience. In size the print is about 12 × 8, taking in the full breadth of the stage. The exposure was made at midnight, no fewer than thirty arc lights of the Brush pattern being employed. The lens used was a Dallmeyer's rapid rectilinear with the second stop. The exposure for the picture was, we believe, about a minute, though some smaller negatives were taken with exposures as short as eight seconds. A remarkable feature is the entire absence of the strong cast shadows so generally met with in pictures by the electric light, and the contrast between the illumination of the interior and the glimpse of open landscape and figures seen through the window in the centre is very cleverly managed. We shall not be surprised to find this example in theatrical advertising followed by managers on this side of the Atlantic.

READERS of our advertising columns are familiar with the considerable amount of variation in the prices quoted by the various dry-plate makers, and some time ago we gave an example of the terms ruling in America for similar goods, which varied to as great an extent as here. Whether to prevent ruinous competition or as a mode of combining for mutual benefit we cannot say, but a circular has recently been published by five of the leading American dry-plate manufacturers with a uniform and fixed tariff for all, and, as this may interest a number of our readers, we give the prices of a few leading sizes:—

4¼ × 3¼	per dozen	$0·60
5 „ 4	„	0·90
6½ „ 4¼	„	1·20
8 „ 5	„	1·75
10 „ 8	„	3·40
12 „ 10	„	5·00

Subject to five, ten, or fifteen per cent. for orders amounting to 50, over 50, and over 100 respectively. It will be seen that they differ little from our own leading makes.

ON COLLODION EMULSIONS, WASHED AND UNWASHED.

IN my previous contributions on collodion emulsions which have appeared in THE BRITILH JOURNAL OF PHOTOGRAPHY I have perhaps omitted to mention or to sufficiently impress upon your readers the fact that in every case I referred entirely to a collodion emulsion in its unwashed condition. I am led to make the following observations, on this subject from seeing a casual remark made by Mr. Wm. Brooks, in his able article, *Collodion* v. *Gelatine*, in a late number. He says:—"When speaking of collodion emulsion I mean the washed emulsion, as I think an unwashed emulsion a thing of the past." Such an expression from an old and well-known worker in collodion emulsions should carry great weight, and it will be necessary for me to enter fully into the reasons why I have, in my own practice, entirely relinquished "washed" in favour of "unwashed" emulsion.

I know that in doing so I shall have a certain amount of prejudice to overcome, especially amongst those who have been accustomed to the working of washed emulsions; for during the last seven or eight years of the practice of collodion, before the advent of gelatine, an unwashed emulsion was rarely even spoken of, much less practically employed. But my object in writing and endeavouring to revive an interest in this beautiful process was not to return to the collodio-bromide as it was, even in its latter days, but to a certain modification of it suggested by the further experience and knowledge gained by the practice of gelatine processes. This suggested method was to so prepare a collodio-bromide film as to bring it into as nearly as possible the same *physical* conditions as those which exist in a gelatine film; and as in my first article I entered fully into the reason why it will be unnecessary to repeat it here. It will be sufficient to say that the first and most important change is reducing the amount of pyroxyline to the lowest possible quantity consistent with the suspending power of the sample used.

Now, with an emulsion made in this way, washing becomes a very difficult, if not an almost impossible, operation. To those who have never made collodion emulsion a word of explanation may be necessary. The object of washing the collodion, like the gelatine emulsion, is principally to get rid of the free nitrates resulting as by-products of mixing bromides with nitrate of silver. To accomplish this one of three methods is usually adopted: either the whole quantity is poured into a shallow dish, and the solvents allowed to evaporate until the emulsion has set or stiffened without becoming absolutely dry, when some organic preservative is poured on and the thick film broken up and afterwards washed; or it is precipitated by being poured into a large quantity of water; or, the reverse, a large quantity of water is poured into the emulsion to cause precipitation. In any case there is a total loss of the solvents originally employed, and very often considerable loss of sensitive bromide as well. But, with an emulsion made with only one or one and a-half grain of pyroxyline to the ounce of solvent and a large quantity of silver bromide, the attempt at washing by either method produces very different results to that which occurs when the full quantity of cotton is employed. If poured into water precipitation certainly takes place, but the bulk of the silver bromide breaks away from the pyroxyline and settles as a fine powder, just as an aqueous precipitate of bromide and silver would; and this precipitate, after being washed and dried, refuses to re-emulsify, or only does so in a coarse and granular condition. The same or very nearly the same result occurs if the evaporation method be employed; for, on proceeding to wash the thick set film the molecular condition of the bromide seems to be changed, and on redissolving, after drying, a gritty or sandy film is very apt to be produced, giving a coarse and granular image.

Then there is the question of cost. Mr. Brooks refers to that in his article when he says that forty ounces of solvents are required to produce twenty ounces of emulsion; and, as ether and alcohol are expensive, even if methylated be used, as suggested by the Editors, the loss of one-half during the process of washing becomes a serious item in cost, especially when large quantities are made. To justify such an addition to the cost in material some very great advantage in the product must be shown.

Again: what is, perhaps, of equal importance is the large amount of time and attention involved in the various operations necessary in washing, organifying, and drying the pellicle. Forty ounces of emulsion, if poured into a dish to evaporate, require from twelve to twenty-four hours to set properly and several hours to wash, while the drying of the pellicle is also a troublesome and tedious operation. And all along you are in a state of uncertainty whether your labour may not be thrown away and your material wasted; for it frequently happens that an emulsion which worked perfectly in its unwashed condition will not give a picture after washing. This may occur from unsuitable proxyline being employed, or from molecular changes taking place in the silver bromide itself.

But the most important objection of all to the washing operation is the absence of any corresponding benefit to be derived from it. It is true that merely coating a plate with washed emulsion and putting it away to dry without further manipulation is an operation which is simple enough. But experience has shown that with this facility in preparation comes a drawback in the tendency to spots of a most exasperating character; and the pages of this Journal for many years teemed with suggestions and investigations into the cause and remedy for the annoyance. The most certain and perfect cure was to wash each plate after coating, and apply a preservative; but, when this had to be done, why wash the bulk?

In the older formulæ for emulsion making an alkaline bromide was usually employed, or a double bromide of cadmium and ammonia, and, of course, an alkaline nitrate resulted as a by-product in the emulsion. Now, an emulsion containing an alkaline nitrate has no keeping property, especially when there is the slightest excess of silver nitrate present; it was, therefore, necessary to test the unwashed emulsion, and when full sensitiveness was obtained to proceed at once with the washing, or hopeless fog would soon set in. But with metallic nitrates present—especially those of uranium, zinc, or cadmium—this tendency to fog is reduced or is altogether absent. Colonel Stuart Wortley and Mr. M. Carey Lea frequently pointed out this property of the metallic nitrates; but there is another function they exercise which is not taken into consideration, and that is the influence they exert mechanically or physically upon the molecular condition of the bromide of silver. There is not the least doubt that the action of these nitrates is to cause the silver bromide to be formed in a much finer state of division and to retain it in such a condition when formed. A simple experiment will illustrate this:—If we mix an alcoholic solution of cadmium bromide with another one of silver nitrate we get, of course, a precipitate of silver bromide, which will settle to the bottom of the bottle in a coarse and granular condition; but if we previously saturate the alcohol with nitrate of zinc, and then proceed to mix in the same manner, the resulting precipitate will be very much finer and form almost an emulsion, so slowly will the bromide be deposited, and when it has settled it will be in the form of an impalpable powder.

For these reasons I hold that, so far from being a disadvantage, metallic nitrates are a positive benefit in a collodion emulsion; and instead of washing them out I should prefer to add more to it. The emulsion is thus rendered finer in its molecular condition, retains this condition with a minimum of pyroxyline, shows no tendency to precipitate with keeping, and will work as clear and bright after being kept twelve months as it did when first made, whilst its rapidity rather increases than diminishes with age. In the practical working of such an emulsion the extra trouble is very little and not worth consideration. After the collodion is flowed over the plate and allowed to set immerse in a dish of water, or, if preparing a number, in a grooved washing-box, and all nitrates are immediately washed out, a film of pure silver bromide remaining. You then have the advantage of every plate being alike to the last drop of emulsion, allowing only for evaporation of solvents during use. As compared with gelatine, you can get equal sensitiveness, whilst development is much more rapid and intensification far easier.

There is another advantage which is possessed by an unwashed emulsion containing metallic nitrates over a washed emulsion, and that is the greater power of adhesion to the glass which it possesses. It is usual to use an albumen substratum with collodion; and in the case of a washed emulsion the albumen is not thoroughly coagulated but remains partially soluble, particularly under the action of the alkali in development. The result is a loosening and slipping of the film or production of blisters, which retain the solutions that pass through the film and frequently spoil what would otherwise be a good negative; but the metallic nitrates in an unwashed emulsion act as powerfully as silver nitrate in the bath process in coagulating the albumen and ensuring adhesion of the film. Even with a minim of pyroxyline, it is surprising what rough usage under a tap such a film will bear without injury, whilst, whether the development be by ferrous oxalate or pyro. with ammonia, or washing soda, or even caustic potash, the substratum is not disturbed.

I have thus given a few reasons why I should prefer working at any time with an unwashed emulsion, and why it is absolutely necessary in a rapid process such as I have indicated; but my principal object in writing has been the fear lest any might be deterred from experimenting on account of the trouble and difficulty involved in washing a batch of emulsion. EDWIN BANKS.

ON FOCUSSING.

No. II.

In the microscope the image formed by the objective is received on a compound lens, called the "eyepiece," and by that is conveyed to the eye considerably magnified; indeed, microscopes are fitted with several eyepieces of different magnifying power. The image seen is inverted.

In telescopes the same general principle is adopted. The objective of long focus gives a comparatively large picture, which is still further increased by the compound eyepiece; in this case so combined in telescopes for day use as to re-invert or erect the reversed image shown by the objective. In both cases the comparatively-feeble image—which would be projected on a focussing-screen placed at the focus of the objective—although greatly magnified by the eyepiece, is brilliant to the eye. Why should not the same plan be adopted—or, I should, perhaps, say, generally adopted—in photography?

In photomicrography it is almost impossible to obtain a sharp focus in any other way. Not only is the finest ground glass so coarse that it seriously impedes the adjustment of the focus, but it generally happens that the illumination is too feeble for the image to be distinctly seen.

It used to be, years ago, a very common practice to have a portion of the focussing-glass polished, and by the aid of the ordinary focussing-lens a sharper focus would be obtained on this spot. The practice appears to have so completely fallen into desuetude that, talking on this subject the other day to a dealer in apparatus, he told me that although he had been over twenty years in the trade he had never heard of such an expedient, but it must be revived again. The advantages are enormous. An image can be distinctly focussed which would require two or three hours' exposure on a rapid bromide plate; therefore there is no need to focus with one stop and take the picture with a smaller one.

That this is really the case anyone may easily satisfy himself at once by pinning a newspaper or other printed matter up against the wall, setting up his camera a few feet from it, inserting the smallest stop in the lens, and, turning the lamp down low (it is most effectively tried at night), take his focussing eyepiece and try to focus. The light may be so faint that no image whatever is distinguishable; but substitute a piece of plain glass for the ground glass of the focussing-screen, or, what is easier, put a piece of plain glass in a dark slide (the shutters of course removed), and then with the focussing eyepiece every letter can be distinctly seen. This, then, is the old plan of a patch of clear glass on the focussing-screen which has been practically abandoned.

The reason is not far to seek. On repeating the experiment of focussing the printed matter on steps with full aperture (lens of rapid rectilinear type), it will be found that, whereas on the ground glass the focus can be easily adjusted for each step in succession, the moment the plain glass is substituted for ground glass all the steps become equally or nearly equally distinct, while with the small stop it is absolutely impossible to establish the focus. The reason is that the eye instinctively and without apparent effort changes its own focus by contraction or dilation of the crystalline lens, and so accommodates itself to the image, correcting the focus accordingly. To prevent this a scratch is made on the side of the clear glass replacing the ground surface, the focussing eyepiece is carefully adjusted to focus this scratch, and thus at the same time the scratch and aërial image are focussed together and coincident. This plan of the scratch was always adopted on the spot of clear glass in the focussing-screen; but the one scratch is not sufficient to keep the eye steady. It will leave it and look for a focus, and it is, therefore, easy to understand that the plan has been abandoned because in practice it is found that, although the detail is more easily seen, it is less certain as to position than the image on the ground-glass screen.

I have said that the image thrown by the microscope or telescope is received *on* the eyepiece. This is not strictly correct. The real image that the objective throws is aërial, and in a definite position. To enable it to be seen the eyepiece must be somewhere behind it, nearer or further according to its own power and the sight of the observer. As is well known, each person has to focus such instruments for himself.

We have then a definite plane (in the air) in which the image really is, and an eyepiece with which to view it, with the difficulty that the eye is apt to be unsteady and accommodate itself to correct a false position of the eyepiece. My first experiment with the object of steadying the eye was to stretch over the piece of clear glass (representing the focussing-screen) a piece of fine net, and the problem appeared at once solved. The symmetrical pattern of the

net held the eye steady and focussing became easier, but the net was too coarse. I then took a piece of clear plate glass, upon which I ruled a number of fine lines about one-sixteenth of an inch apart, crossing each other at right angles, thus dividing the field of view into small squares. The ordinary focussing eyepiece is then very carefully set for this, and the printed matter on steps set up in front of the camera and focussed for the middle one. At first a little difficulty will be found in getting the ruled lines and the image to coincide, but have a little patience and at last the focus of the middle step is established.

Now, keeping the eyepiece steady against the focussing-frame, move the eye to the right and left. The two images remain coincident. Then, if it do not happen already to be so, bring one of the other steps into the field of view. On moving the eye as before the squares will remain steady, but the image of the printed matter will dance backwards and forwards across the squares, in the same direction as the eye if the real focus be behind the squares, and in the opposite direction if in front. Thus the movement of the eye becomes the test for focussing; if the squares and the image remain coincident the image is in focus. On applying this test to the supposed change of position of focus, on inserting a small stop I found, as theory led me to expect, no change of position whatever, but less apparent movement. It is important that the lines should be fine, as cuts or deep scratches may cause sufficient refraction to mislead. With fine lines closely ruled and very little practice accurate focussing is most readily accomplished with a very feeble light.

Some modification of the eyepiece will be necessary, more particularly a lengthening tube at the end at which the eye is placed. This will, of course, depend upon the power of the eyepiece used. With the ordinary focussing eyepiece, if the eye be put close to the lens, only a spot of light is seen in the centre of the field, but by removing the eye about an inch the whole field is clearly illuminated. Using a quarter-plate portrait lens as an eyepiece, I found that the tube had to be lengthened to nearly five inches to get a clear field.

Mr. W. Ackland (whom I consulted on the subject some time since) tells me that the best form of eyepiece is the combination used in an ordinary 5s. or 7s. 6d. telescope, removing the object glass. Focussing lenses of this form—which re-invert the image, which is then seen in its natural position—were in use when the spot of clear glass was in favour, and may still occasionally be met with. It should, I consider, be of high power—not only for the sake of portability, but because the higher the power the greater the magnification and the more easily the fine lines and image are brought to focus together. I doubt, however, whether the non-inverting eyepiece is not better and more accurate, besides obstructing less light. Photographers, too, are so well accustomed to the image being upside down that this is no drawback to focussing. If the erecting eyepiece made the whole field visible that might tell in its favour, but the field is exceedingly small. I find an inch microscope objective an excellent lens to use for the purpose. By cutting an aperture in the top of its box, and cutting away the bottom to such a length that when resting on the glass the fine lines are in focus (or, better still, fitted with an outer tube for adjustment), I find that with a lens of four inches focus, using a stop of $\frac{f}{40}$, I can distinctly focus the veins in the leaves of trees at twenty to thirty yards' distance. I find, also, that with an eyepiece of high power there is less difficulty in making the fine lines and aërial focus of the image coincide, for the simple reason that the higher the power the less the range within which the eye can alter its focus.

It will possibly be wondered why I should attach this importance to ascertaining the exact focus when I have said that extreme sharpness is not necessary. It is for this reason:—In every "picture" there is some important part to which the eye should be directed. If this be made the sharpest the eye will of itself always come to it. It is, therefore, desirable that this part should be accurately focussed, leaving *all* the rest, if possible, less sharp. This, I consider, to be the true art of photography, and not, as is too frequently the case, stopping down the lens till foreground and distance are equally sharp, and the eye wanders about the view—it is not a "picture"—finding no rest. GEORGE SMITH.

NEWS FROM THE ECLIPSE PARTY.

[THE TIMES.]

A TELEGRAM coming through Reuter's agency informs us generally of the success of the observation. The weather seems to have been everything that could be desired, and, although the observations were necessarily made from the lowest possible level, the extension of the corona was quite as great as was expected at this period of *maximum* solar activity. Further: we learn that the light during totality was quite equal in intensity to that of the full moon. This is another indication of the exceptional brightness of the corona, because in this eclipse, which was one of exceptional duration—and that is why such strenuous efforts were made to observe it—the lower and more brilliantly-illuminated portions of the sun's atmosphere being more than usually veiled by the dark body of the moon during the middle of totality, the illumination of the air by these portions of the sun was less than is ordinarily the case. Unfortunately, the telegram may be read both ways touching the intra-Mercurial planet observations. We take it, however, to mean that no intra-Mercurial planet was seen by M. Palisa, who would probably give his chief attention to that point. It is satisfactory to learn that good photographs of the corona were obtained both by Dr. Janssen and the English observers. We may expect that the French photographs of the corona will surpass in beauty and detail anything which has yet been secured during eclipse observation. It is good news, too, to learn that for the first time in the history of eclipses the momentary flash of bright lines seen just before the beginning and immediately after the end of totality has been photographed. Reverting for a moment to our previous article, we would remind our readers that this end has been attained by the use of a slowly-descending plate actuated by clockwork, which, since the flash has actually been photographed, will give its complete history, and enables us to determine the exact order in which the lines appeared and re-appeared before and after totality.

The telegram sent by the English observers—Messrs. Lawrance and Woods—to the Science and Art Department supplies further particulars as to the results of the various attempts at recording the history of the eclipse. The first instrument on the official list is a Rutherfurd grating with 17,000 lines to the inch, which was used in conjunction with an equatorial telescope of six inches aperture. The grating was so arranged that photographs of the green part of the first order spectrum on the one side and the same part of the second order spectrum on the other side should be attempted. This would give the region near F one of the chief solar lines in the blue-green parts of the spectrum; but, although the photographs were actually obtained, the observers do not seem to be very proud of them.

The next instrument is a Dent's prism of 60° mounted on a six-inch equatorial of very short focus. The object in view in employing a short focus was to obtain a very small and intensely-bright image of the corona, while the use of the prism of 60°, giving as small a dispersion as possible, still allowed a really useful amount to be secured. This instrument succeeded well. We do not know the number of photographs obtained by it, but, if the instructions were carried out to the letter, seventeen should have been obtained.

We come next to the instrument by means of which the photograph of the flash of bright lines to which we have referred was obtained. This on the official list is called the "integrating Hilder." It is a spectroscope armed with a collimator of very great focal length and directed merely to the sun's place, no image of the sun or corona, therefore, falling on its slit, as is usually the case. The light from all the regions near the sun is mingled together, a photograph of the spectrum of this mixture being the special aim of the instrument. Messrs. Lawrance and Woods are evidently satisfied with the work in this direction, the code word they use indicating that they consider the results to be good ones. The moving plate with which the instrument is fitted was exposed two minutes before, and withdrawn from exposure two seconds after, totality. Knowing, therefore, as we do, that one flash was photographed, we may reasonably hope that this was the case also with the other; and as the instructions were to allow the plate to fall through one inch in eight minutes, we may also expect to get a comparison between the flash before and the flash after totality.

The slit spectroscope armed with two prisms, which was used by Captain Abney for the observations made last year in Egypt, was utilised also on this occasion with good results. Only one photograph was looked for from this instrument—one which would be exposed from the beginning until the end of totality.

The prismatic camera—the instrument on the model of that used first in the eclipse of 1875, in which the corona forms its own slit—for some reason or other does not appear to have been so successful in this eclipse, although it was tolerably so in that of last year.

The attempt which has been least successful is that in which Professor Rowland's grating was used as a prismatic camera, similar to that to which we have just referred. It was hoped to obtain a photograph of the blue end, both in the first and in the second order spectrum, but the results obtained are ciphered as bad. Seeing that Dr. Janssen was successful in his attempt to obtain large-scale

photographs of the corona, we need not regret so much that our attempt to photograph it on a scale of four inches to the sun's diameter was unsuccessful.

The small photoheliograph that was employed to such good purpose in Egypt last year has again given excellent results, which will be of the highest importance, as they will have been carefully executed, and the American party have taken no photographs themselves on the present occasion

The English observers telegraph that the lines obtained in the spectrum of the corona by these various methods are chiefly those of hydrogen. This, of course, does not apply to the flash we have spoken of. They add that the prominences were almost absent. This is an extremely important fact, because it shows what entire justification there was for the prediction made for the present eclipse after that of 1878, observed in the United States. That eclipse occurred at a *minimum* sun-spot period, and the hydrogen lines were then seen only with difficulty, while the continuous spectrum of the corona was more or less brilliant. In the present eclipse the hydrogen lines were well seen with a very brilliant corona, as was anticipated would be the case at a period of sun-spot *maximum*. This, perhaps, may explain the apparent absence of the prominences, because practically the lower part of the corona was itself made up of them.

We have not, of course, any detailed information with regard to the results achieved by the other parties; but when our own two English observers have obtained such a rich harvest we are justified in concluding that the work of the American and French parties has been equally fruitful. In that case, the trouble which has been taken to secure the observation of this eclipse—which took place at a greater distance from home than any previously observed—will have been entirely justified.

As we have said, the results of the other parties will take some time to reach us; but, at least, we may be sure of this—that the Americans, with their large experience of eclipses and their trained observers, will have much that is new and important to add to the results which our own English party has achieved.

THE ROYAL ACADEMY.

[Final Notice.]

We now turn to the landscape portion of the exhibition, which, though well represented as regards quantity, is, as a whole, not much better than other departments in quality. It can, however, be said of the landscapes that there are some few which stand out pre-eminently before the rest, and one or two which, if we mistake not, will live in the memories of connoisseurs.

We come first to Mr. Peter Graham's *A Quiet Noon* (No. 86)—a boldly-painted study of rock, heather, and cattle, the colouring of which exhibits great power. The glory of the picture lies, however, in its sky, which may also be said of *A Lonely Shore* (No. 354), by the same artist, though the simplicity of the composition and the fine rendering of the weedy beach deserve notice.

Parting Day (No. 98), by Mr. B. W. Leader, is probably the best of that artist's three works, in the opinion of the majority. The glorious effect of sunlight on the landscape, the golden tints of the fleecy clouds, the many-hued reflections in the still water, and the picturesque outlines of the quaint old church, all combine to form a picture which cannot fail to satisfy the most fastidious critic. *Green Pastures and Still Waters* (No. 508) is a charming transcript of a well-known type of English scenery—a placid stream, winding gently amongst green meadows, shadowed by graceful trees; the colouring is rich and varied, though the whole tone is subdued. From the same brush is *An Autumn Evening* (No. 1,471), and this will be chosen by many as the finest of the three. Certainly it is a most striking picture, of commanding size, and as nearly perfection in composition as it is possible to hope to attain. In the centre is a picturesque stone bridge spanning a tranquil stream such as this artist loves to paint, and in which the surrounding objects are mirrored as in polished silver. On the one side are noble groups of trees, and on the other a quaint, old-fashioned homestead, from which a steep path runs down to the landing-place, at which a boat is moored—the whole bathed in a flood of warm, golden sunshine that tells of a fine autumn evening, forming a veritable glimpse of Fairy Land.

Another of the masters in landscape is Mr. J. MacWhirter, whose *Corrie, Isle of Arran* (No. 157), is first to strike the eye. The vigorous style of painting just suits the subject—a rugged, little coast village, consisting of half-a-dozen white cottages, with the road winding up and down upon the very brink of the cliffs. The sky and sea are particularly well executed, and give an unmistakable character to the picture. Close by is *Sunset Fires* (No. 164)—a rugged bit of moorland on the point of sinking into twilight, the sun hovering in crimson grandeur on the distant horizon. *A Highland Harvest* (No. 1,501) is painted in less forcible style, with more of brightness and life about it; but the pick of Mr. MacWhirter's collection is, undoubtedly, his *Nature's Mirror* (No. 448). This, to our idea, differs totally from the artist's usual style of vigorous, almost rugged, treatment; without losing the power much of the roughness disappears, and the result is one of the most charming pictures in this year's exhibition. A stately group of silver birch overhang a placid pool at the bend of a quiet stream, in which a girl is gazing at her reflection—let us hope with satisfaction. The lighting and composition are nearly perfect.

Mr. J. W. Oakes's *Llyn-yr-Adar* (No. 255) is a fine rendering of a piece of grand Welsh scenery, rather sombre in colouring, though not unnaturally so. The foreground contains some rich detail in rock and heather.

Near Tunbridge Wells (No. 263), by Mr. A. A. Glendening, is a cleverly-painted glimpse of furzy Kentish heath, the bold outlines of the first and the rich autumnal tints of the ferns and gorse blending well together, while the judicious introduction of figures into the landscape complete the composition.

The Old Riverside Tree (No. 268), by Ernest Parton, leads us unconsciously into another county, the round-topped hills in the distance carrying the thoughts to Yorkshire. Remarkable boldness of outline in the foreground is blended cleverly with an equal degree of delicacy in the treatment of the water in mid-distance.

Mr. Vicat Cole is represented this year by only two productions, the best of which, *Windsor* (No. 297), is one of the—if not *the*—finest work we have seen from his brush. It represents the Castle from the river, the whole landscape being bathed in golden sunset. The play of irridescent colour on the eddying water is marvellously rendered, changing, as it does, from pale yellow through various tints of green to warm purple. The skilful introduction of foreground accessories in the shape of a few spikes of foxglove and water lilies adds much to the character of the composition, and the picture, as a whole, is worthy of very careful study. The other and minor exhibit, *Autumn Morning* (No. 435), is rather disappointing; for, though the foliage on the right is well and vigorously painted, the colouring of the distance is cold and feeble, tending to too great softness.

A Sunny Day in December (No. 366), by Mr. B. B. Wadham, is an excellently-painted landscape, with little of winter character about it; however, lake, mountain, and fell are alike flooded with gentle sunshine, which gives more the aspect of a summer morning.

Space compels us to bid farewell to the exhibition of 1883, in doing which we cannot help remarking that its general mediocrity is redeemed by its landscapes.

ON THE CAUSE OF THE INSENSITIVENESS OF COLLODION AS COMPARED WITH GELATINE EMULSIONS.

Every now and again, since the general adoption by the profession of gelatine plates, there have been attempts made to revive interest and experimental inquiry in the now almost-disused collodion emulsion process, the great object in view being the attainment of equal sensitiveness to that possessed by gelatine emulsions. "If you can only get that," say the collodion patriarchs, "gelatine will be nowhere!" The most recent of these attempts has been made in a series of valuable papers by Mr. Edwin Banks, who has attacked the subject both theoretically and practically.

Now, in this case of making collodion equal to gelatine emulsions in rapidity, as in all others, to have even a fair chance of success the reason or causes which prevent its attainment must be known in order that they may be eliminated or counteracted; and, although when thoroughly known it may be very difficult or impossible to get over them, yet the probabilities of success become infinitely greater.

To put the actual facts very clearly: suppose two emulsions are prepared both at the same time—one with collodion and the other with gelatine, the quantities of soluble bromide and silver nitrate being exactly alike and such as to allow of a considerable excess of bromide, the mixing to be performed in the same way, so as to give in both the ruby modification of silver bromide, and that they are then digested until the blue granular bromide is formed, and, finally, that they are washed and tested. It may well happen that the gelatine emulsion turns out to be *one hundred* times more rapid than the corresponding collodion one.

I want to know, before attempting to make the collodion equal the gelatine in rapidity—*What is the reason of this enormous differ-*

ence? As far as my reading goes, no *adequate* reason has ever yet been given. Dr. Eder also says*:—"No good reason has ever been discovered to account for the preponderating sensitiveness of bromide of silver when contained in gelatine; for, while it is equally possible to produce the fine granular description in collodion, it is, when contained in this vehicle, far less sensitive."

There have been four different explanations brought forward and more or less supported to account for the difference:—1. That the continued action of heat produces some change in the silver bromide, so that if collodion emulsions could be digested at the same temperature as gelatine ones greater sensitiveness would be obtained. 2. That the sensitiveness depends upon a peculiar state (either of division or structure) into which the silver bromide is brought by the aid of gelatine, and which peculiar state is not produced by collodion. 3. That the difference is due to the different *physical* characters of the two vehicles, pyroxyline and gelatine—the former drying into a porous, sponge-like film, and the latter into a homogeneous film, which perfectly separates and encloses the particles of silver bromide, thus enabling a far more powerful developer to be employed. This is the view which appears to be in most general favour, and is the one taken by Mr. Banks.† 4. That the silver bromide forms an organic compound with the gelatine, and which compound produces the increased sensitiveness.

I propose first to examine these four explanations or theories, and see how far they are borne out by experiment.

I. *The continued action of heat, &c.*—Two collodion emulsions (*a*) and (*b*) were prepared as follows:—

Collodion	Pyroxyline	10 grains.
	Ether	1 ounce.
	Alcohol (methylated)	1 „
Silver nitrate		60 grains.
Ammonium bromide		45 „

The collodion was divided into two equal portions, the silver nitrate being dissolved in one half and the bromide in the other, each with the aid of a few drops of water added. The two were mixed by blowing the bromide from a *pipette* into the silver with agitation, which gave bright ruby-red silver bromide, just as is obtained immediately after mixing a gelatine emulsion.

(*a*) This, after mixing, was placed in a small flask connected with an upright condenser (a simple arrangement by which the ether and alcohol as fast as they evaporate are condensed and drop back into the vessel), and *boiled* for half-an-hour; then washed by precipitation, dried, and redissolved. (*b*) This, immediately after mixing, was precipitated in hot water, and the *precipitated* pyroxyline containing the ruby silver bromide *boiled* for two hours in a three-grain aqueous solution of potassium bromide, dried, and redissolved. *Result:* In both cases the sensitiveness was about doubled by the boiling, and the emulsions very much improved as regards density. Their actual sensitiveness was about thirty-two times slower than the usual rapid gelatine plates. In both cases the ruby silver bromide was converted by the boiling into the granular blue form.

A gelatine emulsion (*c*) was prepared—

Silver nitrate	100 grains in half-an-ounce of water.
Potassium bromide	80 „ „ „
Gelatine (Nelson's 1)	20 „ „ „

The potassium bromide and gelatine solutions were mixed together, boiled for one hour, cooled to 30° C., and the silver solution then added with a small *pipette.* It was immediately precipitated with alcohol, redissolved, made up to five ounces with one hundred additional grains of "X" opaque gelatine, and tested. *Result:* It was thirty-two times quicker than the collodion emulsions (*a*) and (*b*), or the same as ordinary rapid plates. The colour of the silver bromide was red, but had in thin films a decided tendency to violet. *Inference:* Of these experiments (*a*) and (*b*) show that, even when the ruby silver bromide in collodion emulsions is converted into granular bromide by the boiling heat either of collodion or water, the resulting sensitiveness is not much increased; and, secondly (*c*) shows that rapid gelatine emulsions can be made without digesting the silver bromide at all, so that heat is a very small factor in the matter.

II. *Sensitiveness depends upon a peculiar state, either of division or structure, &c.*—A gelatine emulsion (*d*) was carefully prepared—

Silver nitrate	400 grains dissolved in 8 ozs. of water.
Potassium bromide	300 „ „ 8 „
Gelatine (Nelson's No. 1)	40 „ „ 8 „

All these solutions being hot, the silver nitrate and potassium bromide were added alternately in small quantities to the gelatine solution, giving when mixed a fine orange-red and homogeneous emulsion. It was then boiled forty-five minutes, cooled, precipitated with chromic acid, thoroughly washed, and redissolved. This gave the usual blue, sensitive silver bromide emulsified in a minimum quantity of gelatine. The emulsion was finally diluted with distilled water to forty ounces, and placed in a tall, glass-stoppered jar to settle. Notwithstanding the small quantity of gelatine present the subsidence was very slow, and five weeks after, when the liquid was syphoned off, it was still not clear except a few inches at the top. Supposing an ounce of liquid to be still remaining with the settled bromide (and there was certainly not more), and that the forty grains of gelatine originally employed was not reduced by the first precipitation, there would appear to be not more than one grain, or something less than ·25 per cent., of gelatine left with the silver bromide.

Two emulsions (*e*) and (*f*) were made with the bromide:—(*e*) By emulsifying some in warm gelatine solution. (*f*) By emulsifying some in plain collodion. There was considerable difficulty experienced in doing this, the silver bromide alone refusing entirely to emulsify. It was got over by first emulsifying in a little warm glycerine, then adding with agitation to the collodion, and immediately coating the plates. *Result:* (*e*) gave a good-quality emulsion about half as sensitive as ordinary rapid plates, the slight diminution in sensitiveness being due to the chromic acid employed. (*f*) This was very slow, and even when sufficient exposure was given to get an image it was thin and weak—not by any means a worthy rival of gelatine. *Inference:* These experiments show that the same silver bromide—or, rather, different portions of one sample—behave quite differently when suspended in gelatine and collodion, in the latter case giving a slow and useless emulsion. Further: that silver bromide which has been emulsified and digested in gelatine gives with collodion an emulsion inferior to one originally emulsified in collodion, so that either the mere fact of having been prepared in gelatine has nothing to do with the resulting sensitiveness, or the silver bromide becomes altered so as to be far less sensitive immediately it is emulsified in collodion.

III. *The difference is due to the different physical characters of the two vehicles, &c.*—This theory is based and depends for its existence upon two very curious assumptions—first, that the invisible image is impressed on a collodion film in the same time that it is on a gelatine one, or, in other words, that the *collodion film* is really as sensitive to light as the gelatine film; and, secondly, that the practical difference in the exposures required is because the gelatine film will stand a correspondingly more powerful developer.

What evidence have we for assuming that the invisible image is impressed on a collodion film as quickly as it is on gelatine, and what are the facts as regards the developers silver bromide will stand when suspended in different media? I do not know a scrap of evidence which either supports or disproves the idea that the invisible image is impressed on a collodion plate as quickly as on a gelatine one; but, if so, in the undoubted case of the increased sensitiveness imparted to collodion plates containing a minimum of pyroxyline by giving them a coating of gelatine (pointed out by Mr. Banks), it should be sufficient to secure this increased sensitiveness if the plates are coated with gelatine *after* exposure. There is, however, plenty of evidence regarding development in both cases. Silver bromide alone, it has been frequently pointed out, is reduced by alkaline pyro. without exposure to light, and this is no doubt true when it is in a suitable physical condition for fogging; but granular silver bromide such as exists in good gelatine emulsions is not reduced by alkaline pyro., either alone or suspended in collodion, any more than it is when suspended in gelatine. If anything, I am inclined to think it is more readily reduced when mixed with gelatine than in the other two cases.

Some of the isolated silver bromide from (*d*) was shaken up with warm water, and plates coated with it so as to give films of pure bromide. These did not fog either with ordinary alkaline pyro. or ferrous oxalate, and, moreover, were very insensitive. The emulsions (*a*), (*b*), and (*f*), and many other similar ones prepared with excess of bromide, all stood strong alkaline developers without sensible fog. That ordinary collodion emulsions will not stand strong developers everyone who has used them knows; but this I attribute to the fact that they are prepared with excess of silver nitrate, and not because they happen to be collodion. If gelatine emulsions were prepared with excess of silver nitrate they would fog at least as readily as the collodion ones. In forming, then, a correct opinion of the restraining powers of gelatine or other vehicles during development, the silver bromide should in each case be prepared in the same manner, and, as I have said, of three different portions of the

* *Modern Dry Plates*, 1881, p. 26.

† *On a Method of Increasing the Sensitiveness of Collodion Emulsions.*—THE BRITISH JOURNAL OF PHOTOGRAPHY, 1883, p. 132.

isolated bromide *(d)*—(1) spread alone upon glass, (2) emulsified in collodion, and (3) emulsified in gelatine. The gelatine one fogged the most readily.

Mr. Banks goes to the very root of the subject when he says the sensitiveness is inversely proportional to the quantity of pyroxyline employed—that is, as the pyroxyline diminishes so the sensitiveness increases—and if he could go on diminishing the pyroxyline until he used none at all he would doubtless get the full sensitiveness. But how is this rhythmic action between the quantity of pyroxyline and the sensitiveness explained on the theory we are considering? The fact that coating collodion plates with gelatine enables them to stand strong developers, irrespective of the quantity of pyroxyline they contain, simply contradicts it.

IV. *The silver bromide forms an organic compound with the gelatine, &c.*—The experiments (*e*) and (*f*) show that this does not explain the difference in sensitiveness, since silver bromide prepared with gelatine is no more sensitive in collodion than if it had been prepared in collodion; but I will describe one or two experiments which tend to show that an organic compound is formed. Some of the silver bromide from (*d*) was spread out on glass and dried in a drying cupboard. It formed a hard, coherent mass, which on heating blackened and gave off the usual pungent fumes of charring animal matter. I am sorry now that I did not estimate the actual quantity of organic matter, but it was certainly considerable. A collodion emulsion was prepared as described in (*b*), and after precipitation was boiled with the following solution:—

Potash bromide	6 grains.
Gelatine	6 „
Water	2 ounces.

After thoroughly washing out every trace of gelatine with boiling water and getting rid of the water with alcohol it refused entirely to dissolve in ether and alcohol, although with the same operations, but omitting the gelatine, it did so readily.

In concluding this critical examination of the theories advanced for explaining the difference in sensitiveness of collodion as compared with gelatine emulsions, I will state briefly what I consider is the principal reason:—That the variation is due to the different *chemical* characters of the two vehicles—gelatine and pyroxyline; that whereas gelatine is a substance having, if anything, a slight reducing action, pyroxyline from its composition is a powerful oxidising agent, and behaves as such in preventing the formation of a developable image. E. Howard Farmer.

NOTES ON VARIOUS METHODS OF DEVELOPING GELATINE PLATES.

[A communication to the North Staffordshire Photographic Association.]

This subject will, doubtless, be well understood by the majority of those present; but, thinking that a few remarks based upon my personal experience may prove interesting, I take the liberty of making them.

In the first place, we will take the developer most used hereabouts and with which we are all familiar, namely, alkaline pyrogallic. It is composed of pyrogallic acid (more properly termed "pyrogallol") and ammonia; a suitable proportion of some soluble bromide is added as a restrainer. It is useless my giving a formula for a developer so well known, and which, moreover, requires modification to suit the idiosyncrasies of various makes of gelatine plates. A plate coated with an emulsion containing a large proportion of gelatine to haloids of silver requires much less restrainer than one in which the emulsion does not contain so large a quantity of gelatine. Some commercial plates you will find coated so thickly with gelatine that they require scarcely any or no restrainer, while others are just the reverse.

This developer is, on the whole, the most useful one we have, the latitude in exposure allowable by "ringing the changes" upon the three before-mentioned chemicals being wonderful. A plate known to have been considerably over-exposed may be developed successfully by adopting a tentative method of proceeding—that is, by using at first the normal amount of pyro. together with a very small quantity of ammonia and plenty of bromide, noting the result, and proceeding accordingly. I have also found that with a very much over-exposed plate citrate of soda acts as a very powerful restrainer. The yellow stain almost inseparable from pyro. development (although I have seen some free from it) may in a great measure be got rid of by soaking the plate in alum (chrome alum preferred) *before* fixation. Additions—such as glycerine, sugar, sulphite of soda, &c.—are sometimes made to the developer. I show negatives developed with each, but can see no positive advantage to accrue from the use of these substances. Glycerine I have found to be a wonderful aid to the formation of obstinate air-bubbles and discolouration of the film, besides slowing the action of the developer. I always, before commencing development, count how many plates I have waiting the operation, calculate the amount of pyro. required, and make a solution containing four grains per half-ounce. I find this plan better than keeping stock solutions of this easily-decomposed substance.

Use a good plate, and pyrogallic development will suit it and yourself. I will say nothing for or against sulphite of soda in the developer, except that once when using it I obtained the most remarkable specimen of greyish-green fog it has ever been my lot to see. This, of course, may have been my individual fault, but it is a coincidence. Common washing soda is substituted for ammonia by some operators; you will see that it gives yellowish images. I do not think that it has been proved to be in any way superior to ammonia, and it is not so handy to use.

The ferrous oxalate developer is the one which should find a place in the portrait studio. It is easy to prepare, and one lot will develope a whole day's negatives—the cost, when made as I shall explain, not exceeding that of pyrogallol:—Make a saturated solution of *green* copperas in hot water, and when cool bottle it off, adding to each bottleful a drop or two of oil of vitriol. This I name No. 1. Dissolve a pound of oxalic acid in hot water to make a saturated solution (so that when cold it slightly crystallises out); add to the solution as much commercial carbonate of potash as will nearly neutralise it (known by slightly reddening blue litmus test-paper). Call this solution No. 2. To use: mix three parts of No. 2 with one of iron solution, pouring the latter into the former. You will then have a clear, bright-red solution, which will make an energetic developer and "do" many negatives. If an approximately-correct exposure have been given no bromide will be required, the sulphate of potash formed in mixing the solutions acting slightly as a restrainer. Should the image come out too flat use four or five parts of potash to one of iron solution. In the case of an under-exposed negative density may be brought up by adding a few drops of hyposulphite of soda solution to the developer. I have, however, sometimes found this addition to cause the ferrous oxalate to precipitate itself on the negative, giving an appearance as though fine sand had been dusted over it, and thus spoiling it.

I do not propose going into the respective merits of iron and pyro. development, having made a practice of using both and obtaining equally good results; but I usually adopt pyrogallic for landscape and microscopic work on account of the latitude allowable in exposure, &c. The same latitude is admissible with iron; but, as the developer once mixed to suit a certain exposure will do for many consecutive plates, I prefer using it for subjects where the exposures have been pretty equal.

A good ferrous-oxalate-developed negative is very like the collodion ones some of you no doubt sigh after, when you want a few dozen prints per diem from a tawny, yellow thing to gaze on, which is a sore temptation to disturb one's temper and wish for old times again.

I exhibit a ferrous oxalate negative, and also one developed with a modification of the developer—the ferrous-citro-oxalate—composed of citrate of potash, oxalate of potash, and sulphate of iron. Other organic salts of iron, as the tartrate, &c., possess developing powers; but none of them have as yet compared either in efficiency or cheapness with the oxalate.

I show two plates developed by hydrokinone—one by two grains of hydrokinone and two minims of ammonia; the other by two grains of hydrokinone and one minim of ammonia, and no restrainer at all. This is an excellent developer, the plate requiring a very short exposure. The image comes up very well, and, as you will see, quite free from stain of any kind. Unfortunately, the high price of hydrokinone compares unfavourably with cheap pyrogallol, or it would doubtless supersede that substance for use in photography. W. B. Allison.

HERR CH. SCOLIK ON COLD EMULSIFICATION.

A recent number of the *Correspondenz* contains a communication, by Herr Scolik, called *Studies of Two Methods of Cold Emulsification of Gelatino-Bromide of Silver*. The first part of the paper deals with Mr. A. L. Henderson's method of cold emulsification, and the second with a series of experiments made with the reverse method, namely, the preparation of bromide of silver emulsion by first adding the silver to the gelatine and then bromising.

The second part of the paper is as follows:—As I understood from Captain Pizzighelli and Herren Hübl and Stadler's experiments that the most sensitive conditions were to be obtained with ammoniacal oxide of silver gelatine, I commenced with that experiment.

Experiment 1.—If a sufficient quantity of ammonia be added to a solution of nitrate of silver a solution of argentic oxide of ammonia is produced, which, when gelatine is added to it, gives a beautiful, firm jelly, the colour of which remains unaltered, even for days. Such a silver gelatine I divided, by means of a horn spatula, into strips one centimetre wide, poured a bromising fluid over it, and allowed it to act for twelve hours; but by this means I was unable to induce an equal formation of bromide of silver. When one of the gelatine strips so bromised is cut up it will be seen to consist of three different films: the external film is green, the second contains white bromide of silver, while the inner kernel remains transluscent, shimmering, and, as Pizzighelli, Hübl, and Stadler assert, contains bromide of potassium. This emulsion, tested by Warnerke's sensitometer, only gave thirteen de-

ees of sensitiveness and furnished pretty dense negatives, which .owed a sooty-looking precipitate.

Experiment 2.—The same experiment was repeated with the variation ıat I divided the gelatino-silver by pressing through a strainer, now :omised with the above solution for six hours, and then washed it in :n changes of water. The resulting emulsion gave more powerful egatives, and also showed itself more sensitive. It now exhibited fteen degrees of the Warnerke sensitometer, and was again strewed 'ith a rather equal, fine, sooty-looking precipitate, which apparently riginated in crystalline bromide of silver. These experiences deterıined me to desist from further experiments with ammonia.

Experiment 3.—As stated in the communication of Captain Pizzighelli nd Herren Hübl and Stadler, already alluded to in Experiment 1, mixures of nitrate of silver and gelatine became instantaneously brown at a igh temperature. When the temperature was very low there was at irst no change observable; but after a few hours, even when light was xcluded, they became yellowish, and in a few days a brownish-red.)f course when exposed to daylight this change of colour took place nuch more rapidly; and, lastly, such a gelatino-silver which had ecome brown when used for the production of emulsion produced red og upon the plates prepared with it. Thus I was led to conjecture :hat it might be supposed that this fault could be restrained by some special medium, and to search after substances which should produce organic silver compounds in the gelatine. The idea occurred to me of how a durable paper for silver printing is obtained by the formation of citrate of silver. I resolved to attain the object by adding citrate of sodium or of potassium to the gelatino-silver; but, neither of these salts being at hand, I took some citric acid and dissolved it in water to which I had added soda, and then finally poured into the solution some gelatine solution to which dissolved nitrate of silver had been added. The mixture assumed a milky, opalescent appearance, which remained unaltered by daylight. I divided the gelatine mass into strips one c. m. broad, bromised them for eighteen hours with a bromide of ammonium solution, and thereafter washed for twelve hours in twenty changes of water; but, unfortunately, in this way I merely obtained a very untransparent emulsion, which only transmitted light with a blood-red colour, and in Warnerke's sensitometer it showed the number of eight degrees, while, further, it could only be poured in thin films.

Experiment 4.—I repeated the same experiment with the variation that I pressed the gelatino-silver through a strainer, now bromised only for six hours, and then washed for three hours in ten changes of water. The results obtained in this way were certainly, in so far as regards density and power, better than the former one; but the sensitiveness still remained at 8° by Warnerke's sensitometer.

Experiment 5.—In the already-mentioned essay by Captain Pizzighelli and Herren Hübl and Stadler, the remark occurs that sensitiveness is increased by the presence of ammonia in the bromising fluid without the intensity of the lights increasing too much, and, as I did not wish to use ammonia directly when bromising, I placed an addition of soda in the bromide of ammonium solution. Thus ammonia was developed, and so I certainly obtained more sensitive emulsion plates, which showed 12° by Warnerke's instrument; yet they had no power.

Experiment 6.—I proceeded as in the previous experiment, with this difference—that I divided the gelatino-silver finer than before by pressing the nodules and then only allowing the bromising solution to act for about three hours, repeatedly shaking up from time to time, and then washed again for two to three hours in from ten to twelve changes of water. After melting the result I obtained an emulsion which, though it was not very sensitive (12° to 13° Warnerke), yet showed a finer grain, better high lights, and gave negatives which were in character most like those produced upon wet plates, and in which both power and harmony were present. The emulsion was yet far from complying with those requirements which one has now a right to demand from such a preparation in order to constitute it a good process.

Experiment 7.—I dissolved 1·25 gramme of crystallised soda in twenty-five c.c. of water added as a powder, one gramme of crystallised citric acid, then dissolved separately seven grammes of gelatine (Winterthur) in seventy c.c. of water at 56° C., and when completely dissolved added to the previous solution. Then I dissolved thirteen grammes of nitrate of silver in thirty c.c. of water, and added ammonia until the brown precipitate which formed had redissolved and the solution became clear again. I now poured both solutions together warm; in daylight the gelatine remained completely unchanged. I allowed it to set over night, pressed the gelatino-silver through the strainer and placed it to bromise in a glass beaker in the emulsionising dark room. The bromising fluid consisted of 2·5 grammes of crystallised soda, 12·5 grammes of bromide of ammonium, and sixty-five c.c. of water. During the first two hours I shook up the fluid and the nodules ten or twelve times, and at the end of six hours I washed it in twenty changes of water. The result showed 14° to 15° by Warnerke's sensitometer, and the plates were again covered with an equal, fine, sooty deposit, which I ascribe to the ammonia, and which should apparently originate in crystallised bromide of silver.

Experiments 8 and 9.—An eighth experiment was made in the following way:—Two grammes of citric acid were dissolved in twenty-five c.c. of water, and then 2·5 grammes of crystallised soda added, which gives rise to effervescence. Then fifteen grammes of gelatine were dissolved in 175 c.c. of water at from 55° to 60° C., and added to the above fluid. Then twenty-five grammes of nitrate of silver were dissolved in 100 c.c. of water, the remainder of the silver salt rinsed out with fifty c.c. of water, and both solutions intimately mixed warm and then filtered through filter paper into a vessel containing 21 × 26 c.c.; the gelatino-silver solution, left to stiffen over night, exhibited a milky, opalescent appearance. The whole mass was divided into two exactly equal halves, one of which was used for *Experiment* 8 and the other for *Experiment* 9. The half called *Experiment* 8 was merely divided by means of a spatula into strips one c.m. wide, and treated with the following bromising solution—Crystallised soda, 2·5 grammes, bromide of ammonium, 12·5 grammes, distilled water, sixty-five c.c.—for eighteen hours in a glass beaker (which I shook up vigorously occasionally during the first hour or so), and then washed in an earthen pot for twelve hours in twenty changes of spring water. The second half of the above quantity of gelatino-silver, which was set apart for *Experiment* 9, was pressed through canvas into nodules, and bromised for six hours in a similarly-prepared bromising solution. This quantity of nodules was washed for six hours, placed in a linen bag to drip, furnished with five-per-cent. of alcohol, then melted, filtered, and poured upon plates. The half called *Experiment* 8 exhibited in Warnerke's sensitometer the number 12°, and gave thin films, which could not be intensified, and, in spite of all the artifices of development, could not be rendered powerful. That called *Experiment* 9, on the contrary, also showed 12° Warnerke; but had thick films and could be developed sufficiently powerful with the ferrous oxalate developer without the addition of bromide of potassium. My opinion is that it appears necessary, in order to obtain passably-good results, to subject the emulsion, in a finely-divided condition, to a rapid bromising and subsequent washing.

Experiment 10.—I took two grammes of pulverised crystallised soda and two grammes of citric acid, which I dissolved in twenty-five c.c. of distilled water. As soon as complete solution had taken place I added 12·5 grammes of Heinrich's gelatine and 125 c.c. more of water, let the gelatine soak for half-an-hour, dissolved the whole quantity in a water bath at 50° to 60° C., and, while solution was taking place, I placed twenty-five grammes of nitrate of silver to dissolve in fifty c.c. of water in a filter.

When the gelatine was completely dissolved I poured the silver solution into it, rinsed out the residue of the silver salt with fifty c.c. of water, and poured that in also. I filtered the whole through damp flannel into a cup (21 × 26 c.m.) and left it to stiffen over night, and then cut up the jelly with a horn knife into strips one centimetre broad, and placed the emulsion in a glass beaker, where I allowed the following solution to act upon it:—Crystallised soda, five grammes, bromide of ammonium, twenty-five grammes, and water 125 c.c. At first—that is to say, during the first three hours—I shook it up twelve to fourteen times, and then allowed the bromide solution to act for ten hours. It was then washed for twelve hours in frequently-changed water. Finally, the excess of water was allowed to drip, the washed emulsion was placed in a glass beaker, and the latter in a water bath of 50° to 55° C. to melt the emulsion. Then five grammes of alcohol and three grammes of albumen were added to every 100 grammes of the emulsion, which was filtered through flannel and poured upon plates. This emulsion only showed 10° of sensibility, and gave medium films which were in need of intensification.

I shall not relate all my further experiments, because they mostly resulted in failures, but call attention to the experiments described under *Experiments* 6 to 10 as those which gave most approximately-satisfactory results.

Perhaps by the co-operation of many upon this principle some variation will be found which will at last be satisfactory. I shall, however, mention yet one more experiment, namely, that by which I tried to discover whether an emulsion would be after-ripened and improved by keeping it for some time in alcohol. My first attempt in this direction was unsuccessful. I had placed the products of the different variations described in the foregoing for eight or ten days in strong alcohol, and then only superficially washed them (instead of doing so very thoroughly, as it ought to be done). When melted the emulsions flowed very unequally upon the plates, and the latter were covered with honeycomb-like spots, which were already visible on stiffening, and appeared transparent after fixation. The second attempt which I made in this direction exhibited, indeed, an increase of 2° to 3° Warnerke—that is, normally, 15° Warnerke—without diminution of the other good properties, which consist in the plates being most similar to those prepared by the wet process. To that the excess of silver may conduce, which I chanced upon in these methods; that is to say, the gelatine containing citrate of silver does not appear to be quite completely bromised, since in the interior of it one still finds the milky-looking opalescent kernel, and is only led astray by the white film. This phenomenon may be explained thus:—That by the employment of citric acid the silver solution cannot be *precipitated* from the gelatine, and that, as known, an excess of nitrate of silver has, *when cold*, a favourable action under certain circumstances.

I must not omit to mention that the negatives taken upon emulsion obtained by a variation of the second principle were, as far as my

experience goes, difficult to develope with an alkaline pyrogallic developer, but should only be developed with ferrous oxalate in order to give satisfactory results.

In conclusion: I must distinctly maintain that all the above-detailed and as-yet-carried-out attempts at modifications of the principle of the second method of cold emulsification cannot shake my opinion that, in spite of the admitted good qualities of the emulsions (which they exhibit and retain in many varying methods of preparation), they are far surpassed in reliability and equality by those modifications produced according to the principle laid down by Mr. Henderson.

ON REAL AND PSEUDO-REVERSALS OF METALLIC LINES.

I am much indebted to the courtesy of Professor Liveing for a copy of a paper extracted from the *Proceedings of the Cambridge Philosophical Society*, vol. iv., part 5, 256, on the circumstances producing the reversal of spectral lines of metals, by Professor Liveing and Dewar. In this communication the following paragraph occurs:—

"Professor Hartley has lately (*Proc. Roy. Soc.*, xxxiv., p. 84) called attention to pseudo-reversals of this class, which may be produced in the case of a strong line by over-exposure. It is well known that over-exposure (solarisation, as we used to call it formerly) produces such an alteration in the sensitive preparation of the photographic plate that the over-exposed parts cease to be developable, so that a very strong line may appear white in the negative where it ought to be black, but with a dark border, and so give the appearance of a reversed line. Professor Hartley finds it difficult to distinguish real reversals of the class we are now discussing from these pseudo-reversals. His difficulty has not occurred to us—first, because we have always been in the habit of taking photographs in series with varying exposure, in order to get impressions both of the feeble lines in some and of strong lines in others; and, secondly, because we almost always close part of the slit of the spectroscope with a shutter, so that the image is cut off sharply by the shadow of the shutter. Strong lines extend into the shadow more or less, and if there is a real reversal the extension of the reversed part into the shadow is trumpet-shaped, whereas if it is only a pseudo-reversal it is closed."

I beg to be allowed to call attention to one or two points in the above quotation which I imagine may lead to a misconception of the phenomena observed, and of my remarks thereon.

First, as regards over-exposure: it is assumed that solarisation is an equivalent for this expression. This is the case only when speaking of the cause, but the word has been used by photographers for many years to describe the effect of over-exposure.

In all collodion processes, wet or dry, this effect is an undue intensity of the high lights and an overpowering of the intermediate tints and delicate shadows adjoining them. This appears to be due to the fact that, from the intensity of the light, not only the direct rays but those reflected from the back of the glass plate, or even those which are scattered, have sufficient power to act upon the sensitive film. In photographs of spectra this is seen in the nimbus or halo surrounding the strongest metallic lines, which disguises their form. It is well illustrated by my photographs of the magnesium, cadmium, and other spectra, published in the *Journal of the Chemical Society*, vol. xli., *Transactions*, 1882, p. 90.

Although I have worked with dry plates of almost every description, and with some modifications prepared by myself which have never been described, I do not recollect having observed that over-exposure causes any other effect than a too dense deposit of silver, excepting when the vehicle for the sensitive salt is a film of gelatine. As far as my experience goes it is a property peculiar to gelatine plates that with such extreme facility they are incapable of development after too strong an action of light, and I carefully avoided the term "solarisation," since it has been used to describe an effect so different from that to which I desired to call attention.

Secondly, with regard to difficulty in distinguishing reversals: the sentence above does not exactly represent my experience, and I think it may be seen by those who read my communication that any want of distinction between real and pseudo-reversals had reference only to photographs which had been already taken with a fixed period of exposure, and that I advocated a method of comparative exposures as necessary in the study of spectra. It appears that this is one of the means whereby Professors Liveing and Dewar are able to draw distinctions between real and pseudo-reversals. The second method—namely, the use of a shutter—is extremely useful in observations on arc spectra, which have been so completely studied by them. I have been studying spark-spectra exclusively, and have not been giving special attention to reversals—in fact, endeavouring as far as possible to avoid them. The use of a shutter does not commend itself to me, since it would cut off a highly-characteristic feature in spark-spectra which it is desirable to observe, namely, the extension of the lines; but I may here mention that a speck of dust on the slit, or a fine wire stretched across it, will answer the same purpose as a shutter, without obscuring any considerable portion of the spark, and may be conveniently employed. And now permit me to add one word: the same alteration in the intensity of the spark which results in real reversals also frequently causes pseudo-reversals. Sometimes simply a turn of the screw attached to the spring of the contact-breaker on the induction-coil is sufficient to effect this change. W. N. Hartley.
—*Nature.*

Royal College of Science, Dublin, May 18, 1883.

Our Editorial Table.

Photographic Colouring. By Miss Rivers, Bond-street Studio, New Bond-street.

We have received from the above establishment a few specimens of photographic painting in water colour, small in size but admirable in execution. The fully-coloured specimens, while possessing a high finish, are not overloaded with colour—an advantage in small work (*cartes* especially), as the likeness then runs less risk of being spoiled in the hands of the artist. A tinted *carte* of a couple of little children makes a very pleasing picture.

The Plaque Portrait. Marion and Co., Soho-square.

We have received from Messrs. Marion and Co. specimens of a new style of picture, which has become popular in America under the title of the "plaque portrait," and, from the tasteful style of the examples before us, is certain to become popular here. The mount is of cabinet size, the picture being circular and pressed into a deep concave shape, to resemble, as its name implies, a "plaque." The effect is very artistic. Messrs. Marion and Co. supply the mounts in rich Florentine design, presses, and all requirements for the production of this novelty.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

PATENT VOID.

No. 2,249.—"An Improved Process of Painting on Cloth, Photographs, Engravings, and Prints." Boleslas de Dutkiewicz and Anatole Edward Deconflé, Paris.—*Dated June* 2, 1880.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 21........	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The last ordinary monthly meeting of the above Society for the present session was held at 5a, Pall Mall East, on Tuesday evening last, the 12th instant,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. H. C. Common and W. F. Purdy were elected members of the Society.

The Chairman read a paragraph from one of the evening papers announcing that the eclipse of the 6th ultimo had been successfully observed by the English party, and briefly detailing the operations of the French and American expeditions.

After a few remarks from Mr. Jabez Hughes,

Captain Abney gave a short description of the instruments employed and the class of work which was the object of Messrs. Woods and Lawrance's expedition.

Mr. John Spiller then read a paper, entitled *Collodion and Pyroxyline: the Question of Permanence*. He commenced by stating that he had recently found a box containing a number of samples of pyroxyline which had been prepared as far back as twenty-one years ago. These consisted of samples of highly-explosive gun-cotton, and also pyroxyline for collodion purposes. He had been surprised to find that so little decomposition had occurred during the lengthened period they had been kept. Though most of the samples were decidedly acid, there was very little sign of destructive decomposition. The explosive samples had generally retained their properties best, though a sample of Dr. Liesegang's papyroxyline, beyond a slight acidity, remained entirely unchanged, and retained its complete solubility in either and alcohol. One or two samples exhibited traces of free sulphuric acid; but in no case, on drenching the pyroxyline with water, was any trace of oxalic acid found as a result of decomposition. A sample of explosive gun-cotton saturated with chlorate of potash was apparently entirely unchanged. He then proceeded to ignite several of the samples, in order to show their varying degrees of explosiveness.

Mr. Valentine Blanchard stated that he had some samples fourteen years' old which had been simply kept in a drawer, and when he had occasion to dissolve them he found them to be perfectly soluble. Some time

k he had come to the conclusion, conjointly with Colonel Stuart Wort- ; that it was necessary these samples should be kept exposed to the iosphere. So far as he could remember they were made by the formula ommended by Dr. Liesegang in 1869, a large proportion of water being d, and the samples prepared at a temperature of about 100° and exposed the combined acids about ten hours.

Mr. T. Sebastian Davis said that a short time ago he had destroyed eral specimens, and out of some ten or twelve he had not found one composed; but in one instance a certain quantity of the nitrous fumes d been liberated in the bottle. He had reason to believe that this had en manufactured with the largest quantity of water that could be added npatible with the preparation of the cotton itself.

Colonel Wortley remarked that he had seen last year several samples oth cotton and paper) put away since 1868, which were certainly as good when made. He thought it most important that the washing should be ry thorough; in fact, he had designed a trough for washing, terminating a point at the bottom, in which he had washed for ten, fifteen, or twenty urs, and he found the better the pyroxyline was washed the better it pt.

Mr. Jabez Hughes considered that perhaps this subject would have en more interesting ten years ago; but he thought all who had had any perience of the matter could bear testimony in support of the views pressed by the gentlemen who had already spoken. Only the other day had destroyed a sample given him by Mr. H. Baden Pritchard, and und it as explosive as when made. He was of opinion that when corked there was always a serious decomposition of the pyroxyline, even when refully washed. He was in the habit of consuming a great quantity of roxyline, but never had any trouble with it, because he always gave it free access to the air as possible.

The Chairman thought that the confirmation which had been given of r Spiller's remarks lead one to suppose that the collodion film might be permanent as gelatine.

Captain Abney then read a paper, entitled *The Effect of Pressure on nsitive Salts of Silver*, in which he said that, having employed card- oard masks to place between his gelatine plates for packing, he had oticed that when the plates were of thick glass and fair size there was onsiderable pressure on the films of the bottom plates in a box, and that n exposure there was the mark of the mask on the plates, while on those the top it was entirely absent. This had led him to experiment by oplying a direct pressure to the films with the point of a glass rod, and e passed round several examples of plates which had been written on in hat manner, showing that upon development a deposit of silver occurred the same manner as if the plate had been exposed to light; in fact, the fect of pressure was identical with that of light.

Mr. Leon Warnerke said that in speaking on this question he felt every onfidence. As far back as two years ago he had read a paper on this ubject, and had shown experiments which led him to the conclusion that ressure on salts of silver destroyed the sensitiveness. In order to find hether the action was produced by mechanical or chemical action, he pre- ared a plate and subjected it to pressure both before and after exposure, ith the result that there was a total destruction of the image.

Mr. W. England thought the markings in packing the plates referred by Captain Abney were due to some imperfection in the cardboard.

Mr. Hughes thought that these markings might be simply due to mole- ular action, and were only a new form of what were known some years ack as "Moser's images," in which the simple contact between two aterials remaining long together apparently produced the same effect as ght.

Captain Abney wished to ask Mr. Warnerke the circumstances under hich he got his results. With regard to what Mr. Hughes had said, he Captain Abney) considered that the result of pressure on gelatine plates r other surfaces was not explained by molecular action, and it must e remembered that wherever there was pressure there was electrical ction.

Mr. J. B. Spurge next read a paper, entitled *A New Unit of Light in Connection with the Sensitometer*. After commenting on the difficulties in onnection with the establishment of a standard light for sensitometrical urposes, he stated that he had adopted a flame of ordinary gas passing hrough an orifice of fixed size and burning under constant pressure. He roceeded, by means of tables and illustrations, exhibited by the aid of the antern, to demonstrate the working of his method; but, as his remarks nd calculations are of too elaborate a nature to be intelligible without the ull text of the paper, we refrain from giving any abstract, and defer its ublication until the appearance of the official organ of the Society. In onsequence of the lateness of the hour and the elaborate character of the aper the discussion was postponed.

Mr. J. R. Sawyer then read a paper on *The Copying of Works of Art in Colour by Photography*, which was a supplement to his previous communi- ation. He exhibited an enlargement of a negative he had taken of a ommon chromolithograph, and proceeded to demonstrate the difference in he value of colours as seen by the eye and as represented by photography. He observed that the whole point of his subject lay in the question as to whether such monochrome reproduction as they were at present capable of vas or was not a true representation of colour; and he thought it was their usiness, if they attempted to produce pictures at all, to do it in such a nanner as not to be at the mercy, as it were, of the actinic power of certain olours on sensitive surfaces.

Mr. Norman Macbeth, R.S.A., expressed the great pleasure it afforded im to be present and to listen to gentlemen of whom he had so often eard, and observed, with reference to the subject of Mr. Sawyer's paper, hat he thought it would always be a matter of considerable difficulty to et anything like a true representation of colour by means of photography.

Votes of thanks having been accorded to Messrs. Spiller, Abney, Spurge, nd Sawyer, it was announced that the exhibition of the Society would pen on Monday, 8th October, and close on Thursday, 15th November, and hat the *soirée* would take place on Saturday, the 6th October.

The next "technical" meeting of the Society will be held on Tuesday, the 26th instant, and during the recess the meetings will take place on the fourth Tuesday in each month. The meeting was then adjourned.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The last ordinary monthly meeting of this Society for the present session was held on Thursday evening, the 7th inst., at the House of the Society of Arts, John-street, Adelphi,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, the subjects for the artistic competitions for June, July, August, and September were balloted for in the usual way, with the following results: June, landscape: "A Country Road, with a Finger Post." Figure: "Falstaff."—July, landscape: "Landscape, with Merry-making." Figure: "Fisher Folk."—August, landscape: "A Good Place for a Rest." Figure: "Moving Figures."—September, landscape: "A River View." Figure: "The Milk Maid."

The Chairman hoped that, as photographers would have a little more leisure during the approaching holiday months, the competitions would be keener than they had been latterly. For the past month only two examples had been sent in—one for the landscape and one for the figure competition respectively, which at anyrate would spare them the trouble of adjudging the merits of the pictnres. Messrs. Dunmore and Mawdsley were announced as the successful competitors—the former with "Cattle" and the latter with "A Landscape, with Clouds." He (the Chairman) then presented Mr. Dunmore with the Society's diploma for his picture for the April competition, remarking at the same time that that gentleman was deserving of all credit and encouragement, he having been the originator of these competitions, and was now the most persevering amongst the competitors. It was with the deepest regret he had to announce that since their last meeting one of their members had been taken from them—Mr. J. T. Pearsall—who had been connected with the Society for many years, and frequently took part in their discussions. He was quite sure that they would all be much grieved to miss his face amongst them, and he (the Chairman) proposed that a letter be written by the Secretary to the relatives of the deceased gentleman expressing their universal sorrow at his demise. It was also announced that the present was the occasion upon which it was usual to decide upon the places at which the Society should meet during the vacation. They had already had many very pleasant meetings in the country, a spot generally being selected where they could have some tea and wander about the country. It had been proposed in committee that their first meeting this year should be held on Saturday, 28th July, at the "Bull and Bush," Hampstead; and the question had also arisen whether they should have a second meeting, for which the last Saturday in August had been suggested, the venue being Hampton Court, provided the first meeting should prove a success. After some discussion, the above dates and places of meeting were agreed upon.

Mr. George Smith then opened a discussion, entitled "When Large Pictures are Required is it Better to Take Them Direct or to Take Small Negatives and Enlarge Them?" Mr. Smith commenced by remarking that if enlargements from small pictures were satisfactory many people would not take the trouble of carrying the apparatus necessary for the production of large pictures. He had noticed, some time ago, at a meeting of photographers, that Mr. Valentine, of Dundee, had shown some photographs, challenging photographers present to distinguish between the originals and the enlargements. He (Mr. Smith) thought there could be no doubt that enlargements had been produced which would satisfy anybody, still there was frequently a very great loss of sharpness in the enlargement, and he supposed the real question was to find out how that loss arose. He thought there were two causes—first, that the original small negative was not sharp enough, and still more frequently there was a great loss of sharpness in the enlarging. He was of opinion that photographers did not know sufficient about enlarging, nor of taking small negatives. He found that the focussing-screen, as ordinarily used, was not good enough, but that to take a piece of plain, clear glass, with marks scratched on it, and put it in place of the focussing-screen, was a good plan. One thing, at anyrate, was certain—that in this way he could focus with the stop he was going to use. He was aware that, theoretically, putting a small stop into a lens ought not to alter the focus; but certainly in practice it did happen that a material change took place upon inserting a small stop after focussing with a large one. There was an error somewhere to be sought after. He believed the solution of the difficulty would be in using a different arrangement for focussing. He found that, by taking a four-inch lens with a clear-glass screen and using a powerful magnifier, he could distinctly focus the small veins of the leaves of trees thirty yards off. Everybody (Mr. Smith said) must have noticed how few negatives were really sharp, and of course if they appear coarse through a magnifier they must of necessity look so when enlarged. With regard to enlargement with imperfect lighting, he was of opinion that there must necessarily be a loss of sharpness. He (Mr. Smith) then exhibited a focussing-screen of clear glass he had been using lately, with small scratches on the glass. His first experiment had been made with some newspaper cuttings, and he found that when using the ordinary ground-glass screen he detected a difference of focus between the middle stop and the next one; but when using the clear-glass screen and an eyepiece he could bring everything into focus He found it necessary to have some sort of a pattern upon the clear-glass screen upon which to rest the eye. He had first used a piece of muslin, which answered much better than a simple scratch; afterwards he ruled the scratches as shown in the screen he passed round, and this arrangement he found to answer all right.

The Chairman asked what were the smallest negatives used, and to what extreme limits had they been enlarged. He remarked that many of the enlargements to be seen in shop-windows had the appearance of being looked at through a magnifying-glass, whilst others were perfectly free from this magnified effect.

Mr. Smith thought this was decidedly the fault of the negative in the first instance, the markings being coarse, or it might occur from want of care in making the enlargement itself.

The Chairman said he was glad to see present amongst them Mr. J. T. Taylor, who was over on a visit from New York, and he would be happy to hear that gentleman offer some remarks on the subject. He believed that he remembered having heard Mr. Taylor assert upon one occasion that the very smallest negatives sufficed for any practicable size of enlargement.

Mr. J. T. Taylor would like to say something on the subject, but was afraid in doing so his remarks would clash with those of his friend Mr. Smith. He was not aware by what means Mr. Valentine's pictures (which Mr. Smith had referred to) were produced, but he must say they were certainly very fine and sharp, and that there was no apparent difference between the pictures taken direct and those obtained by enlargement. With regard to focussing on a plain glass: that would do very well when using a compound microscope; but he was of opinion that it ceased to be practicable when using a single eyepiece. He then entered into an explanation as to the difference between a virtual image in space which could be examined by a single eyepiece with a considerable range of vision, and that received upon a ground glass when it was arrested and assigned to a definite place. Accuracy under the former circumstances could only be secured by aid of a compound microscope, which possessed no depth of definition. He had of late been making experiments in connection with microphotography and with focussing by aid of microscopic powers, and in the course of these experiments he had found that it was impossible when focussing on a plain glass—that is, plain in the sense of its not being ground—to get perfect sharpness when using anything weaker than a quarter-inch power. He then spoke of the nature of the deposited silver in negatives suited for enlarging, and of the distinction between a stain and the coarse granulations forming some of the images in negatives.

Mr. Smith considered it was a step in the right direction to focus pictures as they were intended to be taken, and also that in every picture there should be some particular point to which it should be the photographer's desire to attract the eye, and that point should be sharper than the rest of the picture. In this way the eye would be instinctively drawn to that point.

Mr. E. W. Foxlee, referring to the title of the discussion, thought it was necessary first of all to determine what was to be considered a large photograph. In taking a picture of eighteen or twenty-four inches, or a life-sized portrait, he was decidedly of opinion that the best means of producing it would be to enlarge; but in dealing with smaller sizes—say 10×8, either portrait or landscape—then he thought the best results would be obtained by taking it direct and not enlarging. He had seen very excellent enlargements of the latter size done from small negatives, but they were not equal to direct photographs. It was possible to produce very perfect 12×10 or 15×12 portraits direct, because gelatine plates enabled them to use a lens very different from the old portrait lens. He thought that if it were desired to take enlarged portraits the original negative should not be too small. With regard to the medium on which to take the negative, he thought it would be found impossible with a small negative to get as fine a grain on a gelatine as on a collodion plate.

Mr. Smith said there could be no doubt that the rapid bromide plates as used at present were quite unfit for accurate enlargements. Though he himself did not like the rapid plates, he did not think there was any reason why comparatively rapid plates should not be prepared without granularity.

Mr. Foxlee observed that the grain in some of the bromide plates (especially the rapid ones) was very coarse indeed; of course the effect of enlarging a very coarse film—say from four to sixteen inches—was very different from enlarging an eight-inch two diameters, as in the one case the grain would naturally look much coarser than in the other.

Mr. Wm. Brooks showed several prints from negatives, some enlarged two diameters and some four, in which he did not think much falling off would be fonnd from pictures taken direct. He quite agreed with Mr. Foxlee that it was much better to enlarge two diameters than four, and he considered that a negative taken on a slow gelatine plate was better for enlarging than one taken on a rapid plate. He adhered to one process (the collodio-bromide), and had taken a thirty-six inch negative with better results than even with wet plates.

Mr. T. Bolas thought that for moderate sizes it was preferable to take pictures direct.

Mr. Frank Howard said it was very seldom they had an opportunity of seeing large photographs taken direct; but there was no doubt (he thought) that in taking a large picture, provided the subject admitted of a long enough exposure, better results were obtainable direct than by enlarging. He endorsed Messrs. Taylor and Foxlee's views as to the advisability of using albumen as a medium.

Mr. Foxlee remarked that Mr. Vernon Heath's negatives were all 12×10, and were enlarged about two and a-half diameters. He thought if the enlargement were only to be (say) twelve inches the better plan was to make it as a transparency, and from that transparency to print the negative. This plan was much used for making small enlargements, and had at one time been sold as a secret process.

Mr. F. A. Bridge exhibited some specimens of photomicrographic enlargements of diseased brains, enlarged from one to two thousand times, by Mr. W. M. Ayres.

The Chairman said Mr. Howard had touched upon the size of the apparatus to be used. Some years ago they had had a discussion as to whether, by enlarging the camera, more correct direct images could be obtained; and he thought Mr. Taylor had then expressed an opinion that there was a limit to this, and that by going beyond a certain point they would only magnify the defects of the picture. He had seen in a notice of the Sydney exhibition there was one picture thirteen inches long, which was asserted to have been taken direct.

Mr. Taylor had a feeling against taking very large pictures direct.

Mr. W. Cobb was very much surprised to find a feeling amongst photographers generally to run after sharpness and smoothness. He considered it was highly desirable to obtain the *correct texture* in their pictures and never mind the smoothness.

Mr. E. Dunmore held, with Mr. Foxlee, that within a certain size direct pictures were certainly preferable to enlargements. He thought there was a delicacy about direct pictures which was missing in enlargements.

Mr. Mawdsley was glad to notice a very general expression of opinion that for plates 10×8 or 10×12 size the results were superior when taken direct to those obtained by enlargement. He thought there were few amongst them who desired larger sizes than these, and he would prefer, in taking a moderate-sized picture, to take it direct; but, after all, he considered it was a matter of personal convenience. He agreed with Mr. Cobb with regard to the tendency towards working to destroy natural effects, the result of which was that what should appear in their pictures as flesh resembled marble.

Mr. Smith said the question at issue was—would it be more desirable in the future to adhere to taking large pictures direct (which seemed to be generally acknowledged to be the best), or to try after improvements in enlarging small ones. He thought there was rcom for the latter.

Mr. F. Hollyer was of opinion that in taking a copy—even of the same size—it could not be equal to the original, provided, of course, the original negative were a perfect one; therefore it was much less likely that an enlarged copy would be as good as the original.

Mr. Brooks showed two collodio-bromide negatives with the same exposure—one developed with alkaline pyro. and the other with ferrous oxalate, the latter having the appearance of five times the exposure of the former.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION

At the meeting of this Association, held on Thursday, the 7th instant, Mr. C. E. Cooke occupied the chair.

A question from the box was read—What is the best lens for taking five-inch heads with?

Mr. W. Coles considered that a long-focus lens of the rapid rectilinear kind would give the best results, and that the plate should not in its longest dimension measure more than half the focal length of the objective.

Mr. A. Collier preferred instruments of the D or long-focus portrait type.

Mr. J. B. B. Wellington showed a half-length cabinet portrait taken with Ross's symmetrical of seven and a-half inches focus.

Mr. Coles exhibited a negative a portion of which was mottled from the packing paper used. The plate had probably been packed for more than a year. He also produced two prints which exhibited a marked difference in the proportion of the face, although from the same negative. This was due to their having been printed upon the paper—one the length and the other the width way of the sheet. Dry mounting would have prevented this distortion.

Mr. W. E. Debenham said that recently he had known two cases where sitters had brought back their photographs on account of this very difference amongst the prints. In one case the broader and the other the longer featured were preferred, although, of course, the distortion was equal in both, and the true result would have been intermediate.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The eighth ordinary meeting of this Society was held at 5, St. Andrew-square, on Wednesday, the 6th instant,—Mr. A. Craig-Christie, F.L.S., Vice-President, in the chair.

The minutes of the last meeting having been approved, Messrs. James Hay, James Gibb, W. G. Campbell, L.A., W. J. Cocherine, A. Stewart, David Watson, A. Ayton, Jun., and Hugh Brebner were unanimously elected ordinary members of the Society.

The evening was devoted to an exhibition of a large collection of transparencies from microphotographs. Mr. W. Forgan gave interesting information as the various objects appeared on the screen, and Mr. J. M. Turnbull successfully conducted the lantern manipulations.

A most curious print from a negative, by Mr. Annan, was handed round, showing a double impression of the same view, as though two lenses of differing foci had been employed.

Mr. Annan could merely suggest that by some means a duplicate image had been thrown on the plate from a large volume of steam at one side but not within the angle of view. Another plate taken under precisely similar circumstances, except that the steam was absent, exhibited no peculiarities.

A conversation took place as to the desirability of having an annual trip and holiday, and it was ultimately decided to appoint Mr. M'Kean, Mr. W. Dougal, and Mr. Wardale as a committee, with power to add to their number, to find out the general feeling of members in regard to the matter.

The usual votes of thanks having been given, the meeting was adjourned.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A meeting of this Society was held at the Town Hall, Hanley, on Wednesday evening, the 6th instant,—Mr. A. Humboldt Sexton, F.C.S., President, occupying the chair. A discussion took place upon the relative value of the wet collodion and dry gelatine processes in a weak light.

Mr. Potter found a wet plate under such circumstances almost as sensitive as a dry one, and obtained better results. He preferred the wet process for every class of subject not requiring a short exposure.

Mr. Burgess agreed with Mr. Potter's remarks, as he had obtained good collodion negatives after seven p.m.

Mr. Potter, in reply to a question from a member, found that in photographing interiors, &c., requiring a prolonged exposure, the great disadvan-

age of using a wet plate was that the film was apt to dry and show markings.

Mr. ALFIERI had found, in using glycerine as a hygroscopic agent, that collodion films had a tendency to come bodily from the plate. He had in some cases prevented this by giving the glass a preliminary edging of shellac varnish. He had also noted as a curious fact that it was difficult to coat a plate with collodion when working in the field with the wind in an unfavourable quarter, especially if in the east.

Mr. POTTER, for landscape work, *much* preferred the wet process, and asked for the opinion of those present.

Mr. ALLISON agreed with Mr. Potter.

Mr. ALFIERI said that, if the question had been put to himself a short time ago, he should have agreed with the last speakers; but that now, although an experienced wet-plate worker, he had, with *proper* alkaline development and good gelatine plates, obtained negatives so closely resembling those by the wet collodion process, that he considered one as good as the other. In reply to a member, he (Mr. Alfieri) said that for his dark-room window he used bookbinders' cloth. He had also found that in developing a plate, if it were exposed to the red light during the whole time of the operation, the same would be much retarded.

A short paper, entitled *Notes on Various Modes of Developing Gelatine Plates* [see page 344], was read by the Hon. Secretary (Mr. Allison).

The CHAIRMAN asked whether, presupposing the use of alum, plates were as liable to frill under the oxalate as under pyrogallic development.

Mr. ALLISON had found that plates subject to this defect were best developed by ferrous oxalate after previously soaking them in alum and washing. In reply to other queries, he (Mr. Allison) had found no appreciable difference in a negative developed by the ferrous oxalate or citro-oxalate developers, and he thought that hydrokinone brought out more detail with density than alkaline pyrogallol.

After deciding to hold the next meeting at Stoke-upon-Trent, Mr. Henk was proposed as a member, and the meeting was adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

A MEETING of this Society took place on April 3rd,—Dr. Emil Hornig, President, in the chair. The minutes of the previous meeting having been approved, several new members were admitted.

Herr CH. SCOLIK read a paper upon *Two Methods of Cold Emulsification and Several Variations of the Same.* He showed the results he had obtained by means of these variations by subsequent bromising of the silvered gelatine. He also promised to show further specimens at the next meeting, and exhibited several views of an interior taken upon gelatine plates by means of a petroleum lamp, and upon which solarisation phenomena were distinguishable.

Herr GELPKE then gave an account of his experience of cold emulsification according to Mr. A. L. Henderson's method, and added a modified formula of his own.

Lieut. David demonstrated the use of a presser for gelatine emulsion constructed by himself.

Herr Kramer showed some leather-covered *passe-partouts.*

Capt. Pizzighelli exhibited a tourist's camera, by Schröder, of Berlin.

The CHAIRMAN said that, at his request, Herr von Dechy had sent him the translation of the sketch of the projected Hungarian copyright law for the protection of artistic and literary productions. He deplored the apathy shown by those interested in not agitating for a reform in this matter in Austran law.

Herr V. MELINGO recognised that reprehensible apathy, but suggested that the matter should be put into the hands of a few trustworthy men acquainted with photographic needs.

Dr. Eder showed Czerney's improved vulcanite instantaneous shutter.

The fifth part of Dr. Eder's *Handbook of Photography*, and a copy of the third edition of Dr. Liesegang's *Gelatino-Bromide of Silver: its Preparation and its Use in Photography*, were laid on the table along with the first part of Herr V. Angerer's *Reproductions of Art-Industrial Objects and Original Drawings from the Collections of the Imperial-Royal Austrian Museum of Art and Industry*, and some heliogravures by Herr Hanfstängl.

The question-box was then opened and found to contain three questions. The first was:—Why is photography excluded from the International Exhibition of Graphic Art which takes place this year at Vienna? To what but graphic art do photography, silver printing, lichtdruck, photolithography, photozincography, photochemigraphy, Woodburytype, carbon printing, and platinotype belong?

Dr. EDER remarked that he had also been much astonished at reading the announcement of this exclusion in the daily paper, *Die Presse.* He, however, believed that the exhibition was got up by the Society for Reproductive Art, and they had consequently arranged the programme so as to suit the end they had in view.

Herr LUCKHARDT expressed his surprise at the title and heading of the programme of the exhibition, from which he understood that both portraits and landscapes in silver prints were to be excluded.

The second question ran—"Has anyone yet tried to replace gelatine in the emulsion process by some other substance?" And the third—"Would it be desirable to use, instead of gelatine, some other substance in the emulsion process which should possess all the advantages without having any of the defects and drawbacks of gelatine?"

Baron SCHWARZ-SENBORN testified to the successful use of agar-agar in many industries, and inquired whether this substance, which is so little liable to decomposition, might not be successfully used if suitably treated.

Dr. EDER said that agar-agar was difficult to dissolve, and, unfortunately, was easily precipitated from solution and formed bubbles, in which part of the solvent was retained, so that the desired homogeneity of the whole was absent; also, that probably emulsion prepared with agar-agar might exhibit other faults as yet unobserved.

The meeting was shortly afterwards adjourned.

Correspondence.

COLLODION EMULSION.

To the EDITORS.

GENTLEMEN,—I read with much interest the remarks of "Argus" in the last number of your Journal on the revival of the collodion process, but I fear he is too sanguine. I have had, as you are aware, a very great experience in collodion, both wet and dry. The former will, I believe, be in use for many years to come for certain purposes; but collodion emulsion with our present knowledge certainly will not attain a great reputation. I have used it in all its modifications, and where plates can be used and developed at once very satisfactory results can be obtained; but I never could succeed in preparing a plate that would not deteriorate by keeping.

Now, with gelatine plates carefully prepared and properly packed, they seem, as far as my experience of several years goes, to keep indefinitely both before and after exposure; also, the ease with which a gelatine plate can be developed, its sensitive nature, and many other good qualities certainly place its value far beyond collodion.

Of course, now that some attention has again been drawn to this subject, it is possible that such scientific workers as Captain Abney and others, who are, I know, zealously engaged in that direction, may make some improvements which may again bring collodion emulsion into practical use. If so, I should certainly hail it with pleasure; for one naturally sometimes turns back with fond recollections to what in its time has done good service, and may, perhaps, do so again.—I am, yours, &c., W. ENGLAND.

7, St. James's-square, Notting Hill, W., June 12, 1883.

THE SENSITIVENESS OF DRY PLATES.

To the EDITORS.

GENTLEMEN,—The makers of dry plates would confer a great favour on their customers if they would put on each packet the sensitometer number of that batch. One quarter-plate would not be a great loss out of a batch of emulsion, and it would enable customers to make pretty sure of their exposures. As a case in point: I have for a long time used plates of one brand, and was fairly successful; but suddenly all the plates exposed on a short trip were spoilt from under-exposure. I tried them, and found that, under similar circumstances, they required four times the exposure of the former supply. If the numbers had been marked on them I should have saved my plates. Even if it failed as a means of comparison between plates of various makers—as different people might possibly not test exactly alike—it ought certainly to be a test of the different batches by the same maker.—I am, yours, &c.,

June 11, 1883. J. E. GUBBINS, Major R.E.

BLISTERS: A SUGGESTION.

To the EDITORS.

GENTLEMEN,—The cause of the above vexatious attendants on silver printing has never yet, I believe, been thoroughly and systematically investigated. If one of the able experimentalists who now give photographers the great benefits attending their inquiries, and to whom we are all so much indebted, would turn his attention to this really important subject with the view of arriving at a clear understanding of its true cause, and as a result the means of its avoidance, I feel sure that the general body of professional photographers would be most grateful, as certainly would be,—Yours, &c., BROMO.

June 12, 1883.

[Contrary to our correspondent's belief a very considerable amount of attention has been devoted to this question, with the result that "blisters" are far less prevalent than they were a few years ago. One of the chief causes has been shown to be the want of adhesion between the albumen and the paper, caused by improper sizing or by the too great dryness of the paper at the time of albumenising. Amongst the remedies may be mentioned the gradual dilution of the fixing bath instead of removing the prints direct from the strong bath to plain water, or the transference of the prints from the hypo. to a solution of common salt and afterwards to plain water, the object being to prevent the too sudden diffusion of the saline matter contained in the paper, which tends to raise the albumen in blisters.—EDS.]

EXCHANGE COLUMN.

I will exchange landscape background, eight feet by six feet six inches, new, on roller, for iron head-rest.—Address, T. CHAPLIN, Studio, Embankment, Bedford.

I will exchange 12 × 10 glass bath, with ground top, also 150 *English Mechanics*, clean and consecutive, for anything useful. Wanted, a stereoscope.—Address, T. J. LLOYD, Earlsden, Coventry.

Wanted, fur rugs and 10 × 8 rolling-press, in exchange for various-sized cameras, lenses, tripods, plate boxes, nests of carriers in boxes, backgrounds, &c., or offers.—Address, C., 126A, Bold-street, Liverpool.

I will exchange a large rigid camera, by Meagher, for plates from 15 × 12 to 24 × 18, good as new; never been used. Wanted, a whole-plate camera, for dry plates with three or four dark slides.—Address, E. GRANT, Swindon, Wilts.

Wanted, whole-plate bellows-body camera, three double backs, with whole- and half-plate carriers, for dry plates, and Ross's whole-plate symmetrical, or Dallmeyer's rectilinear lens, must be in good condition, in exchange for jewellery.—Address, OTTO MOHR, Maidstone.

I will exchange a 10 × 8 mahogany camera, with rising front, folding tailboard, focus screen, two double dark slides, and mahogany twelve-groove plate-box, with lock and key, all in good condition, for anything useful in photography. Wanted, smaller apparatus. — Address, A. OLD, St. Merryn, Padstow.

I will exchange Dancer's patent stereo. camera and lenses, twelve slides, cost £16, price £3, Meagher's dark tent, £2, gem camera, twelve lenses, new, £3, Victoria camera, nine lenses, £4 10s., solar camera, nine-inch condensers, £4. Wanted, a good *carte* camera or good exchange.—Address, C. P. GEE, Weymouth.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

William Marsden Harrison, 40, Church-street, Falmouth.—*Photograph of the Rev. C. R. Gardiner.*

AMATEUR.—You will find your query answered in an article in this week's issue.

ALFRED WERNER.—Too much alcohol is the cause of the marking. Use less and you will no longer be troubled with them.

S. S. BINNS.—The lens clearly does not work to focus. If you make the correction in the manner you suggest you will, no doubt, find it a very serviceable instrument.

SEPTIMUS.—You have used far too much alkali in the toning bath. Had you adhered to the formula supplied with the paper, doubtless all would have worked satisfactorily.

INQUIRER.—The result you obtained appears to be due to a reversed action of light caused by over-exposure. Try again, and give very much less exposure than you did before.

E. PECK.—1. You will find a thoroughly-practical article on the subject in our ALMANAC for 1881.—2. We cannot give the desired information at present; but we will make inquiries, and probably write to you privately.

WOODBURYTYPIST.—Clearly the negative is at fault. From such a negative—if it be as you say, impossible to obtain a fair silver print from it—a good Woodburytype relief is quite out of the question. Do not waste time on further attempts, as they will prove futile

CHAS. RISTALL.—No; "wet collodion" plates cannot be developed with the ferrous oxalate developer in the way you suggest. Why not try the experiment for yourself? It is simple, and would save you writing so much on your supposed new theory.

W. FOX, Jun.—If the apparatus be quite new you will have to pay duty upon it, but not if it has been in use. You will have to pay duty on the dry plates and chemicals, so we think you will, on the whole, do better to purchase them there, though you will doubtless have to pay a higher price.

S. E. POLLOCK.—We can give you no advice in the matter except to recommend you to make every inquiry possible before parting with your money, as, on the face of it, the whole affair looks very unsatisfactory. Perhaps some of the trade protection societies can afford you information about the parties.

TOBY.—If the prints be protected by copyright the penalty is for reproducing them. Your suggestion to give them away with something else you may sell is only a colourable attempt to evade the law, and would certainly render you liable to all the penalties. You should get better and reliable information about the photographs before proceeding to make any copies.

A. G. P.—The mounting should be done while the print is on the glass and yet damp. Starch will do quite well. Perhaps you might get on better with a thin solution of gelatine; try. Without seeing the lens it is impossible to say what it is suitable for simply from the number it bears. We have not the manufacturers' books to refer to. Write to them or send us the lens to examine.

A. G. W. (Islington).—The fault appears to lie at your door. The plates, judging from the example received, appear to be all right; but they are very much over-exposed, which has produced what you imagine to be fog. If you examine the edges of the plate where they have been protected from light by the rabbet of the slide you will find that free from fog, which proves they are not at fault.

R. R. R.—The reason for the mount changing colour when exposed for a few months to the light is not far to seek in your case. The so-called "white paper," which you say had a "pinkish" tint at first, was made from an imperfectly-bleached pulp, and then tinted to disguise its yellowness. This colouring material (probably an aniline dye) has proved fugitive, and left the paper the colour it would have been had it not been tinted in the first instance.

R. D.—If you have not suitable apparatus to take the size of picture yo require direct the only plan is to make a small negative, and then fro it make an enlargement of the size desired. Can you not with you present apparatus take the size direct in a good light on a rapid gelatin plate?

YOUNG JEFF.—1. There is no satisfactory method of treating the sores pr duced by the action of bichromate of potash. Washing the ulcers wit very dilute ammonia is as good as anything which has been recommende Are you suffering from ulcers proceeding from abrasions of the skin from a skin disease produced by the use of the salt? The two are diff rent.—2. Perhaps the most brittle varnish you could make is simpl common rosin dissolved in methylated spirit.

RURAL.—1. Better follow the instructions supplied with the paper. Th same formula need not, of necessity, suit all samples.—2. You can cer tainly utilise the front lens of a portrait combination for landscap purposes, but it is impossible for us to say what it will cover, seeing tha you do not give its focal length; its diameter is no guide whatever.—3. Much depends upon what is a weak and what is a strong developer, a opinions differ.—4. Not if the best results are required.

R. W. C.—There is no reason whatever why the old fixing bath for print should not be mixed with that used for negatives, and both be treate with liver of sulphur. The washing of the prints it is better to kee separate, as is the old toning baths. The latter is far more valuabl for the gold they contain than the silver. When the gold is diffuse through a large quantity of silver (as it would be if all the residues ar mixed) it will not pay to separate if the proportion be small.

LUX.—Quite as good negatives may be and are produced by the gelatine a by the collodion process. If you have not been so successful with th former as you were with the latter it is certainly not the fault of th process.—A. We are not aware that any manufacturer now makes them B. You will find practical articles in the Journal for 1879—about th month of July.—C. The standard of comparison is too vague.—D. No after exposure.—E. Either may be employed.—F. Probably. Why no write to some of those who supplied them formerly?

RECEIVED.—A. Conan Doyle, M.B.; "Free Lance."

EXHIBITION OF THE ASSOCIATION BELGE DE PHOTOGRAPHIE.—Th latest date for receiving exhibits has been extended to July 1st, afte which nothing can be taken in. The exhibition will probably be opene by the King and Queen, and the number of intending exhibitors i already very large.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—Th subject for discussion at the next meeting of this Club, on Wednesda next, the 20th instant, will be—*The Consideration of the Merits of th Various Landscape Lenses Especially for Use with Gelatine Plates.*—1. *For Slow Work.*—2. *For Rapid Work.*

ROYAL CORNWALL POLYTECHNIC SOCIETY.—The prospectus and priz list of the forthcoming exhibition of this Society has just been published and, as usual, contains a liberal offer of prizes in connection with photo graphy. Eight different departments are classified and medals offere to professional photographers, while meritorious productions by amateur will also be recognised. The exhibition will open on the 11th Septem ber next, and all exhibits must be delivered at the Polytechnic Hall Falmouth, not later than September 4th. As in former years, all infor mation in connection with the photographic department will be afforde by Mr. William Brooks, Laurel Villa, Wray Park, Reigate, who ha the arrangement of that department.

MUSICAL LANTERN ENTERTAINMENT.—We have received from Mr F. A. Bridge, the well-known Honorary Treasurer and Secretary of th South London Photographic Society, a programme of his new series o musical lantern lectures for the season 1883-4. Mr. Bridge, in addition to being an able photographer, is—as many of our readers are aware—an accomplished musician and facile lecturer, and during the season, with the assistance of Mr. William Brooks, who manages the lantern, gives illustrated lectures interspersed with appropriate musical selec tions, at several of which it has been our good fortune to be present The new programme presents plenty of variety of subject from which to select—"from grave to gay, from lively to serene;" and if past pres judgments prove any forecast of the future we may predicate for th entertainment a coming successful season. The "tridiaphanon," a the magnificent triple lantern has been named, gives in the hands o Mr. Brooks a disc twenty-five feet in diameter (or a square picture o the same dimensions) when the size of the hall will permit.

CONTENTS.

THE BRITISH
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No. 1207. Vol. XXX.—JUNE 22, 1883.

EXPERIMENTS WITH COLLODION EMULSION.

Immediately upon receipt of Mr. W. T. Wilkinson's article on *Collodion Emulsion,* which appeared in our issue of the 8th inst., we proceeded to repeat our previous experiments in the line marked out by him, in the hope that perchance our previous failures might prove to have been due to accidental circumstances and not concomitant to the process. With what success the following record will show.

We may, however, premise that, for the most part, our previous attempts in this direction, spread over a number of years—the earliest dating back nearly nineteen years—were made without any idea of improving or in any way modifying the sensitiveness of the films, but merely with a view of simplifying the process of making the emulsion. Thus, soon after the first publication of the collodio-bromide process, it was recognised that, the precipitation of silver bromide from aqueous solutions being more rapid than in collodion, the process of emulsification would be thereby considerably accelerated; and, moreover, it was hoped that, by washing out the decomposition salts from the precipitate before adding the latter to the collodion, an emulsion would result that might be used by simply pouring it on to glass and drying—in fact, what came to be called afterwards a "washed emulsion."

Subsequently, on the introduction of washed collodion emulsion, another incentive was given to the perfection of a method of emulsifying precipitated silver bromide, by the waste of ether and alcohol involved in the evaporation of the emulsion; but, though numerous attempts were made by different workers, no great amount of success appears to have been achieved by any. That it is *impossible* to emulsify precipitated bromide of silver we do not for a moment assert, but simply that no practical method has yet been discovered by which the operation can be performed with the expenditure of a moderate degree of trouble and with the production of results that shall satisfy by their quality. For purely experimental purposes it is very easy to produce films that will exhibit the properties of pure silver bromide under different forms of development, for instance; but such preparations are wholly useless for pictorial purposes.

Reverting to our experiments: we tried several methods of precipitation, commencing with the one which Professor Stebbing uses. We selected this because of the rapidity with which the precipitate can be washed, but, unfortunately, the extreme coarseness of the bromide—which disappears in gelatine—proved a complete bar to success, the particles settling down in the collodion almost as rapidly as in plain water, and never at any time showing the slightest tendency to emulsify. We then returned to Captain Abney's original method, which gives a much finer precipitate; but here, though a better result was obtained, the emulsion was of no use for practical purposes. The precipitate appeared to retain its extremely-fine state of division up to the point where alcohol is substituted for water in the washing, when the subsidence of the bromide becomes at once more rapid and the particles coarser.

We next produced a precipitate by a method similar to Mr. W. K. Burton's, by prolonged boiling in the presence of a larger proportion of gelatine than in either Stebbing's or Abney's methods. This deposit, though easily separated and washed, emulsifies readily in gelatine, producing films of the utmost fineness; but in collodion it is not so. As in the previous instance, the contact with alcohol appears to be sufficient to cause granularity, though here it was more marked.

A little consideration will show the reason of this discrepancy between the behaviour of the precipitate in the presence of gelatine and collodion respectively. The effect of precipitating silver bromide in the presence of a minute quantity of gelatine is to form it in a very fine state of division, the individual molecules in the process of "cooking," if that be resorted to, grouping themselves together in flocculent masses, which are prevented from becoming granular by the action—mechanical, most probably—of an extremely-small trace of gelatine. Such a flocculent precipitate, though apparently coarse, settling quickly to the bottom of the flask during washing, easily resumes its fine state of division when agitated briskly with a warm solution of gelatine, owing, no doubt, to the dissolving of the minute quantity of the latter substance by which the individual molecules are held together; but, when such a precipitate in the flocculent state is placed in contact with alcohol, the first action of the latter is to withdraw all the water. This causes contraction and hardening of the gelatine, and the consequent binding together more tightly of the grouped molecules—a state of affairs which, it is needless to say, is only continued and intensified by the subsequent addition of collodion. In fact, the grouped molecules are not dispersed, as in the case of warm gelatine, but more firmly held together.

In order to test the accuracy of this hypothesis, a quantity of precipitate, formed by Abney's plan, was washed in the ordinary way and then mixed with a quantity of weak alcohol s. g. ·840—sufficient, when supplemented with an equal quantity of ether, to form the requisite bulk of collodion to hold it in suspension. The flask containing the silver bromide and alcohol was then introduced for a few minutes into a vessel of hot water and shaken vigorously, when a partial breaking up of the precipitate occurred, as was shown by the dense milkiness of the liquid; but, upon forming it into emulsion, the granularity was still too marked for practical purposes, while the large proportion of water present produced an amount of "structure" that would have proved fatal had the bromide been fine enough.

The best result was obtained by forming the silver bromide in glycerine, and removing this gradually, together with the by-salts, by means of alcohol. The solubility of glycerine in alcohol favours this removal and necessarily avoids the contracting or binding effect of the gelatine; yet the process is a slow one, if an extremely-fine state of division is to be preserved. But it is probable that dialysis may prove useful here. Mr. Warnerke has shown that, though alcohol and ether themselves do not to any appreciable extent pass the dialytic septum, yet the salts may be removed from a collodion emulsion by dialysing it over alcohol. It is still more likely, then, that the glycerine with the decomposition nitrates in solution will pass through the septum, and, as glycerine is freely soluble in the mixture of ether and alcohol, such might be used in order not to upset the balance of the solvents in the collodion contained in the dialyser.

Mr. Wilkinson speaks of having failed in his one experiment through adding too much collodion to a given quantity of bromide; but he probably attributes the effect to the wrong cause. The poverty of his film is most likely due solely to the grouping together of the fine particles of bromide, which, even when it does not amount to *visible* granularity, produces a film with little or no "body"—an effect very familiar to practical collodion emulsion workers. A quantity of silver bromide sufficient to give a dense, creamy emulsion with gelatine produces with collodion a thin, transparent film that, when laid upon a sheet of newspaper, is nearly invisible, and yet not a particle of the bromide has been lost, the whole of it being in the emulsion.

That silver bromide *can* be prepared in a sufficiently-fine form, and under conditions that enable it to be emulsified with collodion, we are quite aware; but there are evident incompatibilities in the methods we have mentioned. We have frequently utilised the deposited bromide from an old collodion emulsion by pouring off the decomposed and rotten collodion from which it has subsided and replacing it with fresh, the bromide reassuming its original fineness of division after a little shaking. But, though the method may have its advantages from an economical point of view, we can but repeat what we have said before, namely, that it has absolutely nothing to do with sensitiveness.

ENLARGEMENTS OR DIRECT PICTURES: WHICH ARE BEST?

At the last meeting of the South London Photographic Society (a report of which will be found in our issue for last week) the subject brought forward for discussion was—"When large pictures are required is it better to take them direct or to take small negatives and enlarge them?" This is an old question, and one that has at different periods been well debated, but without any very definite conclusion being arrived at.

It is true that some enlargements have been produced which are quite equal, if not actually superior, in every respect to others taken direct, even when the dimensions have been small; but in the latter case, in the opinion of some, they have been the exception rather than the rule. We are now referring more especially to landscapes. Some of the enlargements (landscapes and architecture) exhibited by Mr. W. Brooks at the meeting, measuring about two feet by one and a-half foot, were so perfect that it is hard to conceive that anything better could possibly have been obtained by taking the pictures direct. Of course the cost of and the difficulty in transporting the necessary apparatus for working this size of picture direct render it well-nigh impracticable in the field. In portraiture, when we approach large sizes—say, for example, the dimensions given above—there cannot well be two opinions that enlarging from small negatives is by far the better method of production.

Apart from the costliness of the apparatus and its cumbrousness in the studio it is impossible to obtain all portions of the figure in focus at the same time; and, even if it were, those parts which are the most forward would still be conspicuously distorted in their proportions, unless the picture were taken with a lens of such focal length that it would be quite impracticable to employ it in general practice. This was well exemplified in those life-size direct portraits shown at an exhibition of the Photographic Society of Great Britain, some few years back, in competition for the Crawshay prizes. In most of the former discussions on the subject no definite size of picture had been fixed upon—an important factor in the case. "Large pictures" is a very vague term, seeing that what one person may consider large another would call small or only of moderate dimensions. Thus, to an amateur whose experience has been confined to a "pocket camera" only, a picture ten inches by eight will appear large; while to a professional, who is constantly working with plates (say twelve by ten, or larger), this size will of course be looked upon as small.

On the present occasion an attempt was made to fix a definite size of picture, and, on consideration—twelve inches by ten or ten by eight being mentioned—the general opinion expressed was that such sizes could be better produced direct than by enlarging. Apart from the subject of, theoretically, the best results obtainable (as one of the members put it), there is the question of personal convenience to be considered. All who have worked in the field with a twelve by ten camera, even of the lightest construction, with (say) only three double slides containing half-a-dozen plates, together with the usual etceteras, know full well that the transport of the necessary baggage is more than one person can conveniently accomplish on a summer's day, particularly when the views required lie widely apart or have to be selected *en route;* and thus what should be a pleasure becomes converted into a toil. On the other hand, a quarter-plate "pocket camera," even with a dozen dry plates, is a mere bagatelle to carry in comparison wth that just mentioned.

The question of economy is also a consideration with many. Small apparatus is inexpensive compared with large, and small plates are also comparatively cheaper; so that a greater number can be exposed, and only the best of them enlarged from after the result has been approved. The waste of a few small plates is a mere trifle in comparison with those costing eight or ten times the amount, as in the case of twelve by ten compared with quarter-plates. Against this there is the set-off that the pictures obtained by enlargement will in the end be more costly, inasmuch as the large plates will still have to be employed for the printing negative, and in addition, a transparency made, all of which will entail so much extra labour as well as additional cost; whereas when the direct negative is once obtained all work and cost is at an end.

During the discussion a point was referred to of great importance as affecting the quality of enlargements, namely, the character of the plates used for the small negatives, and for this reason we direct special attention to it. Some plates, especially of the extra-sensitive kind, yield an image composed of particles of silver so coarse that it is perfectly impossible to obtain a sharp and satisfactory enlargement from them—the grain being too large to form the finest details in their true proportion. This subject was fully treated upon in a leading article in our last volume (see page 102).

A few days back we were consulted with regard to a negative of a group of a large number of persons—we might say a mob—taken on a plate seven and a-half inches by five, each face being only about a-quarter of an inch in length. From this negative an enlargement was desired; but, on attempting to make it, no satisfactory result could be obtained, owing to its being so much wanting in sharpness. Transparencies were made in turn by the wet collodion process (camera printing), by the carbon process, and also by contact printing on a gelatine plate; but from each of them the resulting enlargement was anything but satisfactory, for the reason just stated. Upon close examination, the original negative—owing to the coarseness of the particles forming the image—had very much the appearance of being taken on the surface of ground glass, hence no portion of it had any fine definition whatever. All appeared as if it was out of focus; yet, upon closer examination, we could see that the picture was in the best possible focus, and the lens we knew, from having worked with it ourselves, was capable of yielding the finest definition. From this it will be seen that it is useless for opticians to supply us with lenses of the greatest possible perfection if we employ them on plates which are incapable of rendering those fine details they have been at such pains to enable us to secure. In all cases, where enlargements have to be made from small negatives great attention should be paid in the selection of the plates, and only those made with an emulsion in which the silver bromide is in the finest possible state of division should be chosen—even at the risk of their being somewhat slower.

As a hint that may be useful to some of our readers we may mention that a fairly satisfactory enlargement—or, at least, much better than had previously been obtained—was made from the group negative to which we have referred, and this is how it was accomplished:—Remembering to have seen some very excellent enlargements from paper negatives which had been made somewhat out of focus with a view to hiding the texture of the paper as much as possible, we suggested another trial, this time putting the lens a trifle out of focus. This was done, and, although the resulting en-

·gement was in reality not so sharp as former examples, yet it ·peared to be much sharper, as the granularity was less con- icuous, and, on the whole, was eminently more satisfactory.

FRILLING AND THE ELIMINATION OF HYPO.

OLLOWING on our remarks on the osmotic action that takes place hen a gelatine plate is put in the fixing bath, we instituted and ·e continuing a series of experiments, which, if they have any actical issue, shall in due course be laid before our readers. ·eanwhile, there are several points upon the various modes of carry- g out this everyday operation which, while anticipating some of ır results, may with advantage be dwelt upon at the present time.

In the article we refer to we narrated how the action of the utual forces operating to replace liquid by crystal, or *vice versâ*, in ıe act of dialysis was well exemplified by experimenting with a m which had in great part separated from the plate by frilling— state which might be brought about by allowing a negative to main for a protracted period in the developing solution. Such a ate put in the hypo. bath would, after the fixing was completed, ·hibit no unusual phenomena. The frilling would be discernible, ıt, to all appearance, careful handling in the washing would enable ıe plate to be saved.

The experience, however, of those photographers who have the ·isfortune to work with plates which will frill under certain condi- ·ons—and who has not at times such experience?—tells that, ·nless unusual precautions be taken, a negative so frilled, from hatever cause it may have been, will become spoiled. Of course the ·eat variety in the causes of, and the conditions that govern, frilling well-known, and it is needless to say that frilling will often be seen ·efore the negative is placed in the fixing-bath. These conditions is not our purpose now to discuss; we wish to consider merely ıose cases where this annoying state of the film exhibits itself in ·nnection with fixing operations.

Obtaining some plates which we knew to be free from the tendency ıring cool weather, though liable to frill when summer heat pre- ·iled, we so treated one that it began to blister shortly after placing to wash—the time when, as is well-known, a batch of hitherto perfect ·egatives is liable to "go wrong." After half-an-hour's washing the ·listers had so expanded as to embrace the greater part of the plate. ·the subject had been landscape little trouble would have been ·ven, as a slight increase of temperature in the washing water would ·ave enabled us to float the film off on to a larger plate and allow it to ·y, when a negative of diminished density, but otherwise excellent, ould have resulted, any unevenness in tension not showing. This ·rticular plate happened to be a portrait. We, however, loosened ıe whole film, replaced it on the same plate, placed it to dry in a orizontal position, allowing the now greatly-expanded film to over- ·p the glass so as to keep it as true to shape as possible. The result ·as a perfect negative, but one in which the face of the portrait was · ludicrously distorted as to render it quite useless. Doubtless, ·ith special arrangements for securing a film so loosened and re- ·plied any desired position and arrangement as regards stretch- ·g could be devised; but we doubt the possibility of any process ·eing of easy practicability.

Reasoning upon the cause of the blistering or frilling which we ·ave shown in the particular case under consideration to be in all robability caused by the replacement of the salt by a much larger uantity of water, and so causing expansion of the film and a pres- ·ıre of water between film and glass, it occurred to us that if there ·ere less salt—that is, in this case, hypo.—to be removed, there would ·e less water coming into and through the film while the dialysis ·as occurring—that is to say, while the plate was being washed.

There were two ways in which the experiment might be tried:— ·irstly, by the use of a weaker fixing solution; or, secondly, by ·sing a fixing solution of full strength, but allowing the plate to ·rain thoroughly before placing it to wash. Securing a number of ·lates of the desired character for the experiment, we divided them ·nto three batches so as to compare results, giving all precisely the ·ame treatment—prolonged exposure to the action of a developer ·ontaining an excess of ammonia. The first batch was then placed in strong hypo.; the second we fixed in hypo. of varying strengths; the third we fixed in strong hypo., and allowed to drain for a couple of hours before washing them.

The first batch frilled and blistered in every instance. The second showed a diminution of frilling as the hypo. was reduced in strength, till, when it was at about seven or eight per cent., neither frilling nor blistering took place. In the third batch most of the plates were intact, some few showing slight signs only of blisters.

It is thus seen that, so far as regards the frilling of gelatine plates that sets in after washing (and this, as our readers are aware, is the main point where danger arises), our experiments have resulted in devising a simple mode of working that possesses distinct and decided value. We do not suggest for a moment that we have put an end to all frilling evils; but we do believe that by the use of a weak fixing bath, or by allowing the negative to drain an hour or two after being fixed in a strong bath, a constant source of trouble and worry is greatly reduced, if not entirely removed.

It may be urged that, as alum or chrome alum would do all we claim, in the same case no benefit would be produced by following our recommendation; but, in reply, we would say that the benefit is great. The process is simplified, and space is economised by the use of fewer chemicals, and the need for fewer dishes and utensils—an important point where the accommodation is but limited.

Finally: it possesses a recommendation which in our eyes is still more important—it reduces the risk of introducing elements of uncertainty as to possible fading. When alum is used before fixing to ensure absence of frilling it is necessary to wash well, or a decomposition between alum and hypo. may ensue within the film itself that may be both prejudicial to the perfection of the image and injurious to its permanency. We need not lay stress upon the risk that always exists in a busy studio of these various precautions not being attended to, and we trust that the simple recommendations we this day make may be serviceable to many conscientious workers.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

CHAPTER VIII.—DEFECTS IN PORTRAIT LENSES.—CHEMICAL FOCUS.—ERRORS OF SPHERICITY.—ASTIGMATION.

IN testing a lens it is of primary importance that the ground glass of the camera be so smooth or of such a fine grain as to permit of the use of a magnifying glass without the image suffering from granularity. The mere masking of this granularity by waxing or oiling the surface of the focussing-screen will not suffice; the grain must be fine in itself.

It is equally important that the surface of the ground glass be at precisely the same distance from the lens as that of the sensitive plate. This cannot be ascertained with the requisite accuracy by the usual method of pushing a foot-rule through the aperture in the front of the camera, observing how far it goes, and then trying in the same way a plate in the dark slide. A more accurate method consists in laying a straight rule across the focussing-glass frame, and inserting between the edge of the rule and the surface of the glass a slip of card cut in the form of a wedge, and observing the distance it can be inserted, making a pencil mark at the place where it touches the rule. Next insert a plain glass in the camera dark slide, and do likewise. If the point of contact of the wedge be the same in both cases then both planes are coincident.

In this way a difference of a hundredth part of an inch between the plane of the ground glass and of the sensitive plate may readily be detected. If the wooden adapters in the dark slide be thin and the spring in the back be strong, there is a danger of the sensitive plate being forced nearer to the lens than it ought to be, and the focussing thus disturbed. More than one optician of eminence has had lenses of large aperture and unmistakable excellence returned for alteration owing to an imaginary fault caused by the strength of the spring.

The focussing-screen having been adjusted accurately, the first test may be applied to ascertaining whether the lens has a chemical focus, or, in other words, whether the actinic and visual foci be so carefully adjusted that both shall fall on the same plane. Place

seven or eight printed cards in a row on edge on a slab of wood, the distance between each being six inches. In addition to the printed matter, each card should be boldly inscribed with a figure in black ink. Having placed the slab on a table at a distance of ten feet, arrange so that the cards shall be all focussed as near the centre of the ground glass as possible, all of them being shown. By the aid of a magnifier focus sharply, without using a stop, the centre figure of the row, which, if seven cards are employed, will be marked "3." Now insert a sensitive plate and take a picture; and, if on the subsequent negative the third card be sharper than the others, it proves the coincidence of the two foci. Should, however, a card further away than that focussed upon be found to be the sharpest in the negative it indicates that the lens is over-corrected for colour, or, as expressed by some, it has a back focus. When a lens is not properly corrected for colour, over-correction is the direction in which the error usually lies, and in almost every instance which has been brought under our observation the front lens has been the defaulter.

There are three methods by which the evils arising from over-correction may be cured. The first is that which will prove the most effectual and give the least trouble in future. It consists in removing the lens from its cell, separating its components by immersion in water sufficiently warm to soften the Canada balsam by which the lens is cemented, and then to regrind the contact surfaces in tools of greater radius of curvature. Only few photographers are able to execute work of this sort for themselves; for, although many are quite facile in effecting any manipulation or original investigation in chemistry, others being equally expert in mechanical and artistic departments, the number of those who have entered the field of optics by way of experiment or amusement is very limited. A "jobbing" optician will be more likely to undertake the regrinding of a lens than the manufacturing optician, who would scarcely care to go out of his way to execute a trivial order of this nature.

A method which was much employed when over-corrected lenses were more commonly to be met with than is now the case consisted in having a graduated scale engraved on the sliding tube, so that when a visual image was focussed sharply on the ground glass the lens had then to be racked out a certain number of degrees in order to ensure the image being sharp in the negative. This distance is a constant one only for an object situated a definite space from the camera or in the major conjugate focus of the lens, and varies with every distance of such object. Were this not the case it would be easy to let in the ground glass deeper in its frame, by which the same end would be achieved. If a lens of this class must be employed—and it is a well-recognised fact that they will produce photographs as sharp and fine in every respect as those in which the actinic and visual foci coincide—the best way by far to utilise them with a minimum of trouble and with freedom from all uncertainty is to adopt the system described in Chapter V., which consists in inserting, in the manner of a Waterhouse diaphragm, a very weak lens, the power of which shall be such as, when inserted in its place, to lengthen the focus of the objective to an extent equalling the difference between the visual and chemical foci. If, then, the object be focussed when this auxiliary lens is inserted, and the lens be then withdrawn when the exposure is about to be made, the image will be quite sharp. It may, perhaps, be scarcely necessary to observe that in all cases when purchasing a lens we recommend that one having a "chemical focus" should be avoided.

At this juncture it may be desirable that we give an easy method for ascertaining whether a lens has its blue and yellow rays brought to the same focus, or is "under-corrected" for colour, which is the necessary condition in a photographic objective. Bring the lens to be examined into a slightly-darkened room in which there is a gas light burning, and, retreating several feet from it, hold up the lens so as to form an image of this light in the eye of the observer. The image must, however, be examined through an eyepiece of any good construction; we prefer the "Ramsden" for this purpose. At the point where the image is sharpest there is but little colour; but, by bringing the portrait lens a little nearer, the flame, if the lens be properly corrected, is seen to be surrounded with a red fringe, while on removing it to a greater distance than distinct definition the light is fringed with green, proving that the blue and yellow rays are combined, and, as a consequence, that the chemical and visual foci coincide.

To test a portrait combination for spherical aberration, the Shadbolt method is as good as, and more convenient than, any other. Cut a disc of thick brown paper of the same diameter as the front lens of the combination, and from the centre of this cut out a smaller disc seven-tenths of the entire diameter. There is thus a disc and a ring the areas of which differ only a trifle from one another. Now, first insert the ring of brown paper, which will act as a diaphragm; and having carefully focussed on a printed bill, take an impression which should be clear and sharp. Next remove the ring of paper and with a little gum or paste attach the paper disc to the centre of the lens, and without altering the focus take another picture of the bill. If the spherical aberration be at all well corrected the second picture should be nearly as sharp as the first; but if the correction be insufficient the latter picture will be more or less indistinct.

Astigmation is a serious fault for a lens to possess in any marked degree. It is closely allied with flatness of field—that is to say, it is usually produced in the endeavour to make a lens which will cover a flat field with a large aperture. A lens of this class will work quite sharply in the centre, but in proportion as an object (such as the head of a sitter) is made to occupy a position tolerably far from the centre of the plate so does the sharpness diminish, and no amount of racking the lens in or out will give definition equal to that in the centre.

To test a lens for astigmation, erect a black cross against a white background. What we find most convenient for the purpose are the astragals of an ordinary window. At anyrate there must be a vertical line crossed by a horizontal one. Now focus these sharply on the centre of the ground glass, and it will be found that both lines, the vertical and horizontal, are well delineated and equally distinct. Next tilt the camera slightly so as to bring the crossed lines to either the top or bottom of the focussing-screen, and again examine the image very carefully, when the want of sharpness will be most apparent. Rack the lens in and out, and a point will be found at which the horizontal bars will be sharp, while the vertical ones are so far out of focus as to be almost invisible, or, at anyrate to have their sharpness greatly impaired. Now manipulate the rack once more, and the vertical lines will become sharp, leaving, this time, the horizontal ones as a confused mass of indistinctness.

In a similar manner, provide a sheet of brown paper with a round hole in it, and fix it on the window. Direct the camera to it as before, and observe that when the image is thrown on the centre of the focussing-screen it is quite round, no matter whether the lens be racked within or without the point of true focus. Now rotate the camera so as to bring the image to the margin, as in the previous experiment, and, behold! it is no longer round as before; for when the lens is racked in or out, it becomes alternately elongated vertically or horizontally, according as the lens is nearer to or further from the ground glass than the best mean focus. When the lens is made to approach the focussing-screen the luminous spot is elongated vertically; but when, on the contrary, the focus is lengthened, the spot expands horizontally.

It is only in lenses corrected for great flatness of field that astigmation is usually to be found in a strongly-marked degree although it is present to a slight extent in almost every lens. A portrait lens, however, having a round field, is more likely to possess freedom from it than any other. The skilful optician constructs his objectives so as to have as little astigmation with as much flatness of field as possible.

Most photographers who have been in the habit of sending their silver residues to the refiners will have been puzzled, at one time or another, by the partly-printed notification of the value of their waste and with its accompanying hieroglyphics; and possibly very few are acquainted with the method actually adopted of making an assay of the quality of an alloyed metal, an ore, or other substance containing precious metal. The report by Professor Chandler Roberts, recently alluded to by us, contains much interesting information upon the subject of the practice adopted by the mint authorities. It is somewhat singular that the Gay-

Lussac process, known to and used by photographers for many years, has only been adopted by the authorities since the year 1871, up to which time the "dry" process had been exclusively used. So long ago as 1829 a commission upon the subject was appointed in France, and they unanimously pronounced the dry method of assay to be deficient in exactitude, which verdict led to the wet method being adopted for obtaining the utmost exactitude, while the dry process was used for obtaining an approximate valuation. But in this country the dry method was still retained exclusively up to the time named, and since then has been employed only as an alternative method. Professor Chandler Roberts has the highest opinion of the dry mode of assay as practised in this country, and states that last year all the ingots of silver imported were tested by its means.

The method of estimating the value of silver by the wet method is well known to, though perhaps little practised by, photographers; yet for ascertaining the strength of a silver bath it is the only reliable mode, and is much simpler than the unpractised would believe. A solution of chloride of sodium (dry kitchen salt will answer sufficiently well) of a certain strength is made. A measured quantity of the silver bath is placed in a specially-graduated tube, the salt solution is added by degrees, with repeated shaking up, till no further precipitation is produced, and the figures on the tube opposite the level of the liquid tell without calculation the strength of the solution.

The dry method, though a very pretty process, is not applicable to the wants of the photographer, inasmuch as it needs a special furnace; otherwise it is simple enough. The furnace is of the muffle pattern—that is, a sort of oven with the opening opposite the operator and flame playing round, not in, this oven. When it is made red-hot tiny little cups of bone ash, called "cupels," are introduced, and then the silver alloy with a certain amount of metallic lead, a number of them being tried at once. They are shut up for a short time, and the melted lead takes up the silver; next, air is let in, which oxidises the lead, and the melted oxide gradually disappears by absorption into the cupel; finally, a little button of pure silver is left behind, which only requires weighing to enable an estimate to be formed of the quantity of actual silver originally present in the small sample operated upon.

M. Marey, whose researches into the motion of the limbs of animals during the movements of progression are almost as well-known as those of Mr. Muybridge, has made another interesting contribution to the question, he having greatly altered and improved his modes of working. He points out that for the purpose it will not suffice to have one instantaneous photograph of a number of birds, as it does not follow that all the usual motions of the wing may be depicted; they do not give the successive positions of the wing, the path taken, nor the speed of the wing at different moments. He employs for exposing a disc more than a yard in diameter and furnished with a series of apertures sufficiently large to overcome any diffraction, a narrow slit passing before the lens giving, as he has discovered, but an indifferent amount of sharpness. His disc is caused to make about eight revolutions in a second, and in front of a black screen a white pigeon is liberated, and by means of this apparatus photographed at successive equal intervals of time. M. Marey calculates the time of exposure to be the one-six-hundredth part of a second, and he makes eight of these exposures in one second. The results, which are published in *La Nature* (being reproduced by the process of similigravure), are both pretty and interesting to the general reader, and to those physiologists and others who study the organs of flight and the principles governing its motions will be of the highest value.

SOME SUGGESTIONS RESPECTING THE PRODUCTION OF PANORAMIC PHOTOGRAPHS OF UNLIMITED ANGLE.

Panoramas by photography appear to be extremely scarce and not so often seen now as in bygone days, when the difficulties of their production far exceeded any likely to arise in the simplified and altered state of things of the present. At the former time—whether pantascopic cameras with clockwork motion and long and curved plates, or the plan of pivoting the camera at the optical centre of its objective on a supplementary base-board and a series of plates were employed—many causes of failure were incidental to the necessity for using wet collodion that would not be met with in the dry processes. Films were scarcely possible then, and, besides paper, there was nothing of a flexible nature fit for use in the wet process to enable a picture of large angle on a continuous surface to be produced. On the other hand, if the panorama were obtained on a series of plates the time involved in preparing them was sufficient for changes of light and weather to take place, and thus mar the harmony of the whole.

Dry gelatine emulsion opens up a new order of things with greater possibilities, and I for one firmly believe that no very great difficulty will have to be overcome in order to secure a continuous picture including an angle of 360°, instead of the 120° or 130° hitherto obtained. The idea, no doubt, appears far-fetched, but, perhaps, the suggestions respecting the apparatus and materials needed will make it less remote and bring it more into the regions of the possible.

In panoramas on a concave glass placed immediately behind the lens there must, of necessity, be a limit to the angle included, because one cannot surround that part of the apparatus with a sensitive surface, and if flat plates were used vibration arising from lack of smoothness would prevent the attainment of any very near approach to perfection. Such being the case, to get an increase of angle without the foregoing objection the lens must either be mounted on the top of the camera (in a horizontal direction, of course) with a system of rectangular prisms or silver-on-glass mirrors to project its image through a narrow vertical slit on the sensitive medium, or the lens may be mounted on the camera in the usual way and the film disposed on a drum behind. It is the latter plan which commends itself most to my mind; so, therefore, it is that to which I shall confine my remarks, and endeavour to develope it sufficiently in detail that any readers who have the brains, time, and means at their disposal may have a complete course of experiment at their service, which, if successfully followed, will not fail to bring them well to the front on account of the novelty and interest of its products—continuous pictures of unlimited angle (if such may be so called which includes every point of the complete circle) never having been obtained hitherto.

The apparatus in its description will, of necessity, appear somewhat complicated; but in reality no more so than the existing forms of pantascopic cameras. In these the workmanship must be of the best quality, especially in the moving parts and driving arrangement; and, whether the latter is obtained from a strong but well-governed spring, winch, or clockwork, its motion must be smooth and uniform in every respect and capable of adjustment for rate, unless this provision is made on some other part of the apparatus to which its motion is communicated. Variations in duration of exposure ranging from great rapidity to seconds or minutes would have to be entirely provided for in this means for accelerating or retarding the motion of the instrument in the circle.

The camera, as far as the front and expanding arrangements are concerned, can be of the ordinary form; but an extension of its base forwards and some modifications and additions to the back will, perhaps, give it a foreign look. It should focus from behind. This portion, being the camera proper, is fastened to a pivot under the optical centre of its lens which passes through into a socket at the middle of a circular board or table, upon which the camera must be free to revolve with as little friction as possible, balancing ball or other bearings being applied to ensure the greatest freedom and steadiness attainable. Upon the pivot, between the camera and the table, a driving pully of a suitable size should be keyed and a second underneath, but fastened to the surface of the table and free of the pivot. The first is for the purpose of receiving the motive power from the clock, and the second for connection with one of similar size which is secured to and imparts motion to the dark slide or holder.

Before proceeding to describe the holder and carriers of the sensitive surface it will be advisable, perhaps, to say a few words as regards the most suitable support for and shape of the latter. Till very recently curved glasses have been the most approved from a theoretical point of view, but almost beyond practice from the great difficulties arising in the manipulation of this kind of plate; and to arrange films or paper in a curve without using a transparent form of glass, through which the image refracted by the lens would have to pass, is scarcely possible. Such, then, being the state of affairs, one is naturally led to inquire whether there was no

escape from curved concave surfaces, and why films or sensitive layers on flexible materials could not be disposed on the outside of a cylinder with the convex side to the lens. As with concave or flat glass the lens would move from right to left or otherwise, and would only project its picture through a very narrow slit fixed opposite its axis, and moving with it in as close proximity to the sensitive surface as possible, therefore the change to the cylinder is little more than a reversal requiring that lens, slit, and holder containing the drum should turn as a whole during exposure, and that the drum in the holder should also turn at a certain similar rate to present fresh surface to the slit—a process of feeding which exists in Liesegang's flat-plate pantascopic camera.

These considerations require the modifications and additions to the back of the camera as promised above, which consist in a continuation backwards of the sliding base-piece from the groove recessed in it for the focussing-screen to the extent of the equivalent focus of the lens, and four or five inches besides, in which should be securely collared, but free to turn, a pivot extending four or five inches upwards, according to the size of the drum, through a metal sleeve or socket, to give stability, and from which it protrudes about an inch in the squared form. On the end under the wood, and also below the slot cut for it in the rigid base of the camera, must be keyed a pulley of similar size to the one fastened to the upper surface of the table. The distance of the centre of this spindle from the ground surface of the focussing-screen must be equal to that of the screen from the optical centre of the combination when the focus has been adjusted for a general view.

The back of the instrument may be fitted with the usual loose focussing-screen to admit of its use for general work if desired, and will not add anything to the difficulty of fitting its panoramic dark holder, which may be square or squared on one face only, to close the back of the camera. This holder is made in the form of a dark box with a light-tight lid and solid bottom, but pierced at the proper place with a hole to fit the socket of the pivot secured in the sliding base-piece. It must be sufficiently large to contain a light drum, whose radius is equal to the distance intervening between the ground surface of the glass and the centre of the pivot. In the middle of its square side there must be a narrow vertical slit equal in length to the width of the picture, and closed by a sliding shutter to keep out the light. This constitutes the dark holder or dark slide.

The carrier or inner frame for the sensitive paper or film is the light cylinder above mentioned. This is passed into the box through the top, and held in position by sliding upon the metal tube erected from the hole in the bottom of the box. A hole is provided at the axis of the drum for this purpose, and also in its interior and at its axis is a squared receptacle at the right height to fit the squared end of the pivot on the camera back, which passes with its socket through the metal tube, and engage with one another when the back is put into its position in the camera. Assuming that the woodwork is complete and the back in its place, I will now explain how the different parts of the instrument are connected together and with the driving arrangement. This is effected by means of a driving band passing from the fixed pulley on the pivot of the camera to a similar one on the motor, and by uniting the pulley which actuates the drum with that screwed to the surface of the table by means of an india-rubber belt or band of suitable tension. This latter one must be of an elastic character, to admit of the racking out of the back of the instrument in the adjustment of the focus.

The mode of using the instrument to produce a panoramic picture is as follows:—The camera is set up and focussed in the usual way, after which the focussing-screen is removed and replaced by the square face box containing the drum, which closes the back of the camera and passes over the pivot till the squares are locked at the same operation, the lens capped, and the small shutter drawn. The whole is then ready to make an exposure by starting the motor and removing the cap, immediately upon which the whole of the instrument commences to turn slowly in a circle, while at the same time, from the pulley of the drum spindle being connected by a band to the one fixed on the motionless table, the drum revolves independently, and presents at the slit a fresh portion of the sensitive layer which encircles it for each fraction of a degree the lens moves through. When the apparatus has completed the circular movement the lens is again capped, the small shutter closed over the slit, and the holder removed for a change of paper or film. To facilitate this and to dispose of the ends of the paper the diameter of the drum may slightly exceed the double of the general focus, and then there will be a little spare space to allow for overlapping if the complete angle of 360° of view be attempted. This space would be recessed or slit, which, when the paper had been turned in, might be closed with a slip pressed flush with the edges of the opening.

In fitting the focussing-glass and dark holder to the back of the camera it must, of course, be borne in mind that the ground surface of the glass and the sensitive surface must be in register, and also that the vertical slit through which the image has access to the holder is as close as possible without touching the drum when filled for use.

Nothing has been said so far in respect of the necessity that will probably arise for tilting the camera and for the correction of the palpable distortion which is created in rendering any architectural subject with an instrument out of plumb by recourse to a swing-back. It being out of the question to incline the stand or to provide a means of tilting the camera apart from it without greatly complicating the mechanism of its movement, the inclination of the lens upwards or downwards must be obtained from a hinged front to carry it with rather more latitude in the rise and fall of the sliding portion. Its use will do away with the necessity for a swing-back to correct distortion, and as this would be its chief requirement nothing further need be said regarding it.

When I first thought upon the subject it was with a view to the production of panoramic pictures for the stereoscope; but the difficulties are so much increased in making use of two lenses that I considered it more advisable to set out by showing how a single picture might be made, then afterwards, by way of supplement, to offer a few remarks upon the application of the idea to the simultaneous production of a couple. The greatest problem, and one that does not come out quite clear in my mind, is at what point to pivot the camera. It is certain that it cannot be at the optical centres of the lenses, because the thing could not turn on two points; nor could that of one lens be selected to the exclusion of the other, because there would be other variations in the points of sight other than that arising from simple separation; therefore, the only course left is to put it between the lenses, equidistant from each and in a line with their diaphragms. Another difficulty would be experienced in the want of space at the back of the camera for the two holders. This, however, could be overcome by making use of right-angled prisms or silver-on-glass mirrors to divert the image to the opposite sides of the instrument. In this case both drums could be controlled from the one fixed pulley on the table.

The negatives obtained, there would be but little difficulty in constructing a stereoscope to view them. The long pictures when printed would have to be mounted one above the other, and in such positions that the one for the left eye is about two and three-quarter inches in advance to the left of that for the right eye. With this kind of picture the partition in the instrument would require to be horizontal; and, to enable the eyepieces to be arranged in a straight line, each of these latter would need the addition of a rhomboidal prism reversed in respect of one another, so that in viewing the pictures through them they should appear in a straight line also. Of course only a certain angle of view could be seen at one time; but as the pictures were slid forward the whole of the panorama would be observed as when seen naturally, yet without turning the head.

In the materials for supporting the gelatino-bromide, paper ranks first; and if this could be prepared as a temporary support for the film only, and from which it could be afterwards transferred to glass, nothing would be better. If the time and means for experiment were at my disposal that would be the line I should open with, because it appears to me that the probabilities of success are great.

Being very much interested in the above as an idea, I should be very glad to give what help I could to anyone who sets himself the task of realising it. JOHN HARMER.

VARNISHING GELATINE NEGATIVES.

ONE of the minor difficulties in connection with the working of gelatine plates—of which we are constantly hearing complaints—is that of varnishing. In the abstract it should, no doubt, be the simplest of all operations; and with collodion, given a moderate amount of care, such was the case. But with gelatine, for various reasons, the apparently-easy process of giving the final protective coating to the otherwise finished negative is found to be, to say the least of it, a somewhat unsatisfactory one; and many operators refuse to varnish their negatives at all, preferring to risk the dangers of printing from bare gelatine films as being the safer plan.

The difficulty arises partly from the physical and partly from the chemical properties of the gelatine. Its powerful affinity for water and its great absorptive powers, and consequent swelling under the action of moisture, render the gelatine film anything but

a suitable companion, at close acquaintance, with the hard, brittle, and inflexible layer of resinous matter which is laid upon it as its protector. This latter, no matter of what materials it may be composed, has hitherto proved wholly inadequate to perform the *rôle* expected of it, and, though supposedly waterproof, appears only to intensify the danger which moisture may threaten to the film of a gelatine negative. A single drop of water on a varnished gelatine negative will, after a very brief contact, leave a mark which, if not indelible, requires the entire removal of the varnish before it can be obliterated, penetrating, as it does, through the film of varnish to the gelatine underneath, and causing the latter to expand and crack the inflexible layer of resin above it.

If the moisture be presented in the form of silver solution, or if silver from damp sensitised paper gain access to the film, the result, though less immediately visible, is far more fatal. Combination takes place between the silver and the gelatine, and brown stains result, which, in the majority of cases, it is quite impossible to remove. Dissolving off the varnish is useless, for the action of the silver will be found to have passed right through that and to have attacked the under layer of gelatine, forming a compound which is amenable only to those reagents which attack the developed image itself.

It appears useless to hope for any way out of these difficulties by merely altering the constituents of the varnish. The fact appears to be that none of the resins usually employed (not even shellac) are really impervious to moisture; and, this being the case, the absorptive powers of the gelatine and its consequent swelling render it hopeless to expect to do more than ameliorate matters. A preliminary coating of collodion has been recommended, and certainly is a great improvement upon varnish alone; but, as applied in the ordinary way, a still greater improvement is to employ the *collodion* alone, and apply the varnish to some other purpose. The intervention of the collodion greatly retards the absorption of moisture by the gelatine film, though it does not arrest it entirely, consequently the ultimate effect is the same as with varnish alone; but, if collodion by itself be used, it is sufficiently elastic to accommodate itself to the expansion of the gelatine without splitting or cracking, and when the plate is dried no trace of any injury remains.

The hardness of a collodionised gelatine film is very surprising to those who are not accustomed to this mode of "varnishing," but something more is wanted. I have myself tried many different kinds of varnish, some of them specially prepared for "dry-plate" work; but, whether with or without the preliminary film of collodion, I can find nothing that will absolutely resist moisture. I have, however, succeeded in attaining with some trouble a degree of protection which practically answers for all the dangers that any ordinary negative is likely to be exposed to, though it may be a question as to whether it is worth while to adopt it in all cases.

My experience with *all* varnishes, as supplied commercially, is that they are *too thick* for gelatine films, though they may answer for collodion. The latter, it must be remembered, is spongy and porous and absorbs some of the alcoholic varnish; while gelatine, on the contrary, rejects it entirely. Consequently, varnish of ordinary thickness flows badly on a gelatine plate, dries slowly, and is a very long time before it loses its "tackiness." I therefore dilute my varnish with *at least* an equal volume of methylated alcohol, and filter carefully through filter-paper. The negative, after drying, is heated and polished with an old silk handkerchief and a little powdered talc; it is then collodionised, dried, and varnished. After the latter operation strong heat is applied for at least ten minutes; the plate is then allowed to cool, and is again polished with talc. If extra protection be required, the operations of collodionising and varnishing are repeated, the result being a surface which is far harder and more impervious to moisture than if a single coating of collodion and *thick* varnish had been used.

A good, cheap varnish for this purpose consists of hard white spirit varnish diluted with four or five times its volume of methylated alcohol. The collodion may be ordinary "enamel" collodion diluted with an equal quantity of a mixture of ether and alcohol.

H. Y. E. Cotesworth.

THE EFFECTS OF CONTACT OR PRESSURE ON THE SENSITIVE SALTS OF SILVER.—COLLODION EMULSION.

It was with very great interest I read the account of Captain Abney's experiments in this direction, in conjunction with the word "pressure," though it will be seen in the heading of this article that I make use of the word "contact." This line of research recals to my mind some experiments made by me some five or six years since in a similar direction. I was experimenting with the effects of the magnet on the sensitive film, trying to corroborate Baron Von Reichenbach's experiments, as published by him, which I did successfully, and which I attempted to bring before the South London Photographic Society at the time; but as some remarks fell from several of the members which I considered not at all encouraging I abstained from bringing the matter forward again, although I afterwards continued my experiments, and I think I had some conversation on the subject with Captain Abney a little time afterwards.

In mentioning the magnetic experiments it might be thought that I am going away from the subject; but I think it may have some bearing on the matter. In these experiments there was neither pressure nor contact used to obtain a result. In total darkness a perforated card (blackened) was placed one-eighth of an inch from the poles of a permanent horseshoe magnet and above that a sensitive plate, *specially* prepared, an eighth of an inch above the perforated card, making a quarter of an inch between the poles of the magnet and the sensitive plate. With five miuutes' exposure I obtained a result, and this was repeated scores of times, the most remarkable thing being that sometimes I obtained a positive and sometimes a negative image, which I tried to account for but could not. Sometimes I had a positive image on one half of the plate and on the other half a negative image; but the most astounding part was that some printed matter which was under the wash of indian ink (that I had used to blacken the card) was perfectly readable when the plate was developed. This only occurred once, and I believe I have the plate still in my possession. I then made experiments through a glass plate, painting a device on the glass plate with black varnish. Although this was contrary to the experience of Baron Von Reichenbach I obtained a result. I then tried experiments without the aid of the magnet by placing certain materials in contact with the plate for some considerable time, the contact lasting sometimes for days and sometimes for weeks, sometimes obtaining results on developing and sometimes no result at all, using the same articles in contact. Sometimes I allowed a small space between the object and the film; at times I obtained a result, and sometimes *nil*. Sometimes I used pieces of white cardboard, and on developing a reduction took place where the card was in contact, and sometimes not. At other times where the piece of card had been in contact it was perfectly transparent with a fringe of light all round like a halo. If it were anything that was due to the material why should I have got varying results at different times? The only apparent difference was that the glass plate used was not the same, and each might have been a different sample of glass for all that I knew.

Natural crystals acted on the film at times; these were rather more certain than the pieces of cardboard. Only one end of the crystal seemed to have any effect; but I had to find this out by experiment. I give these as they occurred to me at the time. I have not done much for some time past.

I see Captain Abney noticed the impression made by the pieces of paper or thin cardboard used for packing the plates, giving an image of its shape. I have also noticed that sometimes there is a reduction caused where the paper or card has been in contact, and sometimes a slight reduction round the edge of it while the middle was left transparent. I have not tried heavy pressure, as mentioned in last week's leading article, but now the matter has cropped up I will make a few more experiments.

I remember in the wet collodion days that if a plate were cleaned and polished and coated at once all sorts of inconveniences occurred on development; but, of course, this could be accounted for. The plate being excited electrically, marks from the same caused, if a stiff brush were drawn a time or two briskly with a certain amount of friction over a polished glass plate, on development a number of straight, transparent lines, showing in the same direction the brush had been passed. The results obtained by both Captain Abney and the editors seem diametrically opposed to one another; and it is my opinion, from the experiences above related, that such will be the case until we are made acquainted with the cause which produces the effects.

Another instance of a different nature I have to relate, in connection with a gentleman, a friend of mine in the city—a would-be amateur photographer (this was in the days of wet collodion, some ten years since). At times, from some unaccountable cause, every plate he prepared and attempted to develope fogged all over, and he used to bring his bath, chemicals, &c., into my dark room. I would prepare, expose, and develope a plate as clean as possible; he would try a plate directly afterwards, exposed precisely under the same conditions, but it would be fogged. I have permitted him to use my chemicals with a like result. It appeared that all the plates he handled were subject to this, and I never could ascertain the origin.

I have just noticed that the Editors, in their experiments, used a glass rod drawn out to a point to write with. I would suggest the

use of the other end of the same glass rod, also drawn out to a point, in order to see if a different result be obtained. The reason I suggest it is on account of my experiments with the crystals, one end affecting the plate and the other not. I think the subject is well worthy of investigation. Although opposite results are obtained by both parties mentioned I should not like for one moment to doubt their veracity in the matter, owing to the different results I have myself obtained under apparently similar circumstances.

Collodion Emulsions, Washed and Unwashed.

In Mr. Edwin Banks's last contribution to this Journal he apparently challenges the truth of the statements in my former article, *Collodion* v. *Gelatine*. It was not a hastily-written article, and the statements put forward were the results of many years' careful work, and to which I strictly adhere.

As I have not the slightest commercial interest in the manufacture of collodion emulsions I have nothing to conceal. I consider a washed emulsion far superior in many ways to an unwashed one. One point in connection with an unwashed preparation for general use is that, owing to the amount of water it contains, it is never in a condition to give the best possible results, whereas in a washed emulsion the more free the solvents are from water the finer and more perfect the film. I also think the plea for an unwashed emulsion very lame, and I should like to ask Mr. Banks one question, namely—What is the difference, after a plate has been washed and dried that has been coated with an unwashed emulsion, compared with one that has been coated with a washed emulsion (not taking into consideration the imperfections before stated in the one prepared with the unwashed preparation)?

Again: he says that washing, drying, and redissolving are difficult, tedious, and uncertain operations. They may be to some, but not to those who have had much experience in such matters; and I think it takes up far more time in washing every plate separately after it has been coated than to wash the emulsion in bulk in the first instance. He also mentions a "gritty, sandy film, giving a coarse, granular image." This is all new to me, as I have never seen a film of this kind in collodion emulsions, and I have made in my time many scores of gallons. I have never seen an unwashed emulsion that will keep for years; it is apparently quite a new feature in collodion emulsions. In my hands an unwashed emulsion is continually on the change and very uncertain, unless it be used within a certain time after preparation.

I could never see any benefit to be derived from adding nitrate of uranium to an emulsion. I made some experiments at one time, and found that nitric acid alone had a similar effect. Certainly I did not find that there was any gain as regards adding to the sensitiveness of the emulsion. I found that it had quite the opposite effect.

As to spots in a washed emulsion: they have never troubled me much—not so much as the unevenness on the film caused by the preservative spoiling the delicate half-tones and flat middle tints.

Mr. Banks also alludes to the washing up of the film of unwashed emulsion, and also its blistering. With neither of these defects am I troubled, nor have I any occasion to use a substratum of albumen. I consider that with alkaline pyro. albumen is perfectly useless, for this reason—that coagulated albumen is dissolved in the presence of ammonia or any strong alkali; so on that point I find not the least advantage.

I must not omit to mention the washing of an emulsion containing a small amount of pyroxyline. That difficulty I get over by making the emulsion, in the first instance, in a concentrated form, without losing any of the silver salt.

Now, as to the use of caustic potash in the developer: I have tried it, and so also have many others, and I have never heard of anyone succeeding. As I have never yet found a restrainer sufficiently powerful to keep it within bounds, so as to be manageable, I should very much like a little information on this point.

I have not yet succeeded in making collodion emulsion as rapid as the so-called rapid gelatine plates. The most I have done is to get a fully-exposed negative in about one-third the time of an ordinary wet plate, and that only with ferrous oxalute development, which I consider equal in many respects to the rapidity of several commercial plates now in the market. I would much prefer to have to develope a collodion emulsion plate at any time rather than a gelatine plate.

Mr. W. England, in the same issue, has a letter on collodion emulsion. He says he "never could prepare a plate that would not deteriorate by keeping" (meaning collodion). I have no doubt that Mr. England, as well as myself, has had a little experience with Dr. Hill Norris's plates. They kept well enough. I developed a plate that had been prepared twenty years, and which had retained its sensitiveness. The preservative in these plates was, I believe, gelatine. Why not prepare a collodion emulsion, and give a final coat of gelatine? This would prevent the spots so much spoken of. I should very much like Mr. England to take up this matter, and, with the use of ferrous oxalate as a developer, I am sure he would see the wonderful gain over alkaline pyro. as a developer. We all know Mr. England's ability in matters of practical photography.

Wm. Brooks.

ON FOCUSSING.

No. III.

In the report of the meeting of the South London Photographic Society, published in The British Journal of Photography of last week, it will be seen that Mr. J. Traill Taylor made some remarks clashing with mine. Now, Mr. Taylor is so good an authority on photographic optics that I should be very sorry if we disagreed upon any material point. I cannot, therefore, but feel sure that there is some misapprehension which will be cleared up to our mutual satisfaction. I was, I confess, much surprised to hear that he disagreed with my views, and listened attentively to his remarks without being in any way convinced that his conclusions were as correct as his arguments. The point of our difference was a side issue, and, therefore, only bearing indirectly on the question of the evening, consequently I did not think it advisable then to occupy the time of the meeting in discussing it. The report in The British Journal of Photography is, I believe, a fair summary of his remarks, and to the latter I will now reply.

I had never said that focussing on a plain glass could be done with a single eyepiece, either in the camera or the microscope. What I did say was that it could *not* be done, no matter how high the power of the eyepiece, unless there were some lines or some other similar expedient on the surface of the glass. My remarks were a *résumé* of the two papers *On Focussing* which have just appeared in The British Journal of Photography, and I was most careful to say that the one scratch which used to be employed was not enough. Mr. Taylor went on to say that, in his experiments in microphotography, "he had found it impossible when focussing on a plain glass—that is, plain in the sense of its not being ground — to get perfect sharpness when using anything weaker than a quarter-inch power." Now, here I must join issue with him. If it mean a clear glass without lines or scratches, then I say that it is impossible to obtain an *accurate* focus even with a quarter-inch power; but, if it mean a glass with lines, then I can assure him that, while a higher power has its advantages, it is perfectly easy to obtain accurate focus with the lowest power or even with a single lens used as an eyepiece. I must also object to the use he makes of the term "depth of definition," when he says:—"Accuracy under the former circumstances could only be secured by the aid of a compound microscope which possessed no depth of definition." What I particularly object to is the "only," which, with the context, leaves it to be inferred that any more simple eyepiece would possess depth of definition.

"Depth of focus," or "depth of definition," is a term used in two different senses:—1, pictorial definition, which is approximate only; 2, depth of definition peculiar to the eye. There is no depth of definition in any lens, simple or compound—absolutely none whatever, unless, by a forced construction of the term, error in the lens is made to convey that meaning. For instance: in a common single lens, where there is no true focus in the mathematically-correct sense of the word, each part of the lens has a different focus.

It is, therefore, quite true that the compound microscope *possesses* no depth of definition, but the eye which observes with that microscope has. The *apparent* depth is always small, and less as the magnifying power employed is greater. Let anyone try a low power on any object, and, although there will be one plane which, when carefully focussed, is easiest seen, the eye can force itself to focus the contiguous planes. The limit varies in individuals, and even in the same individual. In early life it is far greater than in after years; but it always exists and is always instinctively and unknowingly used.

The compound microscope and the camera are precisely analogous. Examine the image in the camera with an eyepiece and it becomes a compound microscope. Substitute a piece of ground glass for the eyepiece of the microscope and it becomes a camera. The one is always used for enlarging and the other generally for reducing, but each can be employed for either purpose. It is simply a question of convenience to use a high power for enlarging and a low one for reducing. The principles involved are identical. In the microscope the image is aërial, and there is no need to fix it on any definite plane. Each observer, as he looks at it in turn, has to alter the optical position to suit his peculiar sight. In practice this is usually

done by moving the whole body of the microscope; but the focus could be equally well adjusted by moving the eyepiece alone, leaving the real aërial focal image in exactly the same plane.

This want of depth of focus is the principal obstacle to the successful reproduction by photography of microscopic objects. It is not even practicable to produce them as *seen* in the microscope, for there the depth of definition possessed by the eye is a real assistance, while by simply turning the fine adjusting screws the various planes are successively brought into true focus. All that can be done is to focus for the centre and leave the rest to come as sharp as it will. It is precisely the same in ordinary photography; but it consequently happens that the true focus of the middle distance —which we may take to be the average centre of focus—is somewhere in space, and thus, while the whole picture is pictorially defined, no point is actually in true focus. This, I contend, is a frequent error in practice, and, if the principal object in the picture were made as sharp as possible, the picture would gain vastly in pictorial effect by the remainder being less sharp, and that in most cases this would allow of a larger aperture being used. If this view be correct, then it is worth while to try and devise a plan for obtaining this degree of accuracy; and, though I by no means pretend to have solved the problem, I cannot but feel convinced that the direction is a right one.

Pictorial definition is, of course, essential not all over, but in the principal object in the picture; but this depends upon the distance at which the picture is viewed. Stage scenery, for example, is often very effective when viewed from the body of the theatre; whereas, if it were examined closely, it would very likely be pronounced the veriest daub. In reality it is not so; for the general effect as an accessory is better produced by the broad treatment than it would be if every detail were to be carefully painted. The same principle holds good in photography. There is no advantage to be gained by producing detail which the eye cannot see, and, therefore, a large picture (which must, of necessity, be viewed at some distance from the eye), does not require the same degree of sharpness as a smaller one, which would naturally be more closely examined. What, then, is the degree of sharpness which constitutes pictorial definition?

The standard has been established as "one minute of arc." Every circle is divided by mathematicians into 360 degrees, and each degrees into sixty minutes, so that in any circle there are $360 \times 60 = 21{,}600$ minutes. Now, imagine yourself in a circular room and placed exactly in the centre, and the wall divided by parallel vertical lines—alternately black and white, or black on the white wall—that would be 10,800 lines and 10,800 equal white spaces. Each would subtend one minute of arc, and a person with good sight should be just able to distinguish the lines from the spaces. If there should be more lines, or he were to move away from the centre of the room, the eye would no longer be able to separate the lines from the spaces; all would appear grey. The diameter of the room would make no difference; for, whether it were ten or 100 feet, the effect would be precisely the same.

A more convenient plan of realising what is meant by "one minute of arc" is to take some printed matter of which the letters are one-sixteenth of an inch in height. Each letter seen at three feet distance will subtend five minutes of arc; the parts of the letter, as the upstrokes, will be somewhat less than one-fifth of the size of the whole letter, and therefore give a very clear idea of "one minute." It requires exceedingly good eyesight to read (say) a leader in *The Times*, in which the letters would be about this size, at three feet from the eye, and few people would think of attempting it. Much smaller type is made—some only the thirty-second of an inch in height—which, with perfect eyesight, should be clearly distinguished at eighteen inches. This, as a matter of fact, is the test-type and distance adopted by one of the chief oculists.

Photographic reproductions of printed matter are now common enough as advertisements, and fairly represent an over-sharp photograph. Their sharpness is exceedingly painful. It is the same with an over-sharp photograph: the eye is strained and fatigued in trying to resolve the details which it is felt are there.

George Smith.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

SOUTHSEA: THREE DAYS IN SEARCH OF EFFECTS.

Of all seasons of the year commend me to Easter as the time best adapted for a pleasant and instructive little photographic tour. The air is cold enough to brace the sinews and make the pedestrian stride lustily forth without numbing the hand in which he holds his portable leather case. There is a sun above him bright enough to produce a moral effect without scorching his face and moistening his brow. Spring is rising up all round. The birds are singing and the hedgerows blossoming. There are changing effects of light and cloud, sunshine and rain. To wind up, everything is *en fête*, and there are studies of life to be secured as interesting as anything in nature. Taking it all in all, the vagrant searcher after the beautiful could hardly choose a better time for his peregrinations.

So thought my two friends, "The Man of Science" and "The Lunatic" (any nearer clue to their identity might be invidious, especially in view of some of their future proceedings). As March dragged its slow length along many a heated discussion was held as to the place to be done and how to do it, in which the rival merits of Brighton, Eastbourne, and other watering-places were eagerly discussed. The question might never have been settled had an invitation not arrived from a provincial friend of photographic propensities whom we shall name "The Doctor," in which he proposed that his house at Southsea should be made headquarters of the party, and that they should choose the banks of the Solent as the scene of their operations. The proposal was too tempting to be refused, and the night train upon Good Friday found our two photographers clutching desperately to their somewhat bulky apparatus, and struggling with a dense crowd of bony-elbowed excursionists who were bound for the same destination. "Not angels, but angles," "The Lunatic" remarked in an an outburst of sanity, as he stowed his gear on the rack and rolled his eye upon his fellow-travellers in a homicidal fashion.

Southsea is a geographical expression which it might puzzle a good many people to define. That it is a watering-place within an attainable distance of London is generally known, but its exact size is vaguely appreciated save by those who have had the pleasure of visiting it; and this vagueness is intensified when the inquirer demands his railway ticket and finds that none are issued to any place of the name. As a matter of fact Southsea is an offshoot of Portsmouth, and has not been honoured by an independent station, although in point of size it is second only to Brighton, and when taken in conjunction with Portsmouth very much surpasses it. There is something piquant and interesting in this union between a grim old fortified town, grey with age and full of historical reminiscences, and a bran new fashionable watering-place, resplendent with piers, parades, and hotels. Apart from sentiment, it promises a variety to the vagrant photographer which can hardly be matched by any single town of my acquaintance.

Before going further let me run over briefly the "kit" chosen by my visitors, for I may acknowledge my identity with "The Doctor," though I prefer the *soubriquet* as giving this little sketch a less egotistical sound. In "The Man of Science" our little party boasted the presence of one of the leading dry-plate workers of the day, and the holder of a name which is familiar wherever The British Journal of Photography circulates—a tolerably-wide range. His preparations were naturally more pretentious than those of his companions. He used a Rouch's camera fitted for 12×10 plates, though 10×8 were used for instantaneous work. The lens was a Ross's rapid symmetrical of sixteen inches focus, provided with an instantaneous shutter of the ordinary drop form, but having the peculiarity that it was so arranged as to drop from three different heights in such a way as to give exposures of varying lengths. The shutter intended to give a comparatively-long exposure dropped only a quarter of an inch before opening, so as to have little momentum. The medium exposure was effected by a drop of about two inches. The most rapid had a drop of four inches, the latter giving one-twelfth of a second exposure. During our tour the shortest exposure was always used, the lens being worked sometimes at $\frac{f}{16}$—that is, sixteen of the uniform standard of the Photographic Society of Great Britain, or occasionally even at thirty-two of the same. In every case the exposures were ample.

"The Lunatic"—whose lunacy, by the way, never manifested itself until late in the evening, when he would dance weird dances and exhibit a desire to shake hands with every able-bodied citizen that he met—was content with a more portable "kit." He used a half-plate camera of Lancaster's make, and also a quarter-plate camera. His lens was a single view, with a diaphragm of $\frac{f}{32}$, or sixty-four of the uniform standard. He used rapid hand exposures as far as possible, and these were found in most cases to be rather over- than under-exposed. Curiously enough, though yachts were taken many times during the tour when in rapid motion crossing the field near the camera, they all came out sharp. This shows the absurdity of the idea commonly held that an exposure as short as one-eightieth or one-hundredth part of a second is necessary to get ships in motion. In this case the exposures were probably never shorter than from one-quarter to one-sixth of a second, to attain which requires a skilful manipulation of the lens cap. Among the successes achieved by this member of the party may be mentioned a group in the open air taken with a hand exposure at $\frac{f}{16}$.

Southsea was reached at midnight, where two or three genial and hospitable friends awaited the arrival of the travellers, who insisted upon what "The Man of Science" described as an "extended trial of the wet process," and it was not until fairly on the Common with the

next morning's breeze playing merrily across it that some symptoms of vitality began to show themselves in the party.

My own apparatus had little to distinguish it beyond its weather-beaten appearance, arising from the fact of its owner having walked to and fro in the world like a well-known historical character whose intentions were less laudable. I have already had the honour of describing it in the Journal. I may remark, however, that I have recently adopted a changing-box in place of dark slides, and find the arrangement very satisfactory. I do not trouble to cover the whole of my apparatus with a focussing-cloth, but manipulate my camera and changing-box without the smallest fear in bright sunlight. In fact, I may say here that, in my opinion, very unnecessary precautions are taken generally. I find that, though both my friends discarded the use of the focussing-cloth entirely after the mere operation of focussing was performed, and handled their dark slides in the light, none of their negatives were ever fogged except in cases of evident over-exposure.

The morning was a bright and cheerful one, with just enough of cloud piled up in the horizon to make an effective seascape, in which each of the party immediately indulged. The broad Solent, with its three circular forts, its fleets of yachts, and its sullen-looking men-of-war, all backed up by the long slopes of the Isle of Wight, made as pretty a picture as an artist's eye could desire. Our next attempt was on the Ryde steamer, which came ploughing along in the fair-way about a couple of hundred yards from the shore, the decks black with excursionists, and the foam flying from the paddles. Owing to her sudden appearance, "The Lunatic," with his quick hands and small camera, was the only one who succeeded in securing her satisfactorily. Wandering along the beach we had hoped to catch a few effects from yachts in motion; but we were temporarily disappointed, as the rising wind prevented most of them from leaving their anchorage. In spite of this drawback our morning was by no means a barren one, as a brave array of plates would testify. A group of tricyclists, a knot of Highlanders ("South Sea Islanders," as "The Lunatic" facetiously remarked), and several groups of friends lent variety to a succession of views of the Solent and Spithead. The spectacle of "The Man of Science" endeavouring to take a fractious infant—possibly with the view of conciliating and including its fair holder — was enough to reconcile us to any disappointment, more especially when his attempt to look fascinating threw the unfortunate child into a rigid and cataleptic state, from which it emerged blue but still screaming. By the way, while alluding to the wind I must give a word of praise to the exceedingly-light and handy alpenstock stand of Mr. George Smith, which was used by "The Man of Science." It is so marvellously light that no one can credit its steadiness under a 12 × 10 camera, even when a heavy wind was blowing, unless they have tested it. We were all impressed by it as a marvel of handiness and strength.

As the elements were still unfavourable in the afternoon we confined ourselves to indoor work and to developing the plates of the morning, the results of which were for the most part extremely satisfactory. I may mention here that all the plates were made by Burton's precipitation process, in which I believe more than ever. In the case of my companions, "The Man of Science" had made the emulsion, and each coated his own plates. They were extraordinarily rapid—considerably more so than mine.

After conciliating "The Doctor's" housekeeper by expending a couple of plates on the perpetuation of her charms, and another in taking a charming little group of Blenheim spaniels, an expedition was made to the house of a genial Southsea solicitor, outdoor work being still precluded by the state of the weather. Here a few more groups were taken, and a small musical party was instituted by our hospitable entertainer, which lent variety to the proceedings.

After a Sunday spent quietly, all hands were ready and eager for work on Monday morning. The weather was beautifully fine, with hardly a cloud on the sky, and just breeze enough to be pleasant. Snatching a hurried breakfast we made our way down to the beach, which was black with holiday makers, and where there were many interesting studies to be secured were it not for the nobler game we had in view. "The Doctor" could not resist the temptation of taking one unfortunate individual, who had bound himself securely with a rope and was piteously appealing to the surrounding crowd for a "little encouragement," on receipt of which it was understood that he would emerge from his bonds. His appeal seemed to be feebly responded to by an apathetic public, though, as "The Lunatic" remarked, a handsome sum would have been promptly raised for the purpose of keeping him in confinement for the remainder of his natural existence. Our original intention had been to keep to the beach and take our chance of yachts standing in near enough to make a good picture. Through the good offices of our legal friend, however, we obtained an introduction to Mr. Newnham, the principal letter of sailing boats, who showed us the greatest courtesy and attention. This gentleman actually ordered several of his yachts to manœuvre off the end of a small jetty upon which our cameras were placed, and, although there was a great demand for them at the time, employed them for more than an hour in cruising about in obedience to our requests. Under these circumstances it was little wonder that we obtained some interesting plates, and that the object of our expedition was amply fulfilled.

Our method of taking these yachts in motion was by focussing for the distance, moving the camera to follow the motion of the yacht, and "firing away" at the moment judged to be the right one—not an easy thing to calculate, as I can testify from numerous failures. This procedure is only possible in the case of the comparatively short-focus lens. In the case of the long-focus (sixteen inches) one it is not possible to focus for the distance, as, if such were done, the yacht when near enough to fill any large portion of the plate would be completely out of focus. An element of guess work is thus introduced.

It is wonderful how possible it is in the nervousness of the moment, when you imagine the camera to be so adjusted that the yacht will occupy the centre of the plate, to miss the object completely. Never shall I forget the rage and dismay which disfigured the intellectual face of our "Man of Science" when he scanned the detail coming up on his pet plate, intended to represent the meeting of two clippers going swiftly upon opposite tacks. As he gazed blankly at the single line of horizon which appeared on the picture, unbroken by the semblance of a sail, he rippled forth a series of theological terms—or, rather, in consideration of his profession, we will charitably suppose them to be engineering ones. His was not an isolated case, however, for there was not one of us but had some similar mishap. Only those who have experienced it can realise how easily the accident may occur.

Through Mr. Newnham's kindness we expended a dozen or more plates, each to excellent advantage, and, having wound up by taking the proprietor himself and a group of all the big leather boots with men in them who congregate about boat-houses, we felt that our morning's work had been a successful one. After luncheon we made the nearer acquaintance of one of Mr. Newnham's craft, and, throwing photography and all that appertains thereto to the dogs, indulged in a glorious sail down the Solent. With a fine press of canvas and a breeze which heeled the little yacht over until her gunwale was almost flush with the water, nothing could be imagined better calculated to clear the lungs of a couple of carbonised Londoners. The only bitter drop in our cup of happiness was the presence of a cynical and saturnine boatman, who insisted upon demonstrating the exact amount of wind which would capsize the boat, which, according to his calculations, was just the least puff more than we had at present. Having made this clear to us he stood by with a gloomy yet triumphant expression upon his countenance, and invented lies about the distance which he could swim in case of an emergency. Beyond the croaking of this "old man of the sea," however, our trip was a most enjoyable one. Running down to Spithead we cruised round the three forts erected by Lord Palmerston—two of which are ironclad, and have fresh coatings of metal added on to meet every increase of armour upon any foreign man-of-war. These forts command the only channel by which Portsmouth can be approached, and, being supported by others on the shore, render the place impregnable upon the sea side. Passing the forts we ran out as far as the light-ship, where the isolated keepers seemed delighted to see us and threw us out their letters, ingeniously sandwiched in between biscuits so as to convert them into convenient missiles. Night was falling, and a purple haze lying over the Isle of Wight, in gorgeous contrast with the deep scarlet bands left by the setting sun, before we found ourselves once more upon Southsea beach. There, bidding adieu to the melancholy mariner, we made our way back to headquarters in a ravenous condition, which considerably astonished "The Doctor's" housekeeper.

As our evening was largely spent in developing I may make a few remarks upon that topic in connection with instantaneous work. The subject usually adopted for this is commonly one from which it is somewhat difficult to get a negative giving sufficient contrast. It is true that the highest lights (in our case, for instance, the sails of the yachts) reflect much light; but, on the other hand, even those parts which are to be represented by transparent or almost transparent glass in the negative reflect much also. There is, therefore, no very great range between the highest lights and what takes the place of shadows. It is necessary to compensate for this fact by a suitable developer. One well adapted for the subject of our plates consisted of two or three grains of pyro., one and a-half grain of bromide, and three minims of strong ammonia to the ounce.

While I am on this subject I should like to say a few words on the advisability of using the alum bath, even when the plates have no tendency to frilling. A little hydrochloric acid should be mixed, but not so much as should be used for negatives that have been fixed, as the clearing and decolourising action of the acid appears to be much more powerful on plates that are unfixed than on fixed ones. It is necessary to thoroughly wash the plates after going through the alum bath, or a white powder (presumably sulphur) is deposited by the hypo.

Little work could be done upon the Tuesday, as the London contingent desired to get home by the afternoon, and most of their effects were already packed. A last stroll was taken about the town, however, under the guidance of Mr. Barnden, the well-known superintendent of the Gresham Insurance Society. This gentleman's kind attention and the assiduity with which he held sheets, carried cameras, and infused good humour into everyone was one of the most agreeable incidents of our tour. Several plates were taken in this final expedition, in connection with one of which a curious photographic incident occurred. A small group had been arranged upon the seashore which "The Lunatic"

was about to take, when a bright idea seized upon "The Man of Science," and, removing his camera to some little distance, he proceeded to take both photographer and group. "The Doctor," not to be outdone, retired forty or fifty yards, and succeeded in obtaining a picture which included both his companions. The effect was, as may be imagined, somewhat quaint and original.

All things must have an end, and the best of friends must part. The midday train bore away "The Lunatic" and "The Man of Science," with all their goods and chattels, including from forty to fifty excellent plates. From first to last the little trip had been a success, and, imperfect as this account of it is, I trust I have said enough to show that our only difficulty was an *embarras des richesses.* Could we have extended it over a week we should still have found much of photographic interest. I think that the last words of my friends were heartily meant when they assured me that their very next holiday would find them in Southsea once again. I trust that on that occasion we may make up for the deficiencies of this one, and that I may have an opportunity of communicating our results to THE BRITISH JOURNAL OF PHOTOGRAPHY.

A. CONAN DOYLE, M.B.

NOTES ON THE ABSORPTION OF ULTRA-VIOLET RAYS BY VARIOUS SUBSTANCES.

[A communication to the Royal Society.]

THE following notes contain some records of ultra-violet absorptions in addition to those which have been examined by Soret, Hartley, M. de Chaudonnet, and other investigators. For these observations we have generally used the spark of an induction coil, with Leyden jar, between iron electrodes as the source of light. Occasionally we have used other electrodes, but the lines of iron are so multitudinous, and so closely set in a large part of the ultra-violet region of the spectrum, that they form almost a continuous spectrum; at the same time there are amongst them a sufficient number of breaks and conspicuous lines to serve as points of reference. The spectroscope has a single prism of quartz, and the telescopes have quartz lenses. The image of the spark was projected on to the slit of the spectroscope by a quartz lens, and the absorbent substances were interposed between the slit and the last-mentioned lens. The gases were held in tubes fitted, some with quartz, others with rock salt, plates on the ends; liquids in cells with quartz sides. The spectra were all photographed.

Chlorine in small quantity shows a single absorption band extending from about N (3580) to T (3020). As the quantity of chlorine is increased this band widens, expanding on both sides, but rather more rapidly on the less-refrangible slide. Different quantities of chlorine produced absorption from about H (3968) to wave-length 2755, from wave-length 4415 to 2665, and from wave-length 4650 to 2630. With the greatest quantity of chlorine tried the absorption did not extend above wave-length 2550.

Bromine vapour in small quantity absorbs light up to about L (3820), and is quite transparent above that. With larger quantity the absorption increases, gradually extending with increase of bromine vapour from L to P (3660); and, at the same time, there is a gradually-increasing general absorption at the most refrangible end of the spectrum, beginning at about wave-length 2500; so that the denser bromine vapour is transparent for a band between wave-length 2500 and 3350.

Liquid bromine in very thin film between two quartz plates is transparent for a band between wave-length about 3650 and 3400, shading away on both sides, so that below M on one side and above P on the other the absorption seems complete. The transparency of the liquid film ends on the more refrangible side just where that of the vapour begins.

Iodine vapour, tolerably dense, cuts off all within the range of our photographs below wave-length 4300, and its absorption gradually diminishes from that point up to about wave-length 4080; from that point it is transparent. Denser vapour produces complete absorption up to 4080, and partial absorption above that point.

Iodine dissolved in carbon disulphide is transparent for a band between G and H, cutting off all above and below. It is not possible to tell how much of the light above M (3727) is absorbed by iodine in such a solution, inasmuch as carbon disulphide is opaque for rays more refrangible than M.

Iodine dissolved in carbon tetrachloride when the solution is weak, shows only the absorption due to the solvent described below. More iodine increases the absorption until it is complete above P (3360), with shading edge as far down as about wave-length 3400.

Sulphurous acid gas produces an absorption-band which is very marked between R (3179) and wave-length 2630, and a fainter absorption extending on the less refrangible side to O (3440), and on the other side to the end of the range photographed, wave-length 2300.

Sulphuretted hydrogen produces complete absorption above wave-length 2580; below that a partial general absorption.

Vapour of carbon disulphide in very small quantity produces an absorption-band extending from P to T, shading away at each end; no absorption in the higher region. With more vapour the absorption-band widens, extending from about wave-length 3400 to 3000, and a second absorption occurs, beginning at about wave-length 2580, and extending to the end of the range photographed.

Carbon tetrachloride liquid produces an absorption-band with a maximum about R, extending, but with decreasing intensity, up to Q (3285) on one side, and to *s* (3045) on the other. In the higher region there is a second absorption sensible about wave-length 2600, and increasing in intensity up to about wave-length 2580, beyond which point it is complete.

Chlorine peroxide gives a succession of nine shaded bands, at nearly equal intervals, between M and S, with faint indications of others beyond. In the highest region this gas seems quite transparent.

A slice of chrome alum a quarter of an inch thick is transparent between wave-lengths 3270 and 2830; its absorption gradually increases on both sides of those limits, but rather more rapidly on the more refrangible side than on the other, and becomes complete below about wave-length 3360 and above wave-length 2730.

A very thin plate of mica shows absorption beginning about S (3100), rapidly increasing above U (2947), and complete above wave-length 2840.

A thin film of silver precipitated chemically on a plate of quartz transmits well a band of light between wave-length about 3350 and 3070, but is quite opaque beyond those limits on both sides.

A thin film of gold similarly precipitated merely produces a slight general absorption all along the spectrum.

The difference between the limits of transparency of Iceland spar for the ordinary and extraordinary rays we find to be very small, and hardly to be detected without using a considerable thickness, three inches or more, of the spar.

We had expected to be able to apply the well-known photometric method by means of polarised light to the comparison of intensities of ultra-violet rays. Ordinary Nicol's prisms are not applicable to ultra-violet rays on account of the opacity of the Canada balsam with which they are cemented, but through the kindness of the President of the Society we obtained from him the loan of a pair of Foucault's prisms. Upon taking photographs of the spectrum of the iron spark through this pair of prisms, at various inclinations between the planes of polarisation of the two prisms, we found that for the whole range between the position of parallelism and the inclination of 80° there was no sensible difference of effect upon the photographic plate, though the length of exposure was in all cases the same. For inclinations between 80° and 90° there was a sensible and increasing diminution in the photographic effect, as the planes of polarisation of the polariser and analyser were more nearly at right angles to one another. It seems to follow from this that the full photographic effect ensues when the intensity of the light reaches a certain limit, but that for intensities of light beyond that limit there is no sensible increase in the effect until the stage of solarisation is reached.

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PHOTOGRAPHIC HINTS TO TOURISTS IN SWITZERLAND.

As many readers of THE BRITISH JOURNAL OF PHOTOGRAPHY may be contemplating a visit to Switzerland during the present summer with their cameras, I venture, as an old campaigner, to make a few remarks which, I trust, will not be without interest to amateur dabblers in the "black art."

A question which is often perplexing to amateurs (especially to beginners, who wish for photographic reminiscences of the scenes they visit) is what quantity and what size of plates should they carry with them. In reply, I strongly recommend quarter plates; for large pictures mean weight and inconvenience, and add greatly to the bulk of one's luggage. Pictures taken on quarter plates certainly lack the breadth and pictorial effect of a more extensive panorama; but, if care have been given to correct focussing and exposure, they are eminently adapted for enlargement for the album as well as for lantern transparencies—now so much in favour.

When I first visited Switzerland (now ten years ago) I took with me some of Colonel Stuart Wortley's collodion emulsion plates, which, though not equal to the gelatine films of today in point of sensitiveness, are nevertheless developed with great vigour and brilliancy after an interval of three weeks between exposure and development. Assuming, however, that collodion films have had their day unless means are soon found to increase their sensitiveness—a subject, by the way, which seems to me well worth serious study—and that gelatine plates are the ones selected, I would suggest that they be medium rapid for Alpine work. Very rapid plates are difficult to work in Switzerland; such, at least, is my experience—the result of a great number of trials with plates of various makers. Amateurs who prefer to make their own plates may take the formula of Dr. Eder, given on page 98 of his book, and prepare their emulsion at a low temperature with prolonged digestion. But ready-prepared plates of excellent quality are now so easily obtainable at low prices that it almost seems like folly for any but professionals to go to the trouble and expense of making their own.

I do not propose in this communication to deal with the question of lenses, snap-shutters, rapid exposures, &c., as so much will depend on

the kind of work the amateur lays himself out for. My own experience is that excellent work can be done in the Alps with the "wide-angle" landscape and "symmetrical" lenses and a flap shutter, provided the operator does not confine himself to one stop for all subjects, and uses his developer intelligently. If the pyrogallic method be employed it will be found a good plan to carry the pyro. ready weighed in small packets, with a small quantity in reserve in case of accidents. The ammonium and bromide may be mixed as directed in the formula for the "Manchester" plate, namely—

Bromide of ammonium	60 grains,
Ammonia	4 drachms,
Water	12 ,,

and used a few drops at a time. It is well to have in addition a plain bromide solution containing one part of the salt to five of water in case of over-exposure. Besides the necessary chemicals, ebonite dishes, and folding ruby lamp, it is well to be provided with a piece of elastic tube twenty-six inches long and a-quarter of an inch diameter. This, when weighted at one end by a short piece of thick glass rod, and fitted at the other with a "Mohr's pinchcock," will serve as a syphon to conduct the water from a jug over a plate when developing in a hotel bedroom, and which economises an article not often too plentiful in foreign hotels.

For packing the camera and its belongings a basket has been recommended on account of its lightness, strength, and flexibility. If this be adopted the lid should be covered with waterproof, and be large enough to contain all that is wanted excepting the plates. These are best stowed away in pairs, and made up in parcels of six. They should be legibly marked—"*Plaques seches pour photographie.*" This will prevent their being opened at the various custom-houses. In my own travels I have never had the slightest difficulty at the *douanes.* My practice is to carry my plates in a small handbag, which I usually fill up with toilet requisites. In the exceptional case of an over-zealous official demanding to see the contents of this bag, the mere opening of it so that he can peep in is sufficient in ninety-nine cases out of a hundred. Politeness and ready acquiescence in the demands of the custom-house officers have a marvellous effect, and travellers would do well to remember this.

A few hints, in conclusion, in reference to developing the plates, which in most cases is deferred till evening. If there are shutters to the windows they should be closed, and the windows themselves should be made light-tight by the counterpane, blankets, or shawls. The bottom chink of the door should also be stopped with some article of bedding or clothing. Having assured yourself that no extraneous light can penetrate, seat yourself on the floor with a chair before you on which your lighted lamp is placed, as well as water-jug and syphon. On the floor beside you spread a newspaper, and place your dishes and the wash-hand basin for slops. Then, with the dark slides and note-book on your left hand, and the bottles, glass measures, &c., on your right, you will be in a fair way to relieve your mind of the cares and anxieties of the day.

In a country abounding, as Switzerland does, in so much that charms the eye at every turn it is not difficult to select a spot in which to pitch one's camp. Visitors for the first time may be a little confused and perplexed as to the route to choose; and, therefore, in grateful acknowledgment of benefit derived I should like to recommend the *J. E. M. Guide to Switzerland*, which, for comprehensiveness and simplicity, is far and away in advance of its rivals. Knowing all the Swiss guide-books I reluctantly purchased this one on the recommendation of a friend, the price being four shillings and sixpence, and I was agreeably surprised to find how, unlike the majority of guide-books, it really tells you what you want to know. It is, in fact, choke-full of the information the amateur wants.

I trust that these few hints will be found serviceable, and that the amateur who avails himself of them will not have cause to regret my advice.

Walter Bagshot.

Geneva.

ON THINGS IN GENERAL.

They say it takes a specially-clever man to set an examination paper on an abstruse subject; and, as possibly the same rule holds good when photography is the subject, I have been wondering who set the examination paper for the City and Guilds of London Institute. One question runs—"A camera has a rising front and a vertical swing-back. How should you use both when focussing a near architectural subject?" Now, it is to be supposed that the examiner had in view a tall building, taken from the ground level, but he does not say so; for, if the "architectural subject" were a building, for example, on one side of a narrow street, and the photographer were situated at a high window half its height on the opposite side of the street, the answer would be—"Not at all." And, again: if the artist were employed in producing a view of the steps at Haddon Hall, for instance, I should like to know what use a vertical swing-back would be, or what the use of a rising front in photographing a well-built area. However, there is scope left for ingenuity and wit in the reply; but I hope no one will get "ploughed" for seeing the illogicality of the question. Question 10 is—"How many grains of silver nitrate will it require to form the maximum quantity of silver bromide by precipitating twenty-five grains of zinc bromide?" This is a misleading question to a nervous student. One of the questions to help him to pass in honours is—"Give the theory of vignetting when it is done by means of an aperture in a card?" "Give the theory of emission of smoke when you light a cigar" would be quite as sensible! What, too, would "the ordinary printing process" represent to the mind of a hand from the Autotype works? One of the oldest "argentometers"—if not *the* oldest—is a graduated tube showing the strength by precipitation; yet the student is told to describe a more accurate method of finding the strength of his bath than by an "argentometer." Question 7 is very ungrammatical, but its meaning can be guessed. We have been told that the Guild people are stingy and will not pay a fair price to some of their examiners; probably some of these papers are to show what may be expected if the "prices are lowered." At all events, it is the falsest of false economy to grudge good pay for examiners, for their work is both difficult, time-taking, and invidious.

Talking of the Autotype Company, photographers are indebted to it (or Mr. Sawyer) for the opportunity of seeing the veritable results obtained by photographing the sets of colours the latter gentleman prepared to illustrate his paper read before the Photographic Society. His communication was interesting and practical—a sort bristling with topics for endless discussion, yet one from which the average photographer could obtain plenty of useful hints.

Mr. J. Pike has cut the Gordian knot. Here for a long time we have had all sorts of horrible messes and occult processes proposed for recovering the bromide in waste emulsion, and this gentleman solves the matter at once by dissolving the bromide in hypo. and precipitating by "sulphide." Nothing could well be better.

I cannot say the same of Mr. S. Fry's plan of using sulphite with pyro., when he recommends a saturated solution to be made by pouring boiling water on the crystals and then dissolving the pyro. while the solution is lukewarm. Before his solution had been bottled for a month he would find a dense mass of crystals compacted at the bottom of his bottle, if, indeed, the solution did not crystallise before it got quite cold—a very likely contingency when the dissolution was carefully done. Mr. Fry, though, is quite right in his recommendation to add the citric acid before dissolving the "pyro."

I have been much interested in reading the articles on *Portraiture for Amateurs;* but before Mr. Downes, in attempting to add to the usefulness of the articles by airing his ideas of the way to arrange the general formation of the group, says "the field in which objects are in exact focus appears to be that of the inside of a sphere whose radius is equal to the distance of the objects from the optical centre of the lens" (optical centre gives a fine touch of exactitude), it would have been better for him to ascertain the truth of the canon he was formulating. He would then have discovered that if he placed the figures in such a manner those at the side would be wofully out of focus, using a lens with full aperture.

I notice, in *Foreign Notes and News*, that a great deal of favour is accorded to a process the invention of "Herr Wild," or "Mons. Wild." Is it possible that these descriptions are to represent a gentleman of that name who gave his process originally, I believe, in the columns of this Journal? Honour to whom honour is due.

I cannot quite understand, from the brief *résumé* of his speech, what M. Davanne means when, in describing that no "fixing" takes place when a gelatino-bromide plate was placed in a solution of alum and hypo. that had previously been saturated with bromide of silver, he says there is a limit to the fixing energy of the hyposulphite bath as soon as this product is saturated with a silver salt. The result of the experiment one would have thought to have been self-evident without trying it.

Someone has been writing a letter to suggest that, at the next *conversazione* of the Photographic Society of Great Britain, instead of placing rubbishy apparatus and fusty specimens of processes on the tables in the middle of the room "the powers that be" should give a good dance. "Discussion on art and on the respective merits of dry plates and collodion are, doubtless, extremely important," the writer states; but, "in deference to the ladies," to whom such topics are as "*caviare* to the general," he makes the suggestion. "Six committee men to act as stewards," come up at once and enrol your names!

Free Lance.

Our Editorial Table.

The Phœnix Shutter.

Leeds: Reynolds and Branson.

Messrs. Reynolds and Branson have sent us one of their "Phœnix" shutters—an improvement upon the combination of "flap" and "drop" shutter introduced by them some two years ago. The advantage of this form of shutter for landscape (or seascape) is in the graduation of lighting from foreground to distance and sky, the lower portion of the

us being opened first by the rise of the flap shutter, the closing by eans of the drop shutter, commencing from the top. By this means becomes perfectly easy to secure natural clouds in the same negative ith a comparatively dark foreground; and, even when clouds are not ı question, the atmospheric rendering of the different distances in a ndscape gives ample scope to the functions of a shutter of this descrip. on. The new shutter is fitted with a very simple arrangement for egulating the exposure to any desired degree of rapidity, while, by a ery slight alteration in the method of using it, exposures of very much onger duration can be given.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 27........	Bristol	Studio, Portland-st., Kingsdown.
,, 28..	London and Provincial	Masons' Hall, Basinghall-street.
,, 28.... ..	Liverpool Amateur	Free Library, William Brown-st.
,, 28.......	Oldham	Hare and Hounds, Yorkshire-st.
,, 28........	North Staffordshire	Town Hall, Stoke-on-Trent.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 14th instant, Mr. A. J. Brown occupied the chair.

The CHAIRMAN said that it had been held that the proper position for an instantaneous shutter was next the plate, and not close to the lens. His view of the matter was that no different effect resulted from the two positions, and in support of his theory, produced an appliance which he had constructed in order to put the question to the test. The apparatus consisted of a rectangular wooden tube, at each end of which was a grooved fitting to take either the dark slide or the lens front, which, for this purpose, was made of the same size as the dark slide. Across and as near to one end of the wooden tube or chamber as it could be made to work, a drop shutter was fixed. Now, by placing the lens at one end of the tube and the dark slide at the other end, the drop shutter would work close to the lens or slide according to the end at which they were applied. He (the Chairman) produced two negatives of the same subject—taken one with the shutter next the lens and the other with the shutter close to the plate—and he could find no difference in them.

Mr. W. E. DEBENHAM said that there would be no difference as regarded the amount of light and the effect of more or less exposure. The question was whether, with a moving object in the field, its movement would affect the sharpness more in one case than in the other. If the aperture of the shutter were long, there would probably be no noticeable difference; whilst if it were very short, although with the shutter next the plate there would be greater sharpness, yet, as the whole of the plate would not be exposed at one time, the parts of the moving object might be represented at different times and a curious distortion result.

Mr. A. COWAN remarked that a shutter with a very long opening was, except for the inconvenience of its bulk, the best, and then its position was very much a matter of indifference.

Mr. A. HADDON confirmed the statement of the previous speakers.

Mr. A. L. HENDERSON inquired if any reason could be given why a weak emulsion kept in the cold improved. He recently had an emulsion of which the gelatine had decomposed from long keeping, although thymol had been added to it originally. He added sufficient fresh gelatine to make it set firmly, and coated, and found the plates particularly rapid and good in every way. He also had an emulsion which he divided into two portions, allowing the one to set, and after some hours remelted it at a heat only sufficient for the purpose, whilst the other half had been kept just liquid all the time. The half that had set and been remelted proved the quicker and better of the two. He thought that the contraction and expansion caused by setting and remelting had operated beneficially upon the bromide of silver.

The CHAIRMAN believed that no ripening of emulsion would take place if the free bromide had been removed by thorough washing.

Mr. DEBENHAM said that Mr. W. K. Burton had found great increase in sensitiveness to accrue from keeping emulsion prepared by the precipitation method, and in this case the bromides were more effectually washed out than in any ordinary washing of set gelatine emulsions.

Mr. HENDERSON said that he had found that by a special mode of preparation it was possible to make emulsion containing much less silver than was usually employed. He had made up 200 grains of silver nitrate into thirty ounces of emulsion and given it to Mr. Prestwich to experiment with.

A MEMBER inquired whether it would not require to be coated thickly in proportion to the reduction of the amount of contained silver.

Mr. W. H. PRESTWICH replied that the emulsion had been given to his coaters with no special instructions as to coating thickly, and the plates certainly had good body. The sensitiveness was, however, only about half that which he considered as a standard.

The names of officers for election at the annual meeting were given in, and it was particularly hoped that members and friends would muster largely on the occasion—Thursday, the 28th inst.

ROYAL ASTRONOMICAL SOCIETY.

THE June meeting of this Society was held on Friday, the 8th inst., at Burlington House,—Mr. E. J. Stone, President, in the chair.

Professor PICKERING, on the invitation of the President, said:—I will endeavour to give an account of the method we are employing for determining the light and colour of the stars by photography. The problem which we have set ourselves is really part of a larger work on which we have been engaged for several years. Some four years ago I undertook the determination of the light of the stars by means of a photometer which has already been described to the Society, and I have here the proof of sheets of a catalogue of the magnitudes of 4,260 stars, including all those which are assumed to be brighter than the sixth magnitude in any of the standard catalogues. The entire work is based upon something like 90,000 observations. These have been compared with all the more important previous observations, including the Almagest of Ptolemy, and the observations of Sir William Herschel, published nearly a century ago in the *Philosophical Transactions*, the more recent and valuable observations of Sir John Herschel and of Argelander, so that we shall be able to give a list of the deviations of our photometric observations from the previous determinations of magnitude. In all these cases, however, the catalogues give only an estimate of the light of the stars as seen by the eye; no account is taken of colour. The only determination of which I am aware of the colour of a very large number of stars is that made by a member of this Society, Mr. Franks, and I am indebted to your Council for the loan of his manuscript, which was sent to me in America. I made considerable use of it, and have returned it to the Society. My attention has recently been turned to the subject of photometry by means of photography; in this my brother, Mr. W. H. Pickering, has been associated with me. The problem we had before us was to attain, by means of photography, a register of the magnitudes of all stars visible to the naked eye. Hitherto, the only photographs of stars have been taken in the focus of comparatively large telescopes, giving a field of at most one or two degrees. Our problem was how to photograph a large portion of the heavens on one plate, so as to compare the magnitude of stars at considerable distances apart. For that purpose we have used a modified form of equatorial, with a camera lens which gives a field of some 15°. For ordinary photographic cameras it is not unusual to construct the lenses so as to take pictures of buildings subtending an angle of 60°, or even 90°; but in such cases it is necessary to use only a very small aperture. We use a combination of lenses, which gives a comparatively large angular aperture, and a field in which there is not much sensible aberration at a distance of 10° from the centre of the field. With this combination, and the sensitive photographic plates that we employ, stars down to the fifth and sixth magnitude leave a trace upon the plate. No clockwork is employed, so that each star would trace a line upon the plate, more or less intense according to its brightness. Our method is to make an exposure of ten seconds; during that time the earth's motion is so small that the images of the stars only appear as circular dots. Then the camera is covered up for ten seconds, and another exposure for thirty seconds is made, so that the image of each star is represented by a dot and a dash. The plates on which the photographs are taken are about six inches by eight inches, and a photograph of a region 15° square occupies about a sixth part of a plate. When one photograph has been taken, the instrument is shifted 15° in declination by means of a spring which falls in the declination circle; this shift can be done very quickly. Then another photograph is taken; this time the exposure of thirty seconds is made first. Then there is an interval of ten seconds and another exposure of ten seconds, so that the image of each star is represented by a dash and a dot. The instrument is again shifted in declination, and another region of 15° is photographed; this time the image of each star is represented by two dashes. Then the instrument is shifted in Right Ascension, and three more photographs are taken, so that on one plate of six inches by eight inches we have the stars in a region of the heavens measuring 30° by 60°—that is, about a twelfth part of the visible heavens, omitting a small region in the vicinity of the Pole, which will have to be discussed by another method. Twelve such plates are sufficient to go entirely round the heavens, and complete the work for the northern hemisphere. In the case of eye observations, it may be alleged, when a new star is observed, that there was some oversight on a former occasion; but these plates will afford permanent evidence of any change of magnitude. They will not enable us to determine the magnitudes of stars, but they will form a very valuable record of their relative brightness—not as seen with the eye, but as measured photographically. In addition to these photographs we propose to publish a photographic map of the whole heavens, and for that purpose we shall take in fainter stars than those upon the plates I have just described. I have here an enlargement of a considerable portion of the constellation of Orion. You will notice the three stars of the belt, and the sword in which the nebula is clearly visible; stars down to about the eighth magnitude are shown here. You will notice that the star β is very faint, but the reason is obvious; it is a red star and its photographic effect is comparatively slight, so that in this way we get a certain approximation to the colour of the stars. Here is a photograph of the constellation Perseus: Algol is distinguished as the brightest star. But there is another bright one in its immediate vicinity, where only a very faint double star is seen with the naked eye. One of the pair is 5·7, and the other of 6·3 magnitude, but they are very blue, and the consequence is that they show as much more intense than they otherwise would in the photographs. Here is an enlargement of the region about the Orion nebula. I find that within a circle, with a radius of 2½° about the nebula, that we have 180 stars so photographed. There is one point I omitted to mention with regard to the measurement of the brightness of stars from these negatives. I have counted the number of stars in one of the negatives about the Orion nebula, and have found that in the region from about 5° north to 5° south, and from five hours Right Ascension to six hours, we have sixteen stars which are common to the photograph and to our catalogue (which includes stars down to the sixth magnitude). There are also in our catalogue sixteen stars in this region which were too faint to be photographed, and there are five stars in the photograph which are not to be found in the catalogue; that is to say, difference of colour have brought out this striking difference between the sensitiveness of the photographic plate and the eye.

The Astronomer Royal said: With regard to the determination of the colour of stars, we need at least three factors; that is, the relative brightness. At three places in the spectrum the stars do not shine with pure spectrum colours. There is always a certain amount of white light intermixed, and, therefore, it will be necessary not only to compare eye observations and photographic observations, but we must know the part of the spectrum to which the photographic plates used are sensitive.

Professor Pickering said: In answer to that question I have here a photograph of the solar spectrum taken with these plates. It will be seen that the photographic action extends from the F to the H line; that is to say, it extends much further down towards the red end than with the ordinary wet plates. I quite agree with the Astronomer-Royal's remark that we must have a register of the stellar light in different parts of the spectrum. Perhaps I may be allowed to describe a little device by which we are hoping eventually to determine the relative light in each part of the spectrum. With a non-achromatic lens there is a great difference in the length of the focus for the red and blue rays. If the plate be put in the focus of the red rays you have a blue ray, represented by a circular patch of very much scattered light. We propose to cut out the centre of the lens by means of a prism of small angle, and thus we shall obtain a species of monochromatic photograph; for it is only the light that is brought to a point which will be intense enough to register itself upon the plate, and so we shall practically get photographs corresponding to different colours for different distances of the plate.

Mr. Common said: My chief feeling is that I should like more information from Professor Pickering. I have myself made a good many experiments as to star photography, and have found that you get some stars in the photographs which are not to be seen in the charts, and there are some stars in the charts which are not to be found in the photographs. But the chief merit of the photographs is that they cannot err. The photographic plate has no prejudices; what it sees it shows with fidelity. I should like to ask Professor Pickering what was the aperture of the instrument with which his photograph of the constellation of Orion was taken, and what were the exposures.

Professor Pickering: One of the photographs was exposed for half-a-minute, and the other was exposed for thirty minutes. The aperture of the lens was about two inches, and the focal length about seven inches.

After several other papers had been taken as read, the meeting was adjourned.

THE POSTAL PHOTOGRAPHIC SOCIETY.

A committee meeting was held on Saturday last, the 16th instant, at the Hon. Secretary's address, 7, Figtree-court, Temple, at 2.30 p.m. Present:—Messrs. J. Pocock (President), Walter Withall, W. M. Baylis, Lieutenant Horton, R.A., and the Hon. Secretary.

The minutes of the previous meeting were read and confirmed, except that the second prize for "portrait of member taken by himself" was withdrawn, as there were so few entries.

The accounts for the year were presented by Mr. W. M. Baylis (Hon. Treasurer), and the balance sheet audited.

It was resolved that the retiring members of the committee should do so in alphabetical order, and that a gratuity of 5s. be given, as decided in resolution 10 of the previous committee meeting.

At 3 o'clock the annual general meeting was held. The President having been voted into the chair,

The Hon. Secretary reported the progress and doings of the Society during the past year.

The Hon. Treasurer handed in the following balance sheet, which was duly accepted and passed:—

GENERAL BALANCE SHEET OF THE POSTAL PHOTOGRAPHIC SOCIETY
For the Year ending June 16, 1883.

Received.	£	s.	d.
July, 1882, to April, 1883.—51 Entrance Fees at 2s. 6d. each.	£6	7	6
September 30.—1 Entrance Fee, Honorary Member, at 5s.....	0	5	0
July to Dec., 1882.—84 Yearly Subscriptions at 5s. each....	8	10	0
1 Yearly Subscription, Honorary Member, at 10s.	0	10	0
Jan., 1883, to April, 1883.—17 Half-Yearly Subscriptions at 2s. 6d. each	2	2	6
Feb. 1.—1 Yearly Subscription, paid in advance, for 1883-84..	0	5	0
May 30.—Contribution to Prize Fund	1	1	0
Excess Carriage returned....	0	0	6
June 7.—Interest on monies in Bank	0	2	0
	£19	3	6

Expended.	£	s.	d.	£	s.	d.
July, 1882, to June, 1883.—Stationery Account, including Paper, Envelopes, Post Cards, Stamps, &c				£4	4	5½
Printing Rules, Reports, and Labels				2	12	6
Book Account, including Albums, Note and Scrap Books, &c.........................				3	9	8
Prize Fund, paid in 1st Competition				1	7	6
Hektograph, Stamp-Box for Prints, Clerk, &c...........				1	10	2
June 16.—Balance—						
In Bank	£5	0	0			
Cash in hand ..	0	16	8½			
Stamps in hand	0	2	6			
				5	19	2½
				£19	3	6

Examined with books and vouchers and found correct,

J. Pocock,
Walter Withall, } *Auditors.*

The officers then retired, as did the three members of the committee in alphabetical order, and Lieut. S. Horton, R.A., who asked to be relieved, as he was likely to be ordered on foreign service, and the following were elected to serve for the year commencing July, 1883:—In London: Messrs. J. Pocock, W. M. Baylis, Walter Withall, H. Senier, F.C.S. In the Country: Surgeon Major Horace Day, M.D., Tunbridge; and Mr. F. C. Cowley, Brighton.

Messrs. H. H. Cunningham and W. M. Baylis were re-elected to serve as Hon. Secretary and Hon. Treasurer respectively.

A letter was then read from Dr. Maguire (Holyhead), pointing out that the competitions would probably be better supported if the prizes were of greater value, and suggesting a contribution of 1s. 6d. or 2s. 6d. a head from all members towards the formation of a prize fund.

The Hon. Secretary said that they had deprecated infusing a mercenary spirit (a member suggested "pot-hunting"); perhaps that word conveyed the meaning better, and was one the meaning of which was well understood in athletic circles—as they had hoped the stimulus given by making all the members judges would sufficiently keep the spirit of competition alive; and judging by the reports of other societies' doings regarding competitions, as published in the photographic journals, he thought their Society might congratulate itself upon the way its members showed up. In competition No. 3, although the quantity was small, the quality was high.

Mr. Baylis said Dr. Maguire's remarks had reference mainly to one subject, admittedly a very difficult one, viz., "portrait of member taken by himself."

Dr. H. Day said that although a spirit of the sort mentioned by the Hon. Secretary was not one to be encouraged, yet a successful member liked to keep some little *souvenir* of his success, and he thought that half-a-guinea would hardly give him much to put in his drawing-room and point to as one of his prizes.

The Hon. Secretary pointed out that when the Society was started subscriptions was not contemplated; that the scale of subscriptions was nominal and was fixed with a view of covering the expenses only of such things as were included in the original rules; that the competitions were started tentatively, were found to succeed, had drawn forth latent and unsuspected talent, and had been in themselves the means of attracting several members to the Society. If members wanted better prizes they must provide the funds; it ought not to be left to the gift of individuals. There were three ways, it seemed to him, in which this might be done. 1. Either by raising the subscriptions all round to ten shillings per annum, but with this subject he would be sorry to see a general meeting deal without a notice that such a question was to be brought before the meeting having been sent to all the members. 2. By increasing the subscription for future members, and leaving untouched existing subscriptions. 3. By imposing entrance fees to the competitions, the danger of this being that it might deter many from exhibiting, and when all got the benefit of seeing and voting all ought to bear the burden.

Mr. Baylis then said that, as a matter of arithmetic, the accounts would show that during the past year the expenses of the competitions (prizes paid and those voted) could be taken out of the entrance fees. These would not be paid over again, and, therefore, would not be available a second time, so that, to put it shortly, if the competitions were to be continued the necessary funds must be forthcoming.

It was then resolved, on the motion of Mr. Senier, that in future each member competing be called on to pay an entrance fee of 1s. 6d. in each class in which he exhibits, to create a fund for the prizes, and that in the case of pictures sent for the Pall Mall Exhibition it be 2s. 6d.; and that upon the question of raising the subscriptions, either for present or future members, the Honorary Secretary be empowered to ascertain the feelings of all the members individually by sending round voting papers or a book for their votes.

A letter was then read from the Secretary of the Photographic Society of Great Britain as to the sending-in day for the exhibition in Pall Mall. It was decided that members of this Society desiring to submit their pictures to the committee for selection for exhibition there must send them, not later than August 31st, to the Hon. Secretary of the Postal Photographic Society; that duplicates be provided of those selected, and that the whole collection then circulate for competition in the ordinary way. There was no restriction as to size or subject, except that all below half-plate was to be excluded; and, at the same time, the two set subjects—"study of old house or old cottage" and "marine, lake, or river view"—be sent in.

The thanks of the Society were ordered to be sent to the private member who had provided prizes for—(1) Interior, such as of room or church; (2) Instantaneous photographs of animals, ships, or train in motion. The giver of prize to have copies of the first and second prize photographs in each class, and November 1st was fixed as the date when these pictures were to reach the Hon. Secretary.

It was resolved, on Dr. Day's motion, to hold an open-air meeting. The committee were left to appoint a place within easy reach of London, and the first Monday in August (bank holiday) was fixed for the day.

The proceedings then terminated, and technical matters were discussed.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The annual excursion and outdoor meeting of this Association took place on Wednesday, the 13th inst., the place chosen this year being Meikleour, the beautiful grounds of which had been kindly thrown open by the Dowager-Marchioness of Lansdowne.

The party, numbering over sixty, including several friends and a goodly sprinkling of the fair sex, left the West Station by the 7.45 a.m. train, Meikleour being reached shortly after ten o'clock.

Refreshments having been served, games were heartily engaged in by the younger portion, while the many opportunities afforded for the use of the camera by the magnificent scenery and various objects of interest in the locality were diligently taken advantage of. The right of fishing in the Tay having also been generously granted, a few plied the "gentle art" with more or less success.

Dinner was served on the green sward by the Messrs. Lamb, Dundee, and while the party were seated a photograph of the group was taken.

The tug-of-war, bowling, and other similar sports were afterwards engaged in, but were unfortunately interrupted by the rain, which fell heavily for upwards of an hour, the excursionists being compelled to seek shelter from the heavy downpour; after which boats were placed at the disposal of the visitors, who enjoyed a delightful sail on the River Tay.

After tea the party proceeded to the front of the mansion-house, where they were tastefully grouped and photographed from the lawn.

Mr. VALENTINE (one of the Vice-Presidents of the Society), in a few well-chosen remarks, then moved a hearty vote of thanks to the officials and committee for their services in arranging the excursion; while Mr. ROBERTSON called for three cheers on behalf of the Marchioness of Lansdowne, to whose courtesy they where so largely indebted for their day's enjoyment.

Both motions were received with acclamation, and the party then proceeded to Cargill Station, viewing on their way the wonderful giant beech hedge and other objects of interest. A special train conveyed the excursionists to Perth, and Dundee was reached shortly betore eight o'clock, one and all being highly delighted with the day's proceedings. The highest praise is due to the indefatigable Secretary of the Society, Mr. Johnson, and to Mr. Mathieson, land steward on the Meikleour estate, for their exertions in providing for the comfort and enjoyment of old and young.

BURY PHOTOGRAPHIC AND ART CLUB.

THIS Club held its first outdoor meeting this session at Bolton-bridge. The members left Bury by the 6.8 a.m. train, arriving at Skipton at 8.15 a.m., where breakfast was provided by Mr. Wrigley, of the Devonshire Arms Hotel.

The party then proceeded per waggonette to Bolton-bridge, where Messrs. Nelson and J. J. Rishton secured very satisfactory groups of the members. Bolton Abbey being then visited, Messrs. J. W. Livsey and J. Rishton took photographs of the beautiful monument designed in the form of a runic cross and erected to the memory of Lord Frederick Cavendish. In the meantime a number of the party drove to the Strid, leaving Messrs. Livsey and Rishton, who worked up the River Wharfe, securing several pleasing reminiscences of that beautiful stream.

The above-named gentlemen having joined the party a group was taken of the waggonette and its surroundings. The members and their friends then drove to Barden Tower, at which place Mr. Nelson secured two very satisfactory negatives of the tower.

The return to Skipton was made over Embsay Moor. The view being so extensive and the atmosphere so clear the scene was magnificent and was thorougly enjoyed by the members.

After arriving at the Devonshire Hotel and partaking of tea the members returned home, having spent a very enjoyable day and secured numerous negatives to remind them of their visit.

We understand that the annual meeting of the Club was held in May, and the following gentlemen were re-elected as officers:—*President:* W. E. W. Mellor.—*Vice-Presidents:* W. S. Barlow and E. Eccles.—*Council:* F. Cooper, H. Dearden, Dorton Mellor, J. Shaw, and J. J. Rishton.—*Treasurer:* John Nelson.—*Hon. Secretary:* F. W. Livsey, The Rowlands, Summerseat, near Manchester.

HALIFAX PHOTOGRAPHIC CLUB.

THE monthly meeting of this Club was held on Tuesday, the 5th instant,—Major Holroyde, President, in the chair.

After the minutes of the last meeting had been read and confirmed, Mr. Keighley Walton was elected a member of the Club.

The CHAIRMAN said he had received a long communication on photographic experiences from Captain F. W. Turton, R.A., of Florence, Italy, who had also sent nine 8 × 5 photographic views of Florence.

Mr. J. WHITELY proposed, and Mr. Alderman J. SMITH seconded, that the best thanks of the Club be forwarded to Captain Turton for the views, which would be placed in the album of the Club.

The Rev. W. E. HANCOCK then gave a very interesting and humorous outline of a fishing and photographic tour in the west of Ireland. He had visited Galway, Connemara, Loch Corrib, Cong, and other notable places. He showed several fine negatives taken on his journey with his 5 × 4 camera, principally with a drop shutter. They were very fine pictures.

Mr. W. C. WILLIAMS said Mr. Hancock had brought home to his mind many pleasant episodes of his former days, both in fishing and photographing.

The Secretary then read over the arrangements for the excursion, which is to take place on Monday, the 25th instant, to Bolton Abbey and woods in Wharfdale. Each member was expected to take his camera, and the negatives taken and prints from them are to be exhibited at the meeting on August 7th.

Mr. BIRTWHISTLE proposed that two diplomas should be given—one for technical excellence and one for artistic merit—for the views taken on the excursion.

Mr. HANCOCK supported a first and second diploma for both technical excellence and artistic merit, which was passed.

Mr. WILLIAMS looked upon this as an encouragement to the members to exhibit the results of the excursion in accordance with the terms of competition for diplomas.

Mr. HANCOCK kindly offered, during next session, to show any of the members' transparencies for the lantern with his lime light apparatus.

Mr. J. SMITH asked what had become of the instantaneous shutter made by Mr. Williams, as several marvellous pictures were exhibited at a former meeting taken by it, and he was very anxious to see the shutter. Judging from results already seen by the Club, the shutter was undoubtedly a great success, inasmuch as foreground subjects and magnificent skies were perfectly rendered in the same plate.

Mr. WILLIAMS, in reply, said:—Some three years ago the matter of instantaneous shutters received much of his attention, and the shutter in question was the result of many experiments. It was so constructed as to open at the centre of the lower edge of the foreground, the whole of the latter becoming exposed before the sky portion was brought under the influence of the light. The latter no sooner became fully uncovered than the shutter again commenced to close on the sky at the upper edge of the plate. The whole of the sky was again closed while the foreground remained under the influence of light, and the exposure was completed by the shutter closing as it had opened on the lower edge of the foreground in the centre. There was no check or reversing action in the movement from beginning to end; it was worked by a compensating balance and not by springs, and could be used before or behind the lens. Some twelve months back, at the urgent request of some friends, he (Mr. Williams) was induced to send the shutter for publication to the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY but it had not been published. One or two shutters had since come into the market, which he imagined from the advertisements involved some feature of working very similar to his, and, therefore, he feared the novelty of his shutter would in some measure be diminished.

The meeting was then adjourned.

Correspondence.

ON FOCUSSING.

To the EDITORS.

GENTLEMEN,—Seeing by chance in your last number (that for June 15th) an article *On Focussing—No. II.*, I think you may feel interested in learning what has been my practice for (now) some years past. After many inquiries and much trouble I found it was impossible to get made for me the sort of focussing-screen I wished for, so I set to work to make it for myself and proceeded as follows, viz.:—

1st. I carefully cleaned a spoilt dry plate.

2ndly. I cut out a cross from a piece of paper, gummed it on one side, and let it dry.

3rdly. When dry I wet it as you would a postage stamp and put it on the *centre of the glass.*

4thly. I varnished this side of the glass with matt varnish, and when the varnish was hard took off the paper cross with a small penknife and carefully cleaned the glass from the gum.

Next I took my focussing-glass, which has a fixing collar, and having procured a fly's wing I put it on the clear glass, on the varnished side where the paper had been. Putting the screen against the window pane I focussed the fly's wing as sharply as I could, and screwed down tight the collar of my focussing-glass. This I put into the screen-holder of the camera as and in place of the ordinary ground glass, which forms the screen that I have, as I have said, used successfully for years in connection with my focussing-glass.

The matt varnished surface gives all that is necessary for a general view of the picture, and absolute sharpness is got through the plain glass cross.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, June 16, 1883.

THEATRICAL PHOTOGRAPHY.

To the EDITORS.

GENTLEMEN,—Your leaderette on this subject in your last impression reminds me of an effort I made some time ago to photograph a *tableaux* on the stage—not, however, with the aid of thirty arc lights, and after the representation was over, but with the ordinary gas and lime light in use on the stage, and in the middle of an ordinary performance.

I enclose you one of the prints. It is the transformation scene from the National Standard Theatre pantomime "Blue Beard," taken (with the kind co-operation of my friend Mr. Douglass) from a centre box on the first tier on February 9, 1880.

We had five cameras at work, and the exposure was thirty seconds. The blurring in two or three places is due to some of the "fairies" making a fresh start after I thought they had arrived at the end of their upward journey, and "uncapped."

I do not know whether this was the first attempt to take stage photographs by artificial light, as some others, like myself, may have tried it and thought the matter not to be of sufficient importance to chronicle; but I do not remember having heard of its being done at the time.

I shall be glad to send you any further particulars should you wish it.—I am, yours, &c., F. A. BRIDGE.

9, *Norfolk-road, Dalston, London, June* 19, 1883.

DRY PLATES ON THE CONTINENT.

To the EDITORS.

GENTLEMEN,—I do not know whether my experience would be helpful to Mr. W. Fox, Jun., to whom you gave a reply in last week's Journal.

Last November I went to the South of France for the winter, and took with me sixteen dozen dry plates, cabinet size, packed in two plate-boxes for storing negatives. I put a strap round them, and had not any difficulty with the custom-house. At Boulogne I told the officer what was in the box, and he never required me to open it. I also went into Italy with one box, and experienced no difficulty; nor again in Switzerland, or when I returned into France.

All the chemicals can be obtained abroad, so I shall not take any in future but pyro., which sometimes is charged an exorbitant price, namely, ten grains to the ounce—that is, eight shillings.—I am, yours, &c., ATHELSTAN CORBET.

Adderley Rectory, Market Drayton, June 19, 1883.

EXCHANGE COLUMN.

Wanted, a Ross's rapid symmetrical lens, not less than whole-plate; will give value in first-class dry plates, any size. Sample sent.—Address, J. Bell, Frome, Somerset.

I will exchange a patent machine, cost £6 5s., for making picture frames (no previous knowledge required to use it), for photographic apparatus—Address, J. Biddle, 97, Medlock-street, Hulme, Manchester.

Wanted, a 15 × 15 bellows-body camera, with double backs, to focus from five to twenty-eight inches, in exchange for a rolling-press, 18 × 12, in perfect repair and condition; difference to be adjusted. — Address, W. H. Warner, Clyde-park, Clifton, Bristol.

I will exchange an excellent new Coventry tricycle, just cost £18, for a first-class set of photographic apparatus, quarter-plate camera, by Meagher or other good maker, with lens by Dallmeyer, Ross, &c.—Address, H., 365, Lodge-road, Hockley, Birmingham.

I will exchange a balustrade and pillar, four feet ten inches in length by twenty inches in height, in splendid condition, for an exterior background, posing-chair, gem camera, half-plate lens, or anything useful in photography. Photograph sent, if required.—Address, John Povey, 35, Salter-street, E., off Ribbleton-lane, Preston, Lancashire.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photographs Registered—

Harry Wheeler, Vandyck Photographic Studio, Weymouth.—*Photograph of Lecture Chart, Book of Daniel.*

John Taylor, 14, Moncrieffe-street, Bolton.—*Two Group Photographs of Freemasons.—Fancy Picture, entitled "Contemplation."*

Oliver Claude Smith, Wembdon-road Studio, Bridgwater.—*Photograph of Painswick Church as Struck by Lighteniug, June 10th, 1883.*

William Hudson, 62, High-street, Bordesley, Birmingham.—*Photograph of the Reception of the Right Honourable John Bright.—Mr. Bright and the Mayor of Birmingham.*

R. W. Simmons (Galway).—Received as we were going to press. Will reply in next number.

A. Bell.—Why not try the experiment? It is a very simple one. We should have to try it before we could answer your query.

F. C. S.—We are not aware whether such permission is granted, but a letter to the "Chief Librarian" will give you the necessary information.

Bromide—and some other correspondents—have not conformed to our rule by sending their names and addresses; hence their queries remain unanswered.

H. S.—Gelatine is the best mountant we are acquainted with for the purpose. If used properly there should be no chance of peeling or leaving bright spots.

J. B. Sebright.—The paper has evidently been allowed to become damp. The most economical procedure now is to reject what you have and to procure fresh.

Portrait.—Altering the portrait in the way you suggest—painting in another dress—and then copying it will not exonerate you from a charge of piracy, as you suppose. You still infringe the copyright and will be liable for the consequences.

School of Art.—1. Continuing the boiling will not get rid of the acid; that will be washed out afterwards.—2. You will be able to procure the prepared canvas from any artists' colourman much better and cheaper than you can prepare it for yourself.

S. J. Waters.—If the collodion be as old as you say it will not be worth the trouble and the expense of fresh solvents to try and renovate it. It is true that fresh ether and alcohol would render it fluid; but we fear you will not be successful in restoring it to a good working condition.

E. S. B.—1. The powder process, using ceramic colours, will be a good one for you to employ. Mr. Solomon, of Red Lion-square, published a pamphlet on the subject some years age, and in it you will find much useful information on the matter, if you procure a copy.—2. The powder process or the carbon process, may be employed for producing pictures on wood blocks. There is no work published on this subject.

Bichromate complains of the loss of high lights and half-tones in his carbon prints. This trouble is very liable to occur during hot weather when the atmosphere is warm and dry, as then the tissue dries very rapidly. The remedy is to dry the tissue more slowly and to keep it a few days before use. As a further safeguard against the evil the water in which the tissue is soaked, prior to squeegeeing on the support, should be kept very cool—not exceeding 50°.

Rev. W. Bowell, M.A.—It is possible that the developers referred to would answer; but, on the whole, we should advise you to employ a developer made by the formula supplied by the maker of the plates. By a "Winchester," or a "Winchester-quart," eighty fluid ounces is understood. The proportion of borax to the grain of chloride of gold is from thirty to forty grains. Thirty grains of borax dissolved in ten ounces of water, and one grain of gold added, will make a good toning bath.

A. W. S.—The studio, in your case, should be built so that the sitter backs the south. The sun can easily be prevented from shining on the lens by screening it during the exposure. You had better have both sides glazed, so that you can use the light from the west side in the morning and from the east in the afternoon. Have four feet from the south end blank and then ten feet or twelve feet glazed on either side. If you can increase the width of the studio so much the better, Nine feet wide is scarcely sufficient for convenient working.

C. A. Birch.—After the "doctoring" to which you have submitted the bath we should advise you to precipitate the silver as a chloride and add it to your residues. It is possible the solution might be restored to a working condition; but it would not be worth the time and trouble involved.

Received.—W. J. Stillman; Herbert S. Starnes.

Photographic Club, Ashley's Hotel, Henrietta-street.—At the next meeting of this Club, on Wednesday next, the 27th inst., the subject for discussion will be—*Consideration of Lenses for Landscape Work*, adjourned from the last meeting. Mr. J. T. Taylor will preside.

Melancholy Occurrence.—On Thursday, the 14th inst., Mr. Edgar Frith (second son of Mr. Francis Frith, of Reigate, senior member of the eminent firm of Messrs. Frith and Co., photographers and publishers), while on a pleasure trip in Norway, disappeared in a mysterious manner. He was in company with a friend some four hundred miles up the country, and was last seen sitting on a rock near one of the rapids. After a short time his friend missed him. Search being made for him in every direction he was nowhere to be found; and though for three or four days search parties were out far and near not a trace of him was discovered, and it is supposed, as from the first, that he must have slipped and fallen into the rapids. He was a most gentlemanly young man of about twenty years of age, of exceedingly great promise and of very quiet habits, and would have been an ornament to the firm of which his bereaved father is the chief. The sad occurrence has been a great blow to his relatives, and has cast a sad gloom upon his friends, acquaintances, and all who knew him. He had only left home about a fortnight since.

A Dishonest Photographer.—At the Belfast Police Court, on Wednesday, the 13th instant, before Sir John Preston, J.P., James H. Haslett, J.P., and W. J. Johnston, J.P., Fred. Weeks, a young lad residing in Hillman-street, was put forward in custody, charged by Sub-Constable Whelan with stealing a number of prints, negatives, chemicals, &c., the property of Mr. A. G. Massey, photographer. Mr. M'Erlean appeared for the defence. It appeared from the evidence of Mr. Massey that prisoner was an indentured apprentice with him for the past three months, and during that time he had displayed great stubbornness. Yesterday morning witness demanded a negative, and while apparently searching for it he destroyed a number of others. Prisoner subsequently defied him, when he was given into custody on a charge of theft. On searching his house, sixty negatives, over two hundred prints, and several pounds' worth of chemicals were discovered, which witness identified as his property. Mr. M'Erlean having appealed to Mr. Massey not to press for punishment, as it would blast the prisoner's character for life, that gentleman said he was a father himself, and therefore he would ask their worships to mitigate the punishment to the lowest term. Both Sir John Preston and Mr. M'Erlean complimented Mr. Massey for the leniency he had shown; and prisoner, having pleaded guilty to the charge, was allowed to stand out on his own recognisances to appear for judgment when called upon, his indentures, in the meantime, to be cancelled.

LONDON GAZETTE, *Friday, June* 15, 1883.

Scotch Sequestration.

James O'Malley, 98, High-street, Paisley, photographer.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,

For two Weeks ending June 20, 1883.

These Observations are Taken at 8.30 a.m.

June	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
7	29·79	E	52	50	—	59	50	Overcast.
8	29·80	SE	59	55	94	68	51	Overcast.
9	29·89	E	59	56	107	74	51	Hazy.
11	30·13	NE	55	52	—	70	51	Overcast.
12	30·33	W	58	53	117	74	57	Fine.
13	30·41	W	64	59	95	70	56	Cloudy.
14	30·30	E	66	61	113	78	59	Overcast.
15	29·94	N	60	56	—	62	46	Overcast.
16	29·83	WNW	52	49	105	64	45	Cloudy.
18	29·95	W	57	53	108	68	49	Cloudy.
19	29 92	W	54	52	107	70	50	Overcast.
20	29·87	SE	58	52	—	59	52	Fine.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1208. Vol. XXX.—JUNE 29, 1883.

VARNISH AND VARNISHING.

N article in our last number, by Mr. H. Y. E. Cotesworth, raises ice more the question of varnishing gelatine negatives—a question very great importance, which has not yet been treated with any efinite or satisfactory results.

It appears, as the outcome of experiments made by various pracical workers, that there exists at present, so far as we know, no arnish that will thoroughly protect a gelatine film from the action f damp; or, in other words, that the attraction which the gelatine as for moisture is greater than can be overcome by the protective afluence of a thin layer of the *quasi* waterproof resins usually mployed by varnish makers. This much being granted, however, here is all the more reason why those who cater for modern hotographers should use more care in endeavouring to render heir varnishes as perfect as possible for the purpose intended.

Since it has been shown pretty conclusively that pure shellac orms the best varnish for gelatine films, it would seem natural that he manufacturers should supply such an article. It is an easy reparation, and the cost of shellac does not form an obstacle, the nly objection that we can see being the old prejudice against its leep colour, which was—and, we suppose, still is—said to intere ere with the printing qualities of the negative. This, however, s merely a fanciful objection, as any one may prove by simply rying the difference between a dark shellac varnish and the lightestoloured one in the market, so that the only apparent reason for the ionuse of shellac to a greater extent is removed. We speak, of ourse, of the unbleached article, as it is well known that the operaion of decolorising destroys, to a great extent, the valuable properties of the lac.

After trying several different samples of varnish which are said o be prepared specially "for dry plates," we have been forced to he conclusion that the manufacturers are sailing on the wrong tack n their attempts to meet the want of the day. The principal ingredients of photographic varnishes are shellac, sandarac, benzoin, and mastic, with Venice turpentine, oil of lavender or spike, and similar substances, to give elasticity or toughness. Shellac possesses all the qualities desirable as regards hardness and toughness; it gives a bright, glossy film, not liable to scratch, and which does not become "tacky" under the action of heat. But, as we have said, there is a prejudice against its colour, and it does not abrade readily to form a surface for retouching. To remedy the latter defect sandarac is employed in large proportion to replace the shellac, giving a hard, bright surface with (theoretically) less colour.

But the hardness of the sandarac surface is accompanied by brittleness instead of toughness, and it is, consequently, very easily scratched as well as roughened for retouching. Venice turpentine and other more expensive materials are, therefore, resorted to for the purpose of giving toughness; but these bring with them, as a rule, the liability to soften and become tacky under the action of warm sunshine—a defect from which most of the gum resins, and especially shellac and sandarac, are practically free. The toughness conferred by Venice turpentine, moreover, augments rather than diminishes the facility of abrasion of the surface for retouching purposes; hence these kind of varnishes have secured a great amount of popularity. Of this class is the well-known "white, hard spirit varnish," for which there are many receipts varying, more or less, in the proportions of some of the minor ingredients, but consisting chiefly of shellac, sandarac, and turpentine (Venice or Chio).

Now it seems that the manufacturers of varnish for special use with dry plates, in their endeavours to render the film as resistant as possible to moisture, have resorted to the too free use of these "toughening" materials. Shellac itself gives a film of wonderfully homogeneous structure; but sandarac, mastic, benzoin, and others of a similar nature are of a distinctly crystalline character and freely permeated by moisture—a failing which is to some extent modified by the addition of the viscous and slowly-drying turpentine. But this addition causes the varnish to be thick and wanting in fluent qualities; for, in order to give a film that will dry with ordinary rapidity, a large proportion of gums must be employed. A pure shellac varnish with apparently far less body than one of these mixtures will give a film of infinitely greater strength.

Referring to Mr. Cotesworth's article of last week: we think there is ample room for improvement in our varnishes. As a rule, they are, as he says, too thick; but this arises not so much from the quantity as the quality of the solid ingredients. The thinning of the varnish obviates one portion of this difficulty, viz., the deficiency in fluency; but it introduces another—the easy removal of the thin film of varnish in rubbing down for retouching. We have frequently seen samples of varnish which, when applied to the plate, flow beautifully, giving a rapidly-drying, bright, hard film. Upon the application of friction the surface at first roughens and then rapidly becomes bright again, simply because the layer of resinous matter is extremely thin and rapidly wears away, leaving the bare gelatine film. The application of a double coating of thin varnish is good, and is in accordance with the practice of carriage builders, who apply several coats of varnish, allowing each one to dry thoroughly and smoothing and polishing it before the application of another. But it appears to us preferable to alter the character of the varnish so as to obtain in the case of negatives a similar result with one application.

IMPROVEMENTS IN THE WOODBURY PROCESS.

The great prospective importance of the Woodbury process of printing was very fully recognised in this Journal when, in 1865, we first published details of it under the designation of the "photo-relief process," by which name it was for some time known. In that year we hazarded a prediction as to its probable value for book illustration—a prediction which has been most amply fulfilled.

Since the process was first described numerous improvements have been made upon it, and it is fitting it should be said that all of them have emanated from its ingenious inventor. Within a brief period another improvement has been made—this time, however, by an enterprising firm, who have adopted this system of printing for certain requirements in an extensive and ramified business.

From a patent specification, which will be found in another page, it will be seen that the firm of Messrs. Brown, Barnes, and Bell have adopted another mode than that hitherto employed of preparing

the lead mould from which the prints are produced. In order to understand the precise nature of the improvement it is necessary that we give a brief description of pre-existing methods.

The generic feature of the Woodbury process of printing consists in producing a pellicular print in bichromated gelatine from a negative and developing it by means of warm water, so as to translate the lights and shadows of the picture into heights and depressions, and then to obtain from this unequally-thick gelatine picture, using it as a mould, a metallic cast or counterpart which serves as the matrix from which are produced the prints. At first the printing plate was obtained in copper by the electrotype process. The gelatine relief picture was brushed over with plumbago or other conducting substance, and placed in an electrotype depositing vat; and the film of copper thus obtained having been backed up with other metal, according to the processes in use by electrotypers, was employed in printing.

An improvement of a marked character was made upon this system by Mr. Woodbury, who, finding that the gelatine picture was hard enough to bear being impressed in a surface of type metal or lead without sustaining damage in even its slightest details, discarded the electrotype battery in favour of the hydraulic press. The *modus operandi* was simple:—On an absolutely flat plate of steel placed on the bed of the press the pellicular gelatine print was laid, this being covered in turn by a plate of lead. The enormous pressure brought to bear upon this by the hydraulic press forced the lead into every crevice of the gelatine, thus producing a perfect *fac-simile* in reverse of the gelatine relief. Such is the hard physical texture of the gelatine that we have seen several metallic moulds made from one gelatine film, the last being, to all appearance, as good as the first. In the possibility of thus multiplying the printing plates will be found one important element, among others, in the great rapidity with which large numbers of prints can be produced in a brief period.

The great cost of a hydraulic press proved detrimental to the general adoption of the Woodbury process, so the indefatigable inventor once more bestirred himself in order to obtain a greater degree of simplification of the system without sacrifice of quality. These efforts culminated in the stannotype process, in which the impression from the gelatine relief is obtained in tinfoil. This, when backed with a yielding material, is pressed in hard contact with the gelatine relief, in the production of which, for this process, certain peculiarities not necessary to be described here are adopted.

Lastly comes the process of Messrs. Brown, Barnes, and Bell, which seems to be so simple as to suggest the wonder that it has not been thought of long since. They produce the indentations in the surface of the lead printing plate not by the hydraulic press but by the far more simple expedient of pressure between a pair of metallic rollers. We have the best means of knowing that this system had years ago suggested itself to others, who had not succeeded with it merely because of the want of certain features now supplied by the patentees, whose process, in brief, consists in making use of two flat steel plates between which is placed a plate of lead which, by the action of a pair of rollers set to a definite distance apart, is brought to a definite thickness. This having been effected, a gelatine relief print is interposed between one of the steel plates and the plate of lead, and the whole is once more passed through between the rollers of the press, the result being a plate of lead of absolutely uniform thickness less the indentations caused by the inequalities in the gelatine relief, and which inequalities constitute the printing surface.

As described, the metallic surface which results is adapted for producing Woodburytypes pure and simple; but by a slight modification a surface may also be obtained adapted for use with fatty inks. The grained surface necessary for this is obtained either by placing a gauze or perforated sheet between a positive and the gelatine plate to receive the relief, or by roughing the metal itself by means of wire gauze, muslin, or sand-paper.

We hail with pleasure every advance made in this system of printing; and have no doubt, from the recognised practical and commercial status of the patentees, that the further development of the process as just described will prove, in its commercial and artistic application, fully adequate to fulfil all those promises which, from its nature, we feel justified in anticipating.

FRILLING, FIXING, AND WASHING.

Last week we described two modes of getting rid of the evils of frilling when it occurred in connection with fixing operations, and the weather that has been experienced since the publication of our last issue has been such as to have afforded numerous opportunities of putting into practice the plans we recommended. A very strong confirmation of the excellence of one of the two methods we devised has recently come to our knowledge.

A professional photographer, finishing off a large batch of negatives on one of the warm days we have lately experienced, had, after preliminary trial, assured himself of the safety of the plan, and developed and fixed the greater part of them without any employment of alum, in the full confidence of there being no frilling after draining the fixed negatives for an hour before washing. Being called away, he left the remainder of his developed negatives in the hands of an assistant with instructions about draining the plates from the hypo. Interpreting these instructions to suit his own views of the early closing movement, the assistant gave them each five minutes between the fixing and washing. The result was that every one of the last-named frilled and was utterly spoiled; while not a single negative of those drained for an hour frilled after immersion for an hour and a-half in running water.

Better proof of the usefulness of our recommendation could not be had; and we trust that equal success may accompany the adoption of the alternative method we proposed—the using of weak hypo. for fixing. If those of our readers, who may have tried either, would report upon it some opportunity might be afforded of inducing the more conservative of photographers to adopt a change likely to be of value. In those establishments where no development is carried on during the presence of the sitter, the whole being done in large batches, there would be less value in such a process, as all the plates would go through the respective baths in due sequence, and alum would be employed with little loss of time; but where, during the hot weather, it is desired to see a completely-fixed negative before parting with the subject, the power of ensuring perfect plates in the absence of alum and in a short space of time will be greatly appreciated.

Some necessary precautions to be taken in draining the negatives will, no doubt, occur to the minds of all who use the plan. Thus it will be well, if the plates are stacked against each another so as just to avoid touching, that the first of the series faces a piece of clean glass, or it might take up some impurity which would injure it. Also, it will be desirable to take care that the bottom of the trough or shelf (or wherever the plates are placed) be free from dust or chemicals, either of which would be taken up by capillary attraction, to the detriment or possible destruction of the image. We should prefer this "stacking" method to the placing of the negatives in grooves, as it affords less opportunity of evaporation, which is naturally to be avoided on many grounds.

In this connection we may refer to a singular experience which occurred to us during the course of the experiments leading up to this plan that we instituted:—One plate, almost useless from the presence of green fog, was left for twelve hours after fixing—in fact, till the hypo. crystallised over a considerable portion of its surface. When we came to wash the negative we found, after the crystals had redissolved and disappeared, that though the negative was spoiled in many places through disintegration of the image consequent upon the crystallisation, it was yet greatly improved in the shadows where the green fog had prevailed, for the greater part was completely dissolved or otherwise destroyed, and in many places not a trace was to be seen. This was sufficiently remarkable to cause a note to be made of it; but we have not, so far, attempted further to follow up the clue indicated.

Among other extemporised expedients for preventing or diminishing frilling in hot weather is the preparation of the hypo. solution immediately before use. The dissolution of this salt producing great

eduction of temperature, one cause of frilling—too high temperaure of a solution—is avoided.

We have now to make some comments upon the manner of emoving the hypo., or, in other words, "washing" the negative. Judging from the number of new makes of washing troughs advertised, it would seem as though photographers were aware that putting it under a tap for five minutes and turning the water on will not suffice to clear a gelatine plate, whatever it might do with a collodion negative. To ensure the complete removal of the insidious chemical it is necessary that the plate remain in contact with water for a considerable time—not less, we should say, than three-quarters of an hour—and where large numbers are operated upon it is obvious that dishes or a trough must be employed.

If a grooved trough be used with the negative placed upright in it, it is desirable that the washing water enter with but slight force upon the surface while the overflow is from an aperture near the bottom, so as the more readily to get rid of the hypo., the solution of which, as it gradually passed out of the film, would naturally gravitate to the bottom of the vessel in which it was contained. That the negatives may be always covered the inflow and outflow must be exactly alike, and several plans have been adopted to ensure this. In one trough that we have seen a tap is fitted so that any speed of egress can be produced; its objection is that any irregularity in the supply causes the adjustment to fail, so that, during the absence of the photographer, the trough may have overflowed or been only half full the greater part of the time, and the negative in consequence been only partly washed. This can be obviated by replacing the tap by a pipe or tube curved upwards, so that its orifice is at a level with the surface of the water. This is automatic as far as keeping a constant level is concerned, and if the exit tube be of india-rubber it can be readily unshipped and placed flat so as to permit the trough to be emptied at pleasure.

This form is most useful; but our preference would be given to that in which a constant change of water is ensured by means of a syphon. Effectual washing is most quickly done by it, and the waste of water need be no greater than by the other method. We must, however, point out a defect that exists in many of this class of trough—notably in one otherwise most ingenious and useful form. We allude to the small bore of the syphon. For this form of washing trough to be useful the syphon should be of far larger diameter than it usually is, otherwise, when after the trough has been filled it begins to empty, it will, after a certain height of water within it is reached, remain at the same level as long as the water runs into it. The syphon will act, but so slowly that it cannot overtake the rate of ingress. Such troughs should have a syphon with a diameter of half-an-inch bore, or more, according to the volume of water it receives.

A trough of this form used for negatives, treated as we recommend, will enable the photographer who uses it to be certain of having thoroughly well-washed negatives, with little likelihood of the development of frilling tendencies.

PANEL PORTRAITS AND THEIR PRODUCTION.

The panel portrait now appears to be well-established amongst the many new sizes of pictures which have been introduced during the last few years. We, therefore, think that professional photographers, as a body, will do well still further to cultivate the taste of the public in this direction or in that of large-sized portraits generally as much as possible, rather than what is being attempted by some, namely, the introduction of sizes more diminutive even than the old *carte-de-visite*. This, we cannot avoid thinking, from a commercial point of view, is a step in the wrong direction.

Panel portraits are of two dimensions—"panels" and "large panels"—the size of the trimmed print of the former being about twelve inches by seven and a-quarter, and of the latter about fifteen and a-half by ten. After the discussion at the recent meeting of the South London Photographic Society the question will naturally arise in the minds of many as to which is the better method of producing these pictures—whether by taking them direct or by enlargement from smaller negatives. During the discussion referred to the general impression appeared to be that, up to a certain size, "large pictures" were best taken direct, but beyond that better results could be obtained by enlarging.

If this be the case—and the accepted opinion was that it is so—it naturally follows that there must be a turning point at which, theoretically, one method of production should be as good as the other. At what size is this in portraiture? From what we gather from the discussion we imagine it was considered to be somewhere about the large panel size. Without entering into this question now we may mention that, without doubt, those who are provided with the necessary apparatus for taking these pictures direct will prefer doing so, and we think they are justified in their decision, as, when once the negative is secured, it is ready for the printing-frame; whereas the other method is at once more troublesome and expensive, seeing that a transparency has to be made, and from that a second negative secured.

The purchase of apparatus of the best kind for these large sizes becomes a serious consideration to many photographers who have only a small business, owing to its costliness, coupled with the uncertainty of this class of picture meeting with commercial success amongst their *clientèle*; hence they do not care to incur the outlay, and therefore, in many instances, discourage the demand for panels. The outlay, however, need not be so extensive as it formerly was, or so large as many still imagine, since a lens of the Petzval or old portrait form is no longer necessary, because with gelatine plates its place for large portraiture is well taken by lenses of the "universal" or group series. We have seen some admirable examples of panel pictures which were taken in the studio with lenses of the "rapid" type, and with a very brief exposure too. Indeed, there is no reason whatever why these lenses should not be used in practice, when others, which may possibly be more suitable, are not at command. However, the production of the panel sizes may well be undertaken by those who have not the necessary appliances for taking them direct, as very excellent results can be, and are daily being, obtained by enlarging from good, ordinary cabinet negatives, which are but little, if any, inferior in sharpness to those obtained direct, while in other respects they may be equal, if not superior.

As a hint to those who may—from choice, or otherwise—adopt this method of producing panels, we should advise that the enlargement be made as a transparency of the full size required, and from this transparency the second negative be made by contact printing on a dry plate. This method of enlarging was some years back vended as a "secret process," and the examples produced by it are amongst the most successful we have yet seen of enlargements of small dimensions. For large sizes—above (say) eighteen by fifteen—it is not so well adapted, as then great sharpness is not so desirable.

The advantage of this method over the one usually practised is that the amplification is made from the original negative; hence the sharpest possible result is secured, whereas, when a small transparency is used, any loss of sharpness in that—and there is always some, however slight it may be—will be exaggerated in the resulting enlargement. Most of our readers have, no doubt, noticed the superior sharpness, or rather crispness, of a collodion transfer enlargement as compared with one of the same size made with the aid of a small transparency. Another advantage of this plan of procedure is that the large transparency can easily be most elaborately retouched, if desired, before the large negative is made from it, and thereby a much better result secured. The eyes, or any portion of the picture that may happen to be somewhat out of focus, can be sharpened up, and delicate shadows put in and deep ones strengthened. This cannot easily be accomplished in a small transparency, and even if it could, it is manifest the retouching would be magnified and thus rendered coarse and conspicuous in the enlargement. But when the retouching is done on a transparency the same size as the large negative, it shows no more conspicuously in the finished print than it did in the transparency itself.

Against this method of enlarging it may be argued that it becomes more expensive in practice. So it does, inasmuch as two

large plates have to be used instead of one; but this is a matter of minor concern where the *best possible* result is the primary consideration. If the transparency is made in a pleasing colour and not too dense—such a picture as may be obtained with wet collodion and gold or platinum toning—it may, after the negative has been produced from it, be backed with ground glass and neatly framed and then used as a window transparency. As such it will, doubtless, often be purchased by the sitter for a price that will amply compensate the artist for the extra cost, and at the same time tend to cultivate a taste amongst the public for portrait transparencies for window decorations.

As we have said before, the taste of the public for the larger-sized pictures should be encouraged, and those who may not be in possession of apparatus suitable for taking the panel size direct should not be deterred from producing them, seeing the excellent results that may be obtained by enlarging from small negatives.

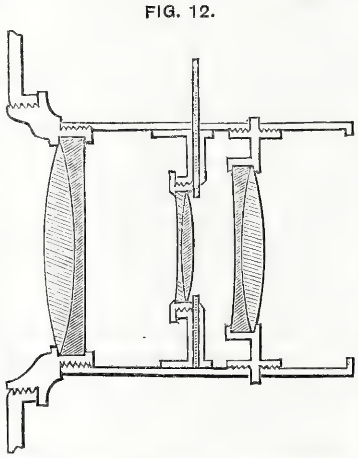
THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter IX.—Wide-Angle, Non-Distorting Lenses.

The nature of distortion having been fully treated in a previous chapter we now enter upon a consideration of the various lenses which have been constructed with a special view to freedom from this error.

The orthoscopic was the first objective presented to the public with a direct claim to correctness in linear projection; but, after a time, its claims to orthographic delineation were abandoned. Arising out of its peculiar formation were several others in which this error was eliminated, and in which category the whole of the triple combinations may be included. The late Mr. T. Sutton took the start with his symmetrical triplet, upon which various changes of a non-symmetrical character were effected by other opticians. The special form of triple lens which secured the greatest degree of favour among photographers is shown in *fig.* 12, which represents the triple achromatic combination of Mr. J. H. Dallmeyer. The flatter surfaces of the front and back lenses are slightly concave, differing in this respect from a triple lens subsequently introduced by the late Mr. T. Ross, in which these surfaces were quite flat. The triple just shown is not entitled to be designated a wide-angle lens, but it is non-distorting. Among the experimental and manufacturing opticians of the "orthoscopic period" was the late Mr. J. T. Goddard, who, with limited resources, made more experiments upon lenses than almost any other optician of whom we have heard.

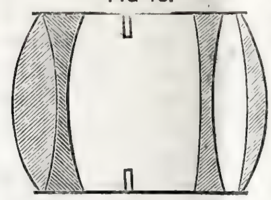
FIG. 12.



One only among the innumerable combinations devised by Goddard shall we mention at present, and we do so on account of the intrinsic merit it possesses, as evidenced not only by the productions of the lens itself, but also by a clever optician of the present time, Mr. Howard Grubb, having some time ago introduced a modification of it for which he applied for a patent; followed at a more recent period (April 27, 1883, see The British Journal of Photography of that date, page 238) by Mr. Thomas Furnell, whose article on his new lens bears evidence of original research on his part.

The lens of Goddard in question was introduced by him in January, 1859, and was designated his "compound landscape lens." It was, or *is*—seeing some of them still exist—composed of a meniscus achromatic landscape lens placed at one end of a short mount, the other end being fitted with a combination possessed of no magnifying power, but exerting such an influence upon the rays as to cure the distortion which would be caused by the use of the achromatic lens alone. This correcting combination (see *fig.* 13) consists of an unequally double concave lens formed of crown glass, mounted close to a meniscus lens, also formed of crown glass, its hollow side being next to the deeper curved side of the concave, and their curvatures being adjusted in such a manner as when placed together they were possessed of no magnifying power. The focus of the combination is, therefore, of the achromatic meniscus; and Goddard's idea was to supply a variety of these mounted in separate cells so that the photographer having a mount containing one correcting back lens—for he (Goddard) preferred giving the achromatic lens the anterior position in the mount—could make use of either of several achromatic lenses of any required focus.

FIG 13.

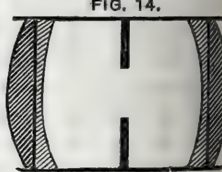


The advantages claimed for the combination just described were freedom from distortion, flatness of field, and the ability for adapting a number of front lenses, each varying in focus from another, to the combination. On referring to some notes made when inspecting Goddard's work-book after his death, we find that he frequently departed from the form shown in the above diagram, occasionally, *inter alia*, adopting the plano-concave instead of the double-concave form for the crown, and sometimes separating the two crown glass lenses to a considerable extent.

A correcting lens of the kind described is a useful appendage to a photographer's outfit; for if he be employing a single achromatic landscape lens and desires to take an architectural subject, for which it is not well adapted, all that is required is to insert the corrector in front of the mount, when the objective becomes at once an architectural lens.

It is, perhaps, not altogether safe to assert that triple lenses have had their day, because fashions in lenses, like those in costumes, are liable to change. Who would have thought that, so long ago as 1841, a symmetrical doublet lens, not differing in any respect as regards external form from the "rapid" series of the present time, was manufactured and publicly sold by a then well-known optician, Thomas Davidson, of Edinburgh? Such, however, was the case. We here give a drawing of it, and may premise that (*fig.* 14) one of this class, which we had made over twenty years ago by a son of Davidson, worked so well that it is doubtful if, with all our modern optical appliances, better pictures can be taken now than were obtained with this combination forty-two years ago. Why, it may be inquired, was it allowed to fall into a state of desuetude? We reply: Davidson introduced it as a *portrait* lens, for which purpose it could not compete with the Petzval portrait combination introduced just about the same time by Voigtlander. The Daguerreotype and Talbotype processes of those days were slow, and the most rapid portrait lens was that which secured preference. Architectural, group, non-distorting, and copying lenses were then uncalled for; but no one possessing the most elementary knowledge of photographic optics will look upon the drawing of Davidson's "portrait lens" given above without observing that it fulfils every requirement of a lens for giving true rectilinearity of projection. It differs from our "rapid" series of lenses of the present time only in the mode of correction employed and the density of the glass; for at the date mentioned it was a difficult, if not impossible, matter to obtain all descriptions of optical glass then desired.

FIG. 14.



To enter further into a history of non-distorting lenses would be foreign to the intention of these chapters; hence we shall, after a few words on the principles upon which they must be constructed, give a brief description of those in most general use at the present time.

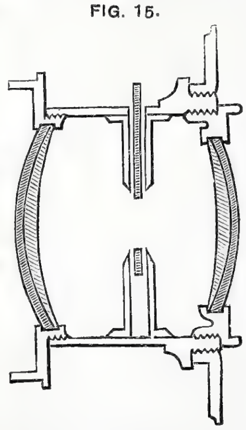
If a ray be emitted from a lens in a parallel direction to that at which it entered no distortion can take place. We have seen that in a single landscape lens this condition is not fulfilled; for, whereas a ray or series of rays are transmitted near the centre with a minimum of refraction, this is greatly increased as they approach the margin. Let us now suppose that rays, such as those from a per-

fectly square map, are to be transmitted through a plano-convex or meniscus lens, the convex side of which is to the outside, and a diaphragm a little distance from the flat side. Observe what takes place. All rays passing through the margin of the lens, except those from the margin of the map, are intercepted by the stop, which renders a like service to the central rays. Now, as we have shown, the photograph taken under such circumstances will not be rectilinear, but be expanded in proportion as it recedes from the centre. This is invariably the case when the stop is situated behind the lens. But, as we have also shown, when the stop is placed before the lens precisely the opposite condition is induced, and the photograph of the map will be contracted as it recedes from the middle. It follows, therefore, that if two lenses be employed in the formation of an objective—one in front of, and the other behind, the stop—the distortion caused by the first will be counteracted by the distortion of an opposite description caused by the second, and the resulting picture will be free from distortion.

It is convenient, but not at all necessary, that mechanical symmetry shall exist in a non-distorting, rectilinear, or (true) orthographic combination; for rectilinearity may exist in a photograph obtained by means of an objective the front and back lenses of which are of different foci. But in this case care must be taken that the stop is situated at a place determined by the ratio of their respective foci.

Good examples of rectilinearity produced by non-symmetrical doublets may be found in the American ratio lens, the Zentmayer lens (neither of which are now generally met with in commerce), and the Dallmeyer wide-angle rectilinear, of which we here present a drawing (*fig.* 15). The front lens of this will be seen to be of larger diameter than the back, which, being also of shorter focus, causes the diaphragm to be placed somewhat nearer to it than the front. This objective includes a wide-angle, with great perfection of detail.

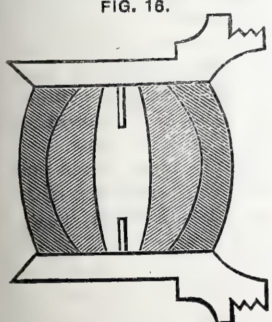
FIG. 15.



Other popular forms of wide-angle, non-distorting lenses are the portable symmetrical series of Ross, and the American wide-angle doublet of Morrison.

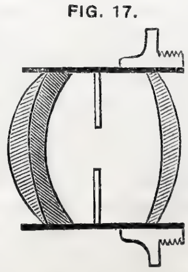
The distinguishing characteristic of the portable symmetrical is its small diameter, the similarity of its front and back lenses (from which its name is derived), the identity of diameter of mounts and flanges of all the usual foci, and the great perfection of detail given by it over the large angle included. Its general form is represented in the diagram (*fig.* 16), the proximity of the back and front lenses being such as to scarcely do more than allow of the diaphragm being inserted between them.

FIG. 16.



The Morrison wide-angle lens (see *fig.* 17) differs from any of those hitherto described, inasmuch as it consists of a deep meniscus front possessing just sufficient full- if not over-correction to enable it to be worked along with a back lens composed of crown glass alone, and of a meniscus form—scarcely, however, so deep as the front lens. This back element is of rather longer focus than the front. It includes a wide-angle, and gives pictures well-defined and sharp.

FIG. 17.



This idea of forming an objective of two lenses—one achromatised and the other simple—is not new; for, so long ago as 1857, it was placed upon record that Mr. F. H. Wenham had had a lens constructed for him in which the front was a plano-convex lens of crown glass, the back lens being an over-corrected achromatic, also of plano-convex form. This lens was evidently not intended for wide angles.

The wide-angle, non-distorting lenses described in this chapter are representative ones, and are frequently to be met with under various designations and by various makers. *Figs.* 15 and 17 are formed of flint and crown glass, *fig.* 16 being composed of two kinds of flint glass, varying from each other in their dispersive and refractive ratios.

THE scientific world has sustained a severe loss in the death of Mr. William Spottiswoode, LL.D., F.R.S., President of the Royal Society, who expired on Wednesday morning last in his 59th year. The deceased gentleman graduated with honours at Oxford, his previous education having been obtained at Eton and Harrow. Though on leaving the University he took the management of the firm of Spottiswoode and Co., the Queen's printers, of which he was the head at the time of his death, Mr. Spottiswoode found time to continue his studies and performed much practical work in many branches of science. He was the author of many works on different subjects, and for two years, in 1857-8, acted as Public Examiner in Mathematics at Oxford. In 1871 he was elected Treasurer of the Royal Society. He was also a corresponding member of the Academy of Sciences, Paris, and held the honorary degrees of LL.D. conferred upon him by the Universities of Edinburgh and Dublin. In 1878 Mr. Spottiswoode was President of the British Association.

IN Convocation, held at Durham, on Monday last, the 25th instant, the honorary degree of Master of Arts was conferred upon Mr. J. W. Swan, in recognition of his valuable contributions to electrical science, but especially of his labours in the perfection of the incandescent method of lighting.

MESSRS. BROWN, BARNES, AND BELL, of Liverpool, London, and elsewhere, who have embarked largely in photo-mechanical printing operations, have recently patented a method of phototypic printing the details of which are not yet made public. By this method photographs in half-tone may be reproduced in the form of blocks to print with type; and, in order to show the various applications of the process, they are about to publish a specimen of the "newspaper of the future," which will be called *The Twentieth Century*. This will be an illustrated print of the size, style, and character of *The Graphic* and *Illustrated London News*, and will contain a large number of reproductions of well-known photographs, including every class of subject, so as to show the applicability of their process to the general requirements of newspaper, magazine, and book illustration. The venture is a bold one, and we shall look with interest for the publication of *The Twentieth Century*. All photographers who take any interest in the advancement of the science will join us in hoping that it may be a correct forecast of the future progress of photo-mechanical printing.

AMONGST some instantaneous studies by Captain Francis, of Sydney, are some very good samples of street scenes, as well as marine views, one of the latter being specially fine. This represents a point of rocky shore upon which the waves are breaking to the height of twenty or thirty feet. But the most remarkable of the collection is a picture of a dog in the act of jumping over a lady's arm, held at a height of a couple of feet from the floor. While the dog is perfectly sharp in every detail, the picture presents the appearance of being fully- if not over-exposed. The negative was taken with a Ross's 3A *carte* lens, the exposure being measured to the one thousandth of a second. This production forms one of the most remarkable examples of instantaneous photography we have ever seen.

WE hear occasionally of amusing instances of failure in photography; but all the extraordinary reasons for want of success are thrown into the shade by a story told to us a day or two back by a well-known dealer in photographic appliances. A gentleman who had not previously attempted photography called and purchased a complete outfit for dry-plate work, of the most approved construction, and, having received a course of instruction in development,

took his departure. After the lapse of a week or so he returned, complaining that it "was no use—he could not manage it!" In reply to a question as to what were his difficulties, he said—"Well, sometimes I forget to uncap the lens, another time I take out the dark slide without closing the shutter, or perhaps I neglect to close the door of the developing-room! *There's too much worry about it for me!* I shall have to get you to take the things back!"

The question of the rate of evaporation of the water in saline solutions has a practical bearing through hot weather, when so many dishes of hypo. or alum are exposed to the desiccating influences of studio or dark room. Contrary to what might be expected, a record of experiments made upon sea water, and presented to the Paris Academy of Sciences, shows that the rate of evaporation is not any less than when fresh water is employed.

If there be one chemical result the truth of which is less open to doubt than another it is the insolubility of various metallic sulphides in water; but recent experiments have cast a rather startling light upon these hitherto admitted facts. The sulphide experimented upon was chiefly copper, and it was found that after long washing (several weeks being given to the operation), so as to free the precipitate from all traces of soluble salts, the sulphide of copper dissolved in water to a black liquid possessing a slight green fluorescence. Sulphide of tin and oxide of antimony and manganese were also obtained in a soluble form. These experiments are very suggestive in regard to insoluble silver salts, and, if continued with argentic compounds, may be capable of throwing some light upon the mutual action of bromide of silver and its surrounding gelatine or pyroxyline in photographic films.

The manifold nature of the topics discussed in our contemporary, the *English Mechanic*, is well known, photography often receiving attention from skilled hands. Last week, in treating of Dr. H. W. Vogel's emulsion process, it speaks of the essential part of his process being "the use of gelatine combined with pyroxyline into a homogeneous fluid, which it is stated was unknown till he discovered a suitable solvent." The real state of the case is that "a suitable solvent" was first published in our pages, its inventor being Dr. G. A. Herschell.

Some time ago we had occasion to speak of a series of lantern slides of real scientific value which were being produced under the advice and with the co-operation of competent scientific authorities. The first series is now published, and Mr. York—who is indefatigable in the production of useful and novel additions to his store of these aids to instruction—is to be congratulated upon the favour with which it has been received. The voyage of the "Challenger" forms the subject of this first issue.

For some time past reports have been current of the finding of some extraordinary fossil remains of human beings that would conclusively prove the existence of "prehistoric man" if the reports were true; and lately the *Lancet* has given currency to the account. At present no one seems to know anything about the matter. We would ask—"Cannot the bones be photographed?" That would soon put an end to all doubt on the subject.

Recently we had an opportunity of seeing a photograph of a fallen giant in the shape of a huge oak tree, which the strong winds of the spring of this year had uprooted and thrown down. Grouped upon and about the tree trunk were various members of a ducal family which, while forming a picturesque study, aided in forming a conception of the size of the monster trunk, an idea of which will be gained when we state that standing on the ground in front of the tree the top of the hat of the tallest member of the party did not entirely hide it. In this country such a tree would be considered very large, but it is dwarfed to insignificance by a Californian giant which is illustrated in *La Nature* of last week, the drawing being taken from a photograph, that popular journal largely employing photography in the production of the pictures which so freely illustrate its pages. This "Dead Giant" has a passage cut through it, and the illustration shows a woodman walking through it with space for half-a-dozen companions abreast. Photography is sometimes accused of exaggeration to the bounds of untruthfulness, but such pictures as these are invaluable in giving true proportions, and form a perfect corrective of "travellers' tales."

TONING.

I have lately spent considerable time in an attempt to attain to somewhat of certainty in the process of toning prints, and specially to acquire the knowledge necessary to enable me to get the particular tone I wished. The difficulty always had been with me that I could not with certainty tell what amount of change would take place in the print after toning was complete and during the process of fixing.

I have experimented with various samples of paper—both sensitising it as I required it and purchasing it ready sensitised. I find it possible with at anyrate certain brands of ready sensitised paper to get quite as good results as with the very best albumenised paper sensitised as required. This conclusion I have come to after trying various strengths of sensitiisng baths and other modifications of working, such as fuming, rendering the bath slightly alkaline, &c.

To every published gold-toning formula I think I have given a trial, and have finally decided in favour of two, either of which I find excellent. The one is our old friend acetate of soda, the other is the borax bath, for which, if I mistake not, we have to thank Mr. Cowan.

The tones which I admire myself, and which it has been my constant endeavour to obtain, are the lightest brown tones which we almost ever see—as close an approach to sepia tint as it is possible to attain to. The difficulty which I found was that, however good a tone I got at first, one of two things happened during fixing. The tone went off horribly, leaving a print of a sickly yellow colour, or a change took place which was equivalent to a deepening of the tone, a grayish but by no means pleasant colour resulting. Always it seemed that I went a little too far, or not quite far enough. It appeared as if I were making the attempt to strike a mathematical point.

I discovered, after some little experimenting, that the completeness or otherwise with which prints were washed before toning commenced had much to do with the colour ultimately obtained. It appeared that a prolonged washing resulted in a slower toning, but eventually in a better colour. A few trial prints so treated always came out well; but when I tried to make use of the result obtained, and to get a pleasing sepia tint in a large batch, I found my old difficulties to have returned, until, on turning the matter over, it appeared that probably even a comparatively long washing would not free a large batch of prints from silver nitrate as thoroughly as would a comparatively short washing when a few prints only were used. It is astonishing how long a washing is necessary to remove the soluble silver salt from (say) half or a quarter of a quire of albumenised paper when in the form of 12 × 10 and 10 × 8 prints.

The best course to pursue, probably, is to lift the prints from one bath to another, and after each time this is done to drain the mass of prints thoroughly. If the last small quantity of water which drains off is caught it will be found to be milky long after it would be supposed that all free silver nitrate was washed out. I find that with the quantity of paper mentioned it is necessary diligently to change the prints from one dish to another for the space of an hour to an hour and a-half before the washing is sufficient.

It would appear that it should be possible to avoid so long a washing by the use of some soluble chloride, such as common salt, this being, in fact, a procedure sometimes recommended. My experience of it is not, however, satisfactory. Of course, the washing of prints in a bath of soluble chlorids gets rid of all excess of silver nitrate, and, in my experience, with the result that toning cannot be accomplished at all.

After the long washing mentioned, the time of toning with a bath of ordinary strength—that is, one containing one grain of gold chloride to fifteen or sixteen ounces of solution—will be found intolerably long, and a stronger bath must be used. One with one grain of gold chloride to eight or ten ounces of water I have found to do well. Although a stronger bath is required with thoroughly-washed than with partially-washed prints, it would not appear that a larger quantity of gold per sheet of paper is necessary. I find three quarters of a grain of gold chloride sufficient to give a brown tone to the prints got from a sheet of paper, and one and a-quarter grain for a deep purple.

Even with the comparatively strong bath of one grain to eight or n ounces of water toning will proceed slowly. This, however, ay be relied upon—the tones of the prints after fixing, if such be one properly, will be the same as when they leave the toning bath. f the very brownest tone be desired it is as well to keep a washed ut untoned print at hand to compare for colour with those which re toning, so that the latter may be removed whenever there is any ery discernible change.

A word of warning may not be out of place here, although it is ne which has often before been given. The prints must on no ccount be left to soak for any length of time in the first washing ater before toning, but must be quickly changed to a second ath, otherwise a degradation of the whites will occur, and the hange will not be removed in the fixing bath.

The next question after toning is whether the washing that omes before fixing must be very complete. I have been unable o detect any difference between two prints, one of which is removed direct from the toning to the fixing baths, whilst the other vas well washed between toning and fixing; but, as our best uthorities insist on a sufficient washing, and as such can certainly o no harm, it is well to perform it.

If delicacy of tone be desired the utmost care must be taken in xing. A too strong bath must be avoided; the solution should be endered slightly alkaline; and the prints ought to be kept in rapid notion, at least during the first part of the process.

I have tried various strengths of fixing baths—from one ounce of ypo. to five ounces to each pint of solution. I found that, as a ule, a solution not stronger than two and a-half or three ounces er pint had no degrading effect on the tone. I have, therefore, dopted one of two ounces or ten per cent., which appears to give a esult in every way admirable. The prints will suffer no harm if eft in this bath for as long as half an hour; but I imagine that wenty minutes is sufficient to ensure thorough fixation.

As I have said, the fixing bath should be alkaline, or, at any rate, by o means acid. A little washing soda or ammonia may be added to t to bring this about. I have never either weighed or measured the uantity which I used, but I do not imagine it is of vast importance.

The next point is, of course, that of getting rid of the hypo. Either washing or the joint action of washing and a hypo. eliminator nust be resorted to. For long I used alum as an eliminator; but vhilst at times it acted admirably, at others it caused a loss of delicacy in tone. I could find no reason for this, as the supply was lways from the same source. Long washing will have the same effect at times. For those who have not a washing machine but have some patience, or can command the labour of one who has, the best method for washing out hypo. appears to be to move the prints from one dish to another, draining after each operation as described before. The process must be continued for a couple of hours or so.

Even after fixing and washing are complete the warmth of tone may be somewhat increased by the use of a very hot burnisher or by placing the prints for a few minutes in water very nearly boiling.

W. K. Burton.

ON COLLODION EMULSIONS.

In my previous articles on collodion emulsions that have appeared in your pages I have endeavoured to revive an interest in a process which was fast falling into disuse, but which I thought was still capable of doing good service in photography. In doing so, I gave the results of many years' practical daily use of emulsions formed in collodion by various methods, and of numerous experiments upon the conditions necessary for the attainment of greater sensitiveness. These conditions were, first, the reducing the quantity of pyroxyline in the emulsion as low as it is possible with the sample employed; second, during the process of emulsification, to have always a *slight* excess of silver nitrate present, and which excess should permanently remain in the collodion. If the emulsion have an excess of bromide, then it will inevitably be very slow; and, unless some substance of a reducing or sensitising nature be employed, after washing it would be many times slower than the collodion process with a bath. In the old days of collodio-bromide plates many such substances were used, such as tannin, albumen, gum-gallic, &c., either as a coating to the plate or as an organifier during the washing. But none of these substances have the effect of increasing the sensitiveness of silver bromide in collodion so much as an excess of silver nitrate retained in the emulsion till it is required for use. In the absence of restraining acids, or of metallic nitrates, this excess of silver gradually acts as a reducer, bringing the bromide into the subbromide condition, and so induces fog, exactly as if it had been exposed to light. Nitric acid delays this fogging propensity to some extent, but metallic nitrates seem to prevent it altogether, and that without any slowing action upon the sensitive bromide.

In the interesting and able communication of Mr. E. Howard Farmer, which appeared in the number for June 15th, upon the *Cause of the Insensitiveness of Collodion as Compared with Gelatine*, he takes, as a standard of comparison, a collodion emulsion formed with forty-five grains of ammonium bromide to sixty grains of nitrate of silver. Now, this quantity of ammonium bromide would require a little over seventy-eight grains of silver nitrate to combine with it, so that there is present an excess of about nine grains of bromide—an excess which may well prevent the attainment of any degree of sensitiveness in the emulsion, no matter how it may be treated afterwards. An emulsion so formed is not only little fitted to receive an impression, but if the bottle containing it were accidentally exposed to light, so as to give nothing but fog on coating and developing a plate, it would gradually be restored to its original condition by keeping in the dark, thus showing that the free bromide not only prevents, to some extent, the image being formed, but destroys it afterwards. The conditions are very different when found in gelatine. As Mr. Farmer very clearly points out in his concluding paragraph, gelatine is itself a reducer, whilst pyroxyline is an oxidiser. With gelatine, therefore, an excess of silver would be fatal because of this reducing action upon silver nitrate.

I have also found precisely the same effect produced by the addition of any organic substance to the collodion emulsion containing an excess of silver. I have, at various times, with the idea of increasing the density as well as the sensitiveness of an emulsion, added organic substances, such as albumen, gelatine dissolved in glacial acetic acid, soap, &c., but always when free silver was present, with the result of destroying the keeping properties, and inducing fog after a time. If free silver be not present such additions are often useful, because they act, like silver nitrate, as reducers or sensitisers upon the silver bromide.

One of the conditions necessary for extreme sensitiveness appears to be the presence of a reducing agent of some kind at the time of exposure. A wet plate prepared with a silver bath, if thoroughly freed from its free silver by washing, before exposure is very slow in comparison with one that is not washed; and redipping it in the bath after exposure and before development does not make it any better. If we take a collodio-bromide emulsion prepared with excess of bromide, coat a plate, and well wash so as to get rid of all traces of free bromide, and before exposure flow over one portion only of the plate a solution of silver nitrate and again wash, it will be found that the portion which had received the silver is at least ten times as rapid as the rest of the plate, and gives greater vigour in development. This seems to prove that, no matter how thoroughly the preliminary washing may be, sufficient trace of the free salt remains to exercise its effect on the resulting sensitiveness. If this be so with a collodion film, which is so readily washed, how much more will it apply to a gelatine film which, as everyone knows, retains so tenaciously the various solutions it passes through!

There is one probable cause of the difference in sensitiveness between a collodion and a gelatine film which has not been considered; that is, the different nature of the solvents employed, both of the film itself and of the developer. In the case of gelatine, water is used as a solvent with the addition of a certain number of degrees of temperature to render the solution fluid, and water without the heat is also the solvent for the developer. Gelatine is not only soluble in hot water but has a great tendency to absorb cold water; so that, on the application of the developer, the film swells up and approaches pretty nearly the physical condition of the original emulsion, in which every molecule of silver bromide is completely isolated from its neighbouring one. But in a collodion film no such conditions arise, for, as is well known, pyroxyline is not only insoluble in water, but repellent of it. If a pyroxyline could be obtained soluble in alcohol alone, and the developer were also dissolved in alcohol with just sufficient water to prevent solution of the film, we should probably have a plate as rapid as gelatine. If my memory serve me right, Mr. W. B. Bolton, several years ago, pointed out that a dry collodion emulsion plate, developed with an alcoholic developer, came up far more vigorously and with a much shorter exposure than if it were developed with a water developer; it was also the regular practice to moisten the plate with one-half each alcohol and water previous to development. The object of this was to cause the horny film to swell, and so render it nearer to the physical condition it had when fluid, precisely as water does with gelatine.

In your last issue Mr. Wm. Brooks has a few remarks on my last article on *Collodion Emulsion*, washed and unwashed. I have not

denied the value, in certain cases, of washed emulsions, nor that good work has been done with them. Every method employed in photography has its appropriate use, and possesses some advantage not possessed by another. In the article referred to, I commenced by drawing especial attention to the fact that I alluded to the use of an emulsion in the particular manner indicated in my previous communications. As this was the coating of each plate with a solution of gelatine it necessarily entailed washing each plate, and, therefore, washing the bulk was useless. Mr. Brooks asks what is the difference between a plate coated with a washed emulsion and one coated with an unwashed emulsion and then washed. In reply, I should say none at all, if the two emulsions were otherwise equal. But economy is decidedly on the side of the unwashed emulsion.

The main question hinges on the keeping power of an emulsion when unwashed. On this point I have already written several times, but may repeat that an emulsion can be made to keep or not, precisely as an ordinary collodion may be, according to the nature of the haloids used. I have not written anything without testing it first; and I have at present in my possession samples of unwashed emulsions that have been made by the methods I have indicated more than eighteen months, and which are as sensitive and fine as when a week old; indeed, to all appearance they will continue so as long again. This is sufficiently long for any ordinary purpose. I worked with washed emulsions for some years, and gradually relinquished them in favour of the unwashed, because I could find no corresponding benefit derived from washing; it is simply a matter of individual experience.

In my hands I have never observed the change from day to day which Mr. Brooks mentions, if the emulsion be properly made at first. The necessary conditions are metallic nitrates only as a by-product, with not more than a quarter to half-a-grain of silver in excess, and the absence of organic substances and, as far as possible, of water. EDWIN BANKS.

THE EQUIVALENT EXPOSURES OF WET AND DRY PLATES.

In an article published in this Journal about two years ago I called attention to the use of the swing metronome in determining length of exposure. Since then I have arranged a series of tables to enable me to find the length of time required for the exposure of plates of different degrees of rapidity, to be equivalent to the number of seconds exposure given a wet plate on the same subject; and I think photographers will find these little swing metronomes (marked the same as the following tables) among the most useful instruments they can possess. Another important point is that their knowledge of wet-plate exposures is all that is necessary to enable them to give the exact exposure to plates from ten to sixty times as rapid.

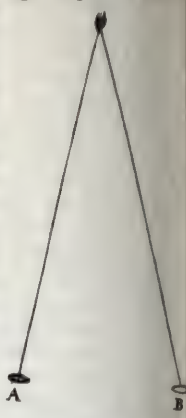
For instance: we will say that a photographer is using a plate sixty times as rapid as a wet plate. With a wet plate he would have given (say) seventeen seconds' exposure. To give an equivalent exposure to a sixty times' plate he would have to expose the $\frac{1}{212}$th of a *minute*, and if he hold the tape of his metronome at $1\frac{7}{8}$ inch from the weight, one swing of the metronome will give him the length of exposure equivalent to seventeen seconds of a wet plate.

I was once asked by a maker of dry plates (of course of the best in the market!) "what difference does it make whether one gives one or sixty seconds' exposure?" on his plates. "The result would be *equally satisfactory;* all one has to do is to slightly alter the proportions in the developer." I told him that I was delighted to hear that he had at last solved the "photographer's problem," because I had never yet seen an over- or under-exposed negative "doctored up" equal in result to one correctly exposed. I know there is a latitude in exposure which can be corrected to a certain extent in the development, but if we were as certain of the correct exposure as we were with the wet process all this "doctoring" would be unnecessary.

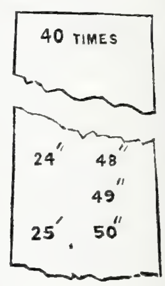
What photographer in the wet-plate days would think of giving fifty seconds when only fifteen seconds were required? and yet the action of the light must be the same on a sixty times' plate in the difference between an exposure of a-quarter of a second and five-sixths of a second, as between fifteen and fifty seconds on a wet plate. An exposure of only one second of the former being equal to one minute of the latter, and the difficulty of being able to measure the parts of a second in the same way as we used to count the parts of a minute, is the only reason why this "doctoring" has become recognised or necessary.

But with the aid of these metronomes we shall be able to expose a sixty times' plate to the difference in the parts of a second equivalent to the difference between (say) twenty-two and twenty-three seconds on a wet plate with even more certainty than in counting the seconds, because no one counts seconds when excited at the same rapidity as when the mind is cool and collected.

As some of your readers may not have seen these little swing metronomes I will describe them. The only things required are a piece of lead (or other metal) from one ounce to one and a-half ounce in weight, and a piece of tape forty inches long and three-quarters of an inch wide. Fix the lead at the end of the tape, and then, by holding (or fixing to tripod) the tape at different lengths from the weight and letting the latter swing to and fro like a pendulum, it will register the exact lengths of time of the different parts of a second. If held at thirty-eight and one-eighth inches from the weight one swing of the weight from A to B will take one second of time. When it has nearly stopped swinging and travels only three inches from point to point of course it takes exactly the same time to travel three inches as it had taken to travel twelve inches when it began swinging.



On referring to the first of the following tables, namely, the table for plates sixty times as rapid as wet plates, opposite "wet plates sixty seconds" is thirty-eight and one-eighth inches from weight which would equal an exposure of one second of time. If the tape be held at thirty-six and three-quarter inches from the weight one swing would take one-sixtieth of fifty-nine seconds to go from point to point, and, after watching the weight swing a few times to and fro the mind will readily grasp the difference in the beat one from the other; so that all that is necessary is to mark the tape sixty, fifty-nine, fifty-eight, &c., at the correct distances from the weight, and then, by holding the tape at any number (which would be the number of seconds' exposure given to a wet plate) one swing of the weight would equal one-sixtieth part of that number of seconds and would be the length of exposure required for a sixty times dry plate. As plates of less than sixty times' rapidity would often require more than one second's exposure, and to register the time would require such a long tape, I have given the distance on the tape where two or more swings of the weight would equal the length of time required for the exposure. For instance: to get the equivalent to fifty seconds on a forty times' plate, by holding the tape at fourteen and one-eighth inches from the weight and letting it swing twice (that is, from A to B and back to A), it would give the length of time required. I have marked my metronomes in the following way, the marks 48″ over the number meaning two swings.



PLATES OF SIXTY TIMES' RAPIDITY.

Seconds.	Inch. from weight.	Seconds.	Inches.	Seconds.	Inches.	Seconds.	Inches.
12	$\frac{1}{4}$	25	$5\frac{5}{8}$	37	$13\frac{3}{4}$	49	25
13	$\frac{1}{2}$	26	$6\frac{1}{4}$	38	$14\frac{1}{2}$	50	26
14	$\frac{7}{8}$	27	$6\frac{7}{8}$	39	$15\frac{3}{8}$	51	$27\frac{1}{8}$
15	$1\frac{1}{8}$	28	$7\frac{3}{8}$	40	$16\frac{1}{4}$	52	$28\frac{1}{4}$
16	$1\frac{1}{2}$	29	8	41	$17\frac{1}{8}$	53	$29\frac{1}{4}$
17	$1\frac{7}{8}$	30	$8\frac{5}{8}$	42	$18\frac{1}{4}$	54	$30\frac{3}{8}$
18	$2\frac{1}{4}$	31	$9\frac{1}{4}$	43	$19\frac{1}{4}$	55	$31\frac{5}{8}$
19	$2\frac{5}{8}$	32	$9\frac{7}{8}$	44	$20\frac{1}{4}$	56	$32\frac{7}{8}$
20	$3\frac{1}{8}$	33	$10\frac{5}{8}$	45	$21\frac{1}{8}$	57	$34\frac{1}{8}$
21	$3\frac{1}{2}$	34	$11\frac{3}{8}$	46	22	58	$35\frac{1}{2}$
22	4	35	$12\frac{1}{8}$	47	$22\frac{7}{8}$	59	$36\frac{3}{4}$
23	$4\frac{1}{2}$	36	$12\frac{7}{8}$	48	$23\frac{7}{8}$	60	$38\frac{1}{8}$
24	$5\frac{1}{8}$						

PLATES OF FIFTY TIMES' RAPIDITY.

Seconds.	Inches.	Seconds swings— One.	Seconds swings— Two.	Inches.	Seconds.	Inches.	Seconds.	Inches.
10	$\frac{1}{4}$	24		$7\frac{7}{8}$	31	14	43	$27\frac{1}{2}$
11	$\frac{5}{8}$	25		$8\frac{5}{8}$	32	$15\frac{1}{8}$	44	$28\frac{3}{4}$
12	1		51	9	33	$16\frac{1}{4}$	45	$30\frac{1}{8}$
13	$1\frac{3}{8}$	26	52	$9\frac{3}{8}$	34	$17\frac{1}{4}$	46	$31\frac{5}{8}$
14	$1\frac{7}{8}$		53	$9\frac{7}{8}$	35	$18\frac{3}{8}$	47	$33\frac{1}{8}$
15	$2\frac{1}{4}$	27	54	$10\frac{3}{8}$	36	$19\frac{3}{8}$	48	$34\frac{3}{4}$
16	$2\frac{7}{8}$		55	$10\frac{7}{8}$	37	$20\frac{3}{8}$	49	$36\frac{1}{2}$
17	$3\frac{3}{8}$	28	56	$11\frac{1}{4}$	38	$21\frac{1}{2}$	50	$38\frac{1}{8}$
18	$3\frac{7}{8}$		57	$11\frac{5}{8}$	39	$22\frac{5}{8}$		
19	$4\frac{1}{2}$	29	58	$12\frac{1}{8}$	40	$23\frac{7}{8}$		
20	$5\frac{1}{8}$		59	$12\frac{3}{8}$	41	$25\frac{1}{4}$		
21	$5\frac{3}{4}$	30	60	$12\frac{7}{8}$	42	$26\frac{3}{8}$		
22	$6\frac{1}{2}$							
23	$7\frac{1}{8}$							

Plates of Forty Times' Rapidity.

Seconds.	Inches.	Seconds. Swings— One.	Two.	Inches.	Seconds. Swings— One.	Two.	Inches.
8	¼		41	9⅛	28	56	18
9	¾	21	42	9⅝		57	18⅝
10	1¼		43	10⅛	29	58	19⅜
11	1¾	22	44	10⅝		59	20⅛
12	2⅜		45	11⅛	30	60	21
13	3	23	46	11¾	31		22⅜
14	3⅝		47	12¼	32		23⅞
15	4¼	24	48	12⅞	33		25⅝
16	5⅛		49	13½	34		27⅛
17	6	25	50	14⅛	35		28¾
18	6⅞		51	14⅞	36		30⅝
19	7¾	26	52	15½	37		32½
20	8⅝		53	16	38		34⅜
		27	54	16⅝	39		36⅛
			55	17¼	40		38⅛

Plates of Thirty Times' Rapidity.

Seconds. Swings— One.	Two.	Inches.	Seconds. Swings— One.	Two.	Inches.	Seconds. Swings— One.	Two.	Inches.
6		¼	17	34	11⅜		47	22⅞
7		⅞		35	12⅛	24	48	23⅞
8		1½	18	36	12⅞		49	25
9		2¼		37	13¾	25	50	26
10		3⅛	19	38	14½		51	27⅛
11		4		39	15⅜	26	52	28¼
12		5⅛	20	40	16¼		53	29¼
13		6¼		41	17⅛	27	54	30⅜
14		7⅜	21	42	18¼		55	31⅝
15		8⅝		43	19¼	28	56	32⅞
	31	9¼	22	44	20¼		57	34⅛
16	32	9⅞		45	21⅛	29	58	35½
	33	10⅝	23	46	22		59	36¾
						30	60	38⅛

Plates of Twenty-Five Times' Rapidity.

Seconds. Swings— One.	Two.	Four.	Inches.	Seconds. Swings— One.	Two.	Four.	Inches.	Seconds. Swings— One.	Two.	Inches.
5			¼	14	28	56	11¼		39	22⅝
6			1			57	11⅝	20	40	23⅞
7			1⅞		29	58	12⅛		41	25¼
8			2⅞			59	12⅜	21	42	26⅜
9			3⅞	15	30	60	12⅞		43	27½
10			5⅛		31		14	22	44	28¾
11			6½	16	32		15⅛		45	30⅛
12			7⅞		33		16¼	23	46	31⅝
		51	9	17	34		17¼		47	33⅛
13	26	52	9⅜		35		18⅜	24	48	34¾
		53	9⅞	18	36		19⅜		49	36½
	27	54	10⅜		37		20⅜	25	50	38⅛
		55	10⅞	19	38		21½			

Plates of Twenty Times' Rapidity.

Seconds. Swings— One.	Two.	Four.	Inches.	Seconds. Swings— One.	Two.	Four.	Inches.	Seconds. Swings— One.	Two.	Inches.
4			¼	12	24	48	12⅞	16	32	23⅞
5			1¼			49	13½		33	25⅝
6			2⅜		25	50	14⅛	17	34	27⅛
7			3⅝			51	14⅞		35	28¾
8			5⅛	13	26	52	15½	18	36	30⅝
9			6⅞			53	16		37	32½
10			8⅝		27	54	16⅝	19	38	34⅜
		41	9⅛			55	17¼		39	36⅛
	21	42	9⅝	14	28	56	18	20	40	38⅛
		43	10⅛			57	18⅝			
11	22	44	10⅝		29	58	19⅜			
		45	11⅛			59	20⅛			
	23	46	11¾	15	30	60	21			
		47	12¼		31		22⅜			

Plates of Fifteen Times' Rapidity.

Seconds. Swings— One.	Two.	Four.	Inches.	Seconds. Swings— One.	Two.	Four.	Inches.	Seconds. Swings— One.	Two.	Four.	Inches.
3			¼	10	20	40	16¼	13	26	52	28¼
4			1½			41	17⅛			53	29¼
5			3⅛		21	42	18¼		27	54	30⅜
6			5⅛			43	19¼			55	31⅝
7			7⅜	11	22	44	20¼	14	28	56	32⅞
		31	9¼			45	21⅛			57	34⅛
8	16	32	9⅞		23	46	22		29	58	35½
		33	10⅝			47	22⅞			59	36¾
	17	34	11⅜	12	24	48	23⅞	15	30	60	38⅛
		35	12⅛			49	25				
9	18	36	12⅞		25	50	26				
		37	13¾			51	27⅛				
	19	38	14½								
		39	15⅜								

Plates of Ten Times' Rapidity.

Seconds. Swings— One.	Two.	Three.	Four.	Five.	Six.	Inches.
2						¼
3						2⅜
4						5⅛
5						8⅝
6	12					12⅞
7	14	21				18
8	16	24	32			23⅞
9	18	27	36	45	54	30⅝
10	20	30	40	50	60	38⅛

In the last table I have entered only the most simple numbers, as the plates being comparatively slow, the differences between the different numbers are not so important as in the more rapid plates, where I have been more exact.

I have given the various distances to the nearest one-eighth of an inch, and have worked the proportions of a second to only ·00. As these points would be quite near enough for all practical purposes, I thought it best not to go into more intricate details. The centre of gravity of different shaped weights would also make a *very* slight difference.

I hope I have made the matter perfectly clear to your readers; if not, I would be pleased to answer any questions on the subject. When I say that one of these metronomes can be made and marked off in a few minutes at a cost of about twopence each, it will be seen that they are very simple little pieces of apparatus.

Herbert S. Starnes.

P.S.—These tables not only give the equivalent exposure to wet plates, but they show the equivalent exposure of a plate of one rapidity to that of another. For instance: a photographer who has never touched a wet plate gets a correct exposure on a fifteen times' plate when he holds the metronome for fifteen times' rapidity at "23," then, whatever the rapidity of any other plate he may be using afterwards, for the same light and sort of subject he has only to hold a metronome (marked for the rapidity of the plate) at "23" and he will have the correct exposure. If he enter in his note-book, opposite the description of the subject, lighting, &c., "exposure 23," that is all that is necessary for him to know in the future, whatever the rapidity of the plate may be that he uses.—H. S. S.

CRYSTOLEUM PAINTING.

The colouring of photographs from the back, after having first rendered them transparent, is by no means a recent invention; for at various times patents have been taken out for methods of working it, although it is only within the last few years that it has become of any real importance from a commercial point of view. As there are several methods it would take up too much valuable space in these columns to go through them all; besides which so much has already been written on the ordinary methods that to most readers it would be going over old ground again. It is therefore, with the Editors' permission, my intention to give a method by which the coloured portrait may be mounted on card like an ordinary print.

Get a smooth piece of glass rather larger than the print to be coloured, and, after having cleaned it thoroughly, dust it over with powdered French chalk; rub it well into the glass, and then wipe it off with a piece of clean linen.

Next coat the plate with plain collodion, and allow to set, but not dry, otherwise the film will probably leave the glass. When the collodion is set, it in turn receives a coating of gelatine solution —one part by weight of gelatine to eight parts of water. This is then placed on a level surface, care having been taken that the gelatine solution has flowed well to the edges of the plate. It must then be left to dry. The print should also receive a coating of gelatine similar to that on the plate. This is best done with a soft brush or a piece of clean sponge, by which means there will be no danger from air-bubbles. The picture must then be dried. Next wet the film on the glass plate by passing a wet sponge over the surface; and at the same time wet the print by immersing it in cold water for a few seconds. Now lay the print face downwards on the glass plate, bringing them in contact by means of a squeegee or roller, taking care, while doing so, not to disturb their position, as it may wrinkle the film beneath. It must then be allowed to dry. Next rub the paper away from the back of the print with fine glass paper, working gently in a circular direction, the object being to get it as thin as possible. Care, however, must be taken not to rub away all the paper.

The next operation is to render the print transparent. There are several substances for rendering the print transparent, but I have found ordinary paraffine wax melted at a low temperature answer as well as anything. Place the print in this, keeping it in a molten condition, and when transparent the picture should be removed. If the temperature be raised too high it is liable to turn the print yellow.

When cold wipe off all excess, and then proceed with the painting. This only requires a little ordinary care. It is best to begin with the eyes and lips and all small places which require different colours to the main colour. When these are dry the colour of the flesh and dress may be laid on with a large brush. When the paint is thoroughly dry a sharp knife is passed round its margin. The print is then raised from the glass, which it leaves freely, and a delicately-painted photograph is the result. It may then be mounted on card in the ordinary way. This process seems to lend itself to oil paints; but if the operator wish to employ water colours he must use some medium, such as shellac dissolved in borax, for mixing the colours.

E. E. Cadett.

NOTES FROM ITALY.

The question of reducing agents for over-intensified plates is one of great importance to inexperienced gelatino-bromide workers, as the correct judgment as to the proper intensity before fixing is far more difficult of attainment than in wet collodion. The intensifying processes seem all, in my own experience, to be liable to stain or spot the negatives, or leave them liable to a disastrous change from the effect of light. The soundest plan, then, is to err—if err we must—on the side of over-density, as the reduction is safer than the intensification. The alum and hydrochloric acid bath is the simplest, and, where only a slight reduction is desired, is safe and sure; but the degree of reduction depends to a certain extent on the proportion of hydrochloric acid, and is with iron-developed plates very limited, while the use of a bath too strong in that acid softens the gelatine and makes it very unsafe to manipulate, and, I imagine, very liable to subsequent cracking under the varnish. It certainly induces frilling, even after the alum bath.

If half-an-ounce of acid to ten ounces of saturated alum solution will not at once reduce the negative to the desired point, it is best to wash it thoroughly and then try the chloride of iron, which has the advantages of continuous action and of hardening the film still further. But, to make the action of this agent quite safe, it is indispensable to have the negative cleansed perfectly from all former chemical applications. In my own practice I wash it in a feeble solution of iodine in iodide of potassium, which eliminates with great certainty lingering traces of hypo.

To beginners I should recommend a five-per-cent. solution of iodide of potassium saturated with iodine, and as much of this dropped into the bath of hard water as will give it a pale golden tint, to rinse the plate in, and then immerse in a feeble perchloride of iron bath (three-per-cent. iron solution) until the reduction desired is reached, and not to hurry the matter. Experienced photographers who can very nearly hit the proper density in every negative have no need of my advice and know the best way; but beginners in gelatine are liable to great mistakes in judging of density before fixing, and will find over-density the safer side to err on. In my experience a considerable over-density cannot safely be reduced by the alum and hydrochloric acid without danger to the film. For the discolouration of the pyrogallic development, which will sometimes give a negative too great printing density, the alum with a little acid is safe and preferable to anything.

I tried some moonlight exposures during the full moon of last month, and with results which I did not quite expect. I used a rapid symmetrical, full opening, with a Wratten and Wainwright instantaneous plate, and gave four hours' exposure. The view was an open one with an extreme distance of about a mile, and the point of view overlooked the houses and gardens which made the foreground. With the same lens and opening I should not give for a fully-exposed negative above one-fourth of a second to sunlight. My moonlight negative was a thin, shadowy image, not more than half exposed, except the sky and the street lamps, which were dense enough. I think it probable that twice the exposure would have given a good printing negative.

If my premisses are well taken—and I think them sound—it follows that the difference between the full-moon light and that of the sun is as eight hours to one-fourth of a second—that is, about 115,000 to 1. That I do not over-estimate the value of the sunlight I am certain from several data in late work. I obtained well-exposed negatives of a similar subject with two seconds' exposure of the portable symmetrical with a stop of $\frac{f}{30}$, and this week at Venice I got a fairly-good negative, with the shutter described in my last, from a gondola afloat and free, every rope of the rigging of ships (also afloat) being as sharp as possible. The lens was the rapid symmetrical, two sizes larger than that employed for the moonlight negative, and the plate Nelson's. As I had just increased the aperture of the shutter, I do not know precisely the time of exposure, but it can be judged practically from the gondola exposure. Of course these exposures would hardly be expected in a climate less favoured than that of Italy, or at another season of the year. Even in that we are at our best now for light; and, by the way, I noted that Mr. Harrison, at the meeting of the London and Provincial Photographic Association, condemns the principle of the instantaneous (so called) shutters which, like mine, open and close from the centre. I do not think that the philosophy of this matter has ever been adequately discussed, and I am myself in doubt whether the ideal shutter ought not to be a slit passing before the lens from side to side, but not for the reason which Mr. Harrison gives. It is not the case that the opening of the lens from the centre increases the concentration of light at the centre of the plate. If it were, the using of a small stop would increase this concentration, while we know from practice that it is—with a properly-constructed lens, at least—quite the contrary which takes place. And this is what the central opening shutter does. It begins with a small stop and ends with it, and the most careful examination of the negatives I have just taken with the shutter I have described fails to show in one of them an increased concentration of light. The reason that I object to it is quite different from this—is, indeed, nearly opposed to it. It is that, practically, we are working with a stop half the diameter of the nominal opening, as the aperture increases from zero to full and then decreases to zero, giving, in reality, the amount of light due to the midway opening of the shutter during the whole exposure; and, as this will be approximately equivalent to one-fourth of the area of the full opening, we must have four times the proper duration of exposure, or, for a given exposure, one-fourth of the light.

It is evident that this is only admissible when we want distribution of light and definition (which we do certainly obtain with the central opening) and can afford the time necessary for these objects; but when we want to use the full power of the lens we ought to use a shutter which opens and shuts instantaneously, giving an interval of actual exposure with the full opening. But this is a purely theoretical condition. There is no such thing in mechanics as a motion that employs no time, "instantaneous" being a mere figure of speech; and an instantaneous exposure which should be divided into three intervals—the opening, the exposure proper, and the closing—would probably amount to much the same thing as in my shutter, namely, an increasing and a diminishing exposure. If this must be the condition the central opening is the only one admissible, for the reason that, while there is any opening at all, the light falls on the whole plate and not on one side of it.

For objects moving laterally the true manner of opening would be in a lateral action, a slit admitting the proper light passing across the plate from side to side, as in Johnson's once much-appreciated panoramic camera. But this used to telescope animals, lengthening them when it followed their motion and shortening them in the contrary case. With a rapid motion of the shutter this might practically be disregarded, and this form of shutter, for waves, shipping, and even animals, &c., in motion, would probably give the most perfect representation attainable if the light were sufficient; but, if it were used with an opening in any way corresponding to the aperture of the lens, the same difficulty occurs: that as the opening of the shutter comes towards and goes from a position which gives it the full value as to light, that value is diminishing or increasing during the whole exposure, giving practically the same amount of light as mine.

A narrow slit would reduce the proportion of this increase and decrease to a minimum; but this is all that can be said, even for that. Any form that opens to full diameter of the lens and then closes with any steady, progressive motion gives in reality the half-way opening, and, this being the case, the central opening shutter is the best. Mr. Harrison makes exception, it is true, in favour of shutters between the lenses, but I do not so comprehend the theory, nor do I find in practice that the evil he deprecates really is present; and, if it were present, I do not see how a shutter opening from one side and closing from the other would better it.

The ideal shutter would, doubtless, be between the lenses and open in an interval which shall be infinitesimal, and, after remaining fully open all the time necessary for the impression, should close in another infinitesimal interval. This may be stated in mathematical symbols and figures, but cannot be put into mechanical operation. Let us, for instance, suppose we want an exposure of the fiftieth of a second. The opening and closing of the shutter must be done in so brief a space that it shall be of no moment compared to that interval—say the one-two-hundredth part of a second for both movements. I do not mean to say that such celerity is impossible, but that it is not attainable without a mechanical force and complication which makes it out of the question to use it for ordinary work. The force required to move a shutter, even if very light, at such a speed will be enough to shake any camera fit for outdoor work. It is difficult to make a shutter open and shut with sufficient rapidity to answer the purpose of the quickest work. How much more difficult, then, this problem of dividing the action of the shutter into three parts!

This is, I understand, theoretically the action of the Boça shutter; but, as I have said, the theory is one thing and the mechanical execution of it quite another. Taking the combination of the two, in my opinion the most feasible plan is that of a shutter opening and closing at the centre of the lens. The difference between the action of such a shutter between the lenses and in front of the combination is one simply of time, as the greater space to be traversed in the latter position requires greater time; but that the actual result as to the illumination is the same may be deduced from the consideration that when the shutter is open it admits all the light possible, and when closed none at all, and this in either case, the extremes being the same the means must also be the same. In the outside shutter the space through which the shutter travels is greater than in the interior arrangements. The interior shutter will, other things being equal, operate in less time, the interval being proportionate to the distance to be travelled. Mr. Harrison's objection, therefore, resolves itself simply into one whether a central stop induces concentration of light or not.

Florence. W. J. STILLMAN.

RECENT PATENTS.

NOTICE TO PROCEED.

"IMPROVED Apparatus for Supplying Sensitive Plates in Photographic Cameras." James Henry Hare and Henry James Dale.

PATENT SEALED.

"Improvements in the Application of Eosine in Photographic Processes." Charles Denton Abel; communicated by P. A. Attout and J. Clayton, Paris.—*June* 26, 1883.

IMPROVEMENTS IN PRINTING SURFACES FROM GELATINE RELIEFS.

The specification of Messrs. Brown, Barnes, and Bell relating to their recent improvements in Woodburytype having now been printed we are enabled to publish it, and from its importance we do so *in extenso* in the language of the patentees.

Our invention relates to certain improvements on what is known as the "Woodbury process," and has for its object the simplifying of the process, namely, that process by which impressions of the gelatine reliefs are by pressure reproduced upon lead surfaces. Previous to our invention it has been the practice to produce impressions from gelatine reliefs on lead plates, brought to a true and even surface, by placing such reliefs between the lead plate and a steel-face plate and applying hydraulic pressure in a suitable press, by which the impression of the gelatine relief was reproduced or impressed in upon the lead plate; such lead plate after trimming serving as the plate or type for printing from. The use of the hydraulic press as a means of producing these printing plates or type renders the process expensive, and limits materially the dimensions of the plates, and necessitates such plates having perfectly true, level, and even surfaces, inasmuch as it is necessary that the pressure which puts the impression from the gelatine relief on to the lead plate should be evenly applied over the whole surface of such lead plate simultaneously.

According to our method of producing impressions upon lead plates or sheets from gelatine reliefs, we take a plate or sheet of lead and place above and beneath it sheets of steel, and outside these sheets of steel we place above and beneath other sheets of cardboard, so that the lower sheet is cardboard, or other like material, to give elastic pressure. The next is steel, then comes the lead sheet, or plate. Over this is the second sheet of steel; and, lastly, the second sheet of cardboard or its equivalent. Having arranged the sheets as above, we then pass them between an adjusted adjustable spring roller press with a required adjustment, or sett, until the lead sheet is reduced to the limit of adjustment or sett of the roller press. By thus reducing the lead plate it is brought to a true, even, and proper surface and thickness for receiving the impression from the gelatine relief. What we mean by the sett of the roller press is the distance between the pressing surfaces; and when this sett is reached the press ceases to further reduce the lead plate.

To imprint the gelatine relief upon the sheet or plate of lead prepared as above, we use a gelatine relief, obtained in the manner well known and in use, which we place between the lower or the upper sheet of steel and the lead plate or sheet, and pass the thus packed sheets of cardboard, steel, and lead with the gelatine relief through the roller press, having the same sett or adjustment as used in producing the lead plate, with the result that the addition of the gelatine relief causes an impression from the gelatine relief to be produced upon the lead plate which serves as the type for printing from, with gelatinous inks, or the like.

When it is desired to print with greasy or fatty inks we use a grained surface, which we obtain by placing a gauze or perforated sheet between a positive and the gelatine sheet to receive the print or relief. This causes the gelatine relief to have a grained surface, and such grained surface is transferred to the lead plate or sheet in going through the roller press.

As another method of obtaining a grained surface we grain or rough the type surface produced as above by placing upon the imprint or face of the lead type a graining or roughening medium, such as a sheet of fine wire gauze, muslin soaked in glue and dried, sand-paper, or their like, and upon the back of the graining or roughening medium we place a layer of soft material, such as cloth, and, together with the steel and cardboard sheets as before described, we pass them through the roller press under a light pressure, but with the same sett as when impressing the gelatine relief, thus effecting a graining, roughening, or abrasion of the surface, and producing a surface suitable for using fatty or greasy printers' ink to print with.

By producing printing surfaces on lead plates or sheets in the manner herein described we are enabled—

First: to obtain from gelatine reliefs impressions of size hitherto practically unattainable, and on thinner sheets or plates of lead; at the same time such impressions are equal, if not superior, to those produced by the hydraulic process of "Woodbury," and are suitable for printing from with gelatinous inks. By the use of rolls in the production of the printing plates an even pressure is applied progressively over the whole surface of the plate without necessitating absolute truth over the whole plane of the plate surface simultaneously. The lead plates thus produced are used for printing from in manner similar to the ordinary "Woodburytype."

Second: when the surface of the lead plate has been grained, abraded, or roughened by the application of wire gauze, or the like, such surface is applicable for printing purposes with ordinary printers' fatty inks.

Certain drawings are appended to the specification, showing the order in which the various plates are placed when ready to pass through the rolling-press; but these it is not at all necessary we should reproduce.

COLOURING PHOTOGRAPHS FROM BEHIND.

One more is added to the already innumerable patents which in every country have been obtained in connection with the painting of photographs on the back, the paper having previously been rendered as transparent as possible by oils, varnishes, wax, or substances of a kindred nature. Under the designation—"Process of and Apparatus for Producing Coloured Photographs," the inventors, Messrs. Chaine, Durand, and Sallonier de Chaligny, all of Lyons, France, describe what they aver is an improvement upon pre-existing methods for effecting this end. They say:—

Heretofore coloured photographs have been produced by the application of ordinary oil colours or paints behind the photograph, which has been rendered transparent by any suitable process. This application, thus effected, had the great inconvenience of producing a photographic picture which deteriorated very rapidly, turned yellow, and upon which stains or spots appeared by reason of the decomposition of the oil colour.

According to the present invention, the same process is employed of direct application of the oil colour behind the photograph, which is first rendered transparent, but the colour is fixed or made unchangeable. For this purpose a bath, a table, and an oven or drying chamber are employed.

The bath is made with a double casing, and is arranged to have a circulation of hot water, steam, or hot gas of any kind around it, which serves to maintain in a liquid state the products designed to fix the image upon the photograph and render the said photograph transparent.

This bath consists essentially of a rectangular case or box having double walls between which circulates a current of hot water, steam, or hot gas and a lid or cover furnished with a sheet of india-rubber, the edges of which form a joint against the interior walls of the said case or box. This lid or cover is capable of being turned upon an axis or rod having its bearings in suitable supports. On one of the extremities of the said axis or rod is keyed a lever by which the said lid can be operated and upon which a weight is adapted to slide, which weight, according to whether it is near to, or farther from, the said axis or rod exerts a greater or less pressure upon the photograph at the moment when the same is withdrawn from the bath.

In order to avoid loss of heat the lid is provided with a covering of felt or other non-conducting material held on by an envelope or case. Two cocks or valves permit of the entrance and egress of the hot water, steam, or gas.

After remaining a suitable length of time in the bath, the photograph is withdrawn, care being taken to pass it between the wall around the bath and the edge of the india-rubber of the lid, so as to remove as much as possible of the liquid with which the photograph is impregnated. The photograph is then placed upon the table, which is composed of a metallic case closed at all parts, the upper side of which is horizontal and properly faced, whilst the bottom is inclined towards the centre, in order to conduct towards the lowest point the products of condensation if the case is heated by means of gas or steam, or the deposits if it is heated by hot water.

The photograph withdrawn from the bath is placed upon the table, which has a double bottom, and is arranged to have a circulation of hot water, steam, or hot gas of any kind around it, and which is kept at a suitable temperature to maintain in a liquid state the surplus liquid still adhering to the photograph. The liquid is completely removed by wiping off and rubbing the photograph either with a cloth or with soft paper, and, after

exposing it to the atmosphere for some minutes, the photograph is ready to receive the paint which will give it the required colours or shades.

The aforesaid oven or drying chamber must now be employed. This oven is constructed with double walls, and is heated to a suitable temperature by means of hot water, steam, or gas, and permits the complete desiccation of the paint in a relatively-short time, and establishes, by a slight fusion, the most intimate combination between the paint and the material of which the photograph is composed.

Probably, owing to its being imperfectly translated, there is some want of clearness in the specification. The invention, so far as we can understand it, seems to consist of a vessel for holding the wax or other material into which the print is immersed so as to become transparent; a hot table on which to place the print in order to having the surplus wax wiped off; and an oven in which to place the prints after being painted on at the back, with a view to having them dried as rapidly as possible. It is not probable that there will be many in this country who will experience a strong desire to infringe this patent.

Our Editorial Table.

THE "KIRKBY SHUTTER."

Liverpool: J. J. ATKINSON, Manchester-street.

WE have before us specimens of work done by this shutter, which speak well for its capabilities. The pictures are taken from the deck of a yacht, the sea being so heavy at the time that it was impossible to stand steadily, the camera being held in the hand with the tripod closed, and practically standing on one leg. One picture of the Crosby (stationary) Lightship exhibits every rope with great sharpness, and with a magnifier it is possible to read distinctly the name of the vessel. Another picture of a steamer leaving port and moving in the contrary direction to the yacht from which it was taken is scarcely less sharp; and taking into consideration the extremely trying conditions of working the results are surprisingly good. It may be added that the light was anything but bright, the yacht having to put back through stress of weather.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 3	Sheffield	Freemasons' Hall, Surrey-street.
" 3	Halifax	*Courier* Office, Regent-street.
" 4	Benevolent	181, Aldersgate-street.
" 5	London and Provincial	Masons' Hall, Basinghall-street.
" 5	Leeds	Mechanics' Institute.
" 5	Bolton	The Baths.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held on Tuesday evening last, the 26th instant, the chair was occupied by Mr. T. Sebastian Davis.

It was announced that during the Exhibition in November there would be several evenings on which the lantern would be used, and amateurs and others were invited to send slides which might be interesting either as illustrating the process by which they were produced or otherwise. A set of standards for size of flanges and camera screws, made by Messrs. Ross and Co. in accordance with the decision of the Committee of the Society, was laid upon the table.

Mr. LEON WARNERKE showed a sensitometer in which the various parts which were usually loose were hinged together to prevent the danger of their being dropped and broken. There was also an addition in the form of a flap made of ferrotype type, having an opening large enough to allow all the squares to be seen through it. When it was desired to try a plate before drying it was laid upon this flap and so kept from pressing against the sensitometer itself. When using dry plates they were put under the flap so as to ensure perfect contact in the usual way.

The CHAIRMAN remarked that only the previous day he had broken part of his sensitometer, owing to its being loose. He also said that he thought it would be an advantage to have the sensitometer in a large frame, so that a half or whole plate could be put into it to be tried instead of being obliged to cut it down to quarter-plate size.

Mr. W. E. DEBENHAM remarked that some time ago he had shown a set of several sensitometers mounted in one frame for convenience of trying several plates simultaneously. In this frame, of course, one large plate could be exposed instead of the several small ones.

Mr. W. M. ASHMAN inquired of Mr. Warnerke whether he had tried wet collodion plates in the sensitometer, and, if so, what number they would register.

Mr. WARNERKE replied that in one exceptional case he had found No. 10 reached. More commonly it was No. 3 A 3, and sometimes nothing at all.

Mr. DEBENHAM asked whether, in the case of the plate which registered No. 10 there had been any auxiliary exposure to light. He had found with gelatine plates that this would bring out a number in the sensitometer representing a sensitiveness sixteen times greater than that which the same plate would give when kept free from extraneous illumination. This auxiliary exposure, however, did not quicken the camera exposure to anything like the same extent. Under the most favourable circumstances, and starting with a plate scrupulously guarded from light, the camera exposure might be reduced by auxiliary exposure to about one-half, and this with some slight loss of quality. The discrepancy between sensitomer indication and camera speed which this represented might be altogether misleading. To some extent, however, this difficulty could be met by disregarding the highest number of the sensitometer image and taking as a standard that number at which the image began to show vigour; as in those cases where a high number had been registered, owing to auxiliary exposure a row of faint figures could be seen all very much alike before any one showing a decided step in intensity.

Mr. J. CADETT said that he had accidentally exposed the back of a commercial plate (which generally gave No. 15 on the sensitometer) to gas light, and the plate on development gave No. 22 or 23.

Mr. ASHMAN remarked that with collodion he had found that camera exposure could be shortened by auxiliary exposure to the extent of four-fifths—that is, instead of ten seconds, two seconds would give an equally exposed negative, and this without any loss of quality.

Mr. WARNERKE said that, with regard to Mr. Debenham's observations, he had also found that the highest number was not to be trusted to as indicating the camera sensitiveness, and that he intended to issue instructions with sensitometers to take the number, giving a certain intensity as the guide. He proposed, when the trial plate was fixed, to take as the standard that square which came of the same intensity as the same square in the sensitometer itself.

Mr. W. ENGLAND asked whether ferrous oxalate or pyro. would give the higher number on the sensitometer.

Mr. WARNERKE said that pyro. gave in his hands two numbers higher than ferrous oxalate made by mixing oxalate of potash and sulphate of iron. When oxalate of iron was dissolved in the potassium salt somewhat greater sensitiveness was shown. On the continent it was usual to direct that ferrous oxalate development should be employed, and this was because the plates themselves were very inferior to those of English manufacture and often would not stand pyro.

Mr. A. COWAN showed a plate which had been subjected to the pressure of being written upon with a glass rod before and after exposure to light. The writing had been made through a sheet of note paper so as to avoid friction and abrasion. The same plate had also been treated with the glass rod in places without the intervening paper. In the latter case the markings of the rod were followed by a reduction of silver, as stated by Captain Abney; but, in the former case, where pressure only and not friction or abrasion had taken place, the lines remained clear as if the film had been rendered insensitive when the pressure had been applied before the exposure had taken place. The writing pressure given after exposure had produced no effect.

Mr. WARNERKE remarked that if a gelatine film it would be seen to emit light, and that in the daylight.

Mr. T. BOLAS said that phosphorescent action depended very much upon the inducing agent having been exposed to light, and the photographic effect produced by the friction of a glass rod would diminish with each time that it was called forth in the dark, but could be reinforced by a fresh exposure to light, or still more powerfully by the discharge of a Leyden battery or induction coil. The late Mr. T. J. Pearsall had called attention to a similar phenomenon in the case of fluor spar.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 21st instant, the chair was occupied by Mr. J. J. Briginshaw.

Mr. H. S. STARNES showed two tapes weighted with lead to act as pendulums, and graduated to swing with calculated velocities. He also exhibited some tables which he had constructed for use with these tapes. His plan was to refer to a table answering to the speed of the plate as compared with collodion, and then selecting one of the tapes to hold it with the fingers at a mark corresponding with the numbers found on the table and count the number of oscillations. He believed that, by the use of the appliances he showed, photographers would be able to give exact exposures, and not be compelled to resort to means in development for correcting under- and over-exposure.

Mr. W. E. DEBENHAM thought that Mr. Starnes was mistaken in supposing that wrong exposures were mostly due to want of a means of measuring time, which for all but very rapid ones could be done with a watch. The real reason was error in judgment as to the amount of exposure required. In instantaneous exposures the tape would, of course, be useless. What was wanted was a mechanism that would open and close the lens in such short-measured periods as were required.

Mr. A. COWAN considered that it would be better to have only one tape, and to refer all exposures to a measurement in seconds or fractions of seconds. Using beats of different speeds would, he thought, spoil the regularity of counting in the head which most photographers possessed.

Messrs. Dale and Hare showed a combined changing-box and dark slide. The principle was that of the revolving table albums, and there being no springs but the action depending upon gravity alone, they claimed freedom from liability to get out of order. As each plate was contained in a carrier any smaller size might be used in the apparatus. The same parties also showed a tripod camera stand each leg of which consisted of two outer bars hung by a link hinge to an inner bar. When the outer bars were turned back upon their hinges, they doubled the length of the leg when packed, but the inner bar was made to slide up and down between the outer ones, by this means, of course, varying the length of leg as in the well-known Kennett stand.

Mr. A. L. HENDERSON referred to the paper which Captain Abney had read at the last meeting of the Photographic Society of Great Britain, and

said that his experience was confirmatory of what Mr. Warnerke had previously stated, namely, that pressure destroyed the image and prevented development, and this effect he (Mr. Henderson) attributed to the hardening of the gelatine by the pressure.

Mr. A. J. BROWN said that his experience, like Mr. Henderson's, was the same as Mr. Warnerke's and exactly contrary to that of Captain Abney's, whose results he (Mr. Brown) thought were due, not to pressure, but to friction. He believed that the effect was not upon the gelatine but depended upon the crushing of the crystals of bromide.

HALIFAX PHOTOGRAPHIC CLUB.

THE annual excursion of this Club took place on Monday last, the 25th instant. The party went by Lancashire and Yorkshire train to Bradford, then by the Midland line to Skipton, travelling in a saloon carriage provided by the Midland Railway Company.

After partaking of an excellent breakfast at the Midland Hotel they proceeded by waggonettes to Bolton Abbey and Woods, in Wharfedale, the property of his Grace the Duke of Devonshire. The members taking views of the Abbey and surrounding scenery proceeded up the river Wharfe.

About one o'clock luncheon was ready and much enjoyed. The route then was along the river to the celebrated Strid, where several cameras were planted to take the choice picturesque views. The journey was prolonged up to the renowned Barden Tower, where the waggonettes met the party and proceeded back over the moors to Skipton. On counting up, the total number of plates exposed was about 130, varying from quarter-plates, 5×4 = half-plate, stereoscopic, 8×6, and 12×10 plates.

On the arrival of the party at Skipton a most sumptuous dinner was in readiness, which all enjoyed, and to which full justice was done. The members expressed themselves as being well satisfied, and, having spent a pleasant day, the return journey to Halifax was completed about 9.40 p.m. All the negatives, and prints from them, are to be exhibited at the next meeting of the Club.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Society met on the 18th ultimo,—the chair being taken as usual by Professor Vogel. Herr Bennecke, photographer and lichtdruck printer, of St. Louis, U.S.A., was present as the guest of the evening. Several new members were admitted.

In answer to a question respecting mounts,

Herr RISSE said that, in order to avoid the dirty marks sometimes produced by the backs of mounts on the faces of those below when piled in heaps, he used a mount only the side upon which the print is pasted being black, the back of the mount being grey.

A number of objects were handed round for inspection, including some galvano-photographic *clichés* by Herr Schäfer, an instantaneous shutter by Beyrich, and a dark slide by Gennert.

Herr BENNECKE exhibited an American dark slide identical in principle with Herr Martini's pasteboard dark slide, except that paper replaces the pasteboard. He (Herr Bennecke) showed a view of the deck of a steamer which he took by means of his paper dark slide during the voyage from America. He then communicated a formula for a long-keeping developer for gelatine plates (given to him by Herr Kramer, of St. Louis). The plate shown was developed with some developer prepared according to this formula before Herr Bennecke started on his journey.

At the time of Herr Janssen's death inquiries were made of the Association for a teacher of retouching, but the Society did not then know of anyone in Berlin; but an intimation has since been received by the President that Herr Kopske gave instruction to a limited number of pupils in this branch of work.

The CHAIRMAN said that, with regard to the iodine test for hyposulphite of soda, one need not be slavishly bound by the quantities he gave at the last meeting. The way in which he recommended it to be used for testing whether gelatine plates had been washed free from soda was to take two test tubes and place some of the test liquid in each of them; then pour some water on the plate to be tested, let it stand ten minutes, and then pour it off into one of the test tubes. To the second test tube add an equal quantity of pure water and observe whether there be any difference between them.

Herr SACHS found that drying at a high temperature gave more sensitive gelatine plates than at a low temperature, but that the high temperature was apt to induce fog. He considered 17° to 18° R. the most suitable temperature.

The CHAIRMAN read an account, sent him by Herr Christmann, of an American process, the most appropriate name for which seems to be "steam photography." The particulars of the process are not known, but it appears to be a development process. A thousand impressions are said to be given off from a *carte* negative in the course of an hour, and of larger plates a smaller number of prints. The prints are said to be "real photographs"—not lichtdrucks, or any sort of photo-mechanically-produced prints. This is not incredible, supposing gelatine emulsion paper with development to be used, when an instantaneous exposure suffices for a print, so that if the paper be changed with sufficient rapidity after the manner of the Schnell press several impressions might be obtained in a second.

Herr QUIDDE made some remarks on the use of the photo-telescope.

The CHAIRMAN proposed that the next meeting should take place in the Technical High School, in order that the small dynamo-electric machine there might be inspected by the members.

The meeting was shortly afterwards adjourned.

AT the meeting of the same Society, on the 1st instant, the chair was taken by Professor Vogel.

The CHAIRMAN read an intimation from the photographic assistants of Zurich that they had formed themselves into a Society, which they hoped in time to see expanded into a Swiss national photographic assistants' association. He next read a letter from a manufacturer of albumenised paper, in which a well-known preventive of blisters was recommended anew—a handful of common salt to every twelve litres of the first washing water used after the fixing bath. It was asserted that this treatment should prevent the trace of a blister from showing itself, even upon strongly-albumenised paper, and that the salt did not harm the tone of the pictures.

Herr QUIDDE remarked that he had, for some years back, been in the habit of using this preventive during the summer months, and found that, if it was not an absolute cure, yet it very considerably diminished the annoyance of blistering prints. With regard to its effect upon the tone of the picture he had observed no harmful effects; but he worked mostly with reproductions, the tones of which are not so sensitive as those of portraits.

Herr FÄHLING also formerly employed the salt cure, but now used instead spring water for the first washing and not the ordinary tap water, and had not since been troubled by blisters.

Herr QUIDDE had found spring less successful than the salt water. He also inquired whether it would not be possible to add something to the tap water, which would impart to it the properties of Berlin spring water, the composition of which was known.

The CHAIRMAN said this apparently-simple experiment was in reality rather complicated, and could hardly be well carried out by any but a chemist.

Herr Pietschmann, of Landshut, Silesia, sent the programme of a projected photographic tour amongst the mountains, similar to that planned for last year, but which was not enjoyed on account of the weather.

Herr Prümm showed an instantaneous shutter, by Nickelsen, of Sylt, and a short discussion on the merits of various shutters followed.

Herr Schaärwachter read several communications relating to the pending dispute between Herr Obernetter and the subscribers to his process, which led to a lively debate, and was prolonged until it had become too late to inspect the dynamo-electric machine, the proposed examination of which was the reason of the meeting being held in that locality. The inspection of it was, therefore, postponed until the next meeting of the Association, and the meeting was thereupon adjourned.

PHOTOGRAPHIC SOCIETY OF VIENNA.

AT a meeting of this Society, on the 8th of May, Dr. E. Hornig, President, occupied the chair.

The CHAIRMAN intimated that Herren Koch and Ganz had kindly sent him the text of the Swiss literary and artistic law of copyright. A number of other communications having been read by the Chairman, he exhibited some photographs of horses in motion taken by Herr O. Anschütz, of Lissa, upon gelatine plates; some portraits of typical faces taken in the Caucasus, mostly in the open air, by a number of different photographers, and collected and sent by Herr Kurdjian; a series of instantaneous views in Geneva, by Herr Boissonas; and an electric alarm clock for the photographic laboratory, sent by Herr Ferdinand Silas. The intention of this clock is to allow an exposure or other prolonged operation to go on in the absence of the operator, yet that his attention, should he be otherwise occupied in the dark room, might be recalled when the exposure was completed.

The Secretary then read, in the unavoidable absence of Herr Mariot, of the Imperial Royal Military Geographical Institute, a paper by the latter gentleman on *High-Relief Etching in Half-Tones for Type Printing from Matrices of Drawings, Photogrammes, &c.*

Professor EDER made a few remarks upon the emulsion process, as carried out in the studio of Herr Boissonas, of Geneva. He also showed some flexible supports for negatives prepared by Herr Wilde on a principle similar to Professor Stebbing's flexible supports, which were shown at a former meeting. He (Professor Eder) showed some prints from negatives upon flexible supports, forwarded by Herr Ficheisen, of Villingen; and, finally, he read a communication from Herr Wilde respecting his modification of the ferrous-oxalate developer.

Lieut. David showed an apparatus which had been sent him from Hamburg for lighting the dark room by electricity, and an apparatus for working with gelatine emulsion.

Herr Hamsa exhibited a vulcanite plate-box, arranged to hold plates of different dimensions.

Herr Scolik presented a variety of articles.

Herr KRAMER showed a portrait of Booth the actor, at the bottom of which was the sitter's autograph, printed at the same time as the portrait. He recommended this idea to the attention of portraitists.

Some further business was transacted, but it was not of general interest, and the meeting was shortly afterwards adjourned.

Correspondence.

ON FOCUSSING.

To the EDITORS.

GENTLEMEN,—Mr. W. T. F. M. Ingall's letter, in your issue of the 22nd inst., confirms my opinion that a need is felt for a more accurate system of focussing, and I see with pleasure that he has adopted so simple an expedient. I would, however, suggest that there are many larger wings of insects—as, for instance, some of the dragon flies—suitable for the purpose; and that a more convenient method for employing them would be to cement them with a drop of Canada balsam to the surface of the ordinary ground-glass focussing-screen, and covering them with

thin glass microscopic "covers." Several might be so applied to the focussing-screen, so as to afford a choice of position for the principal object of the picture.—I am, yours, &c., GEO. SMITH.

26, *Colebrook Row, London, N., June* 23, 1883.

SULPHITE AND PYRO.

To the EDITORS.

GENTLEMEN,—In your last issue "Free Lance" says that by my method of mixing sodic sulphite and pyro., a mass of crystals of the former will soon be found at the bottom of the bottle.

Occasionally a few are formed, and it is desirable they should be, as it is then clear that the solution was *really* a saturated one. It must be remembered that only about two drachms of the saturated solution are used for four ounces of water in developing. Experience shows that less sodic sulphite than a saturated solution to start with does not effect the desired object.—I am, yours, &c., SAMUEL FRY.

Surbiton, June 26, 1883.

P.S.—A rather metallic appearance is often seen on looking down on the plate after developing with the above; but the green and yellow colour of a gelatine plate is distinctly gone.—S. F.

EXCHANGE COLUMN.

What offers for a quarter-plate portrait lens by Fleming, of Oxford-street, London?—Address, HELSBY, photographer, Denbigh.

Wanted, Ross's whole-plate rapid symmetrical in exchange for Voigtlander's whole plate portrait lens, Waterhouse diaphragms, or offers.—Address, R., 41, Paul-street, Kingsdown, Bristol.

I will exchange Lancaster's half-plate camera lens, double-back, and tripod, complete. Wanted, a quick-acting *carte* lens by a good maker.—Address, FOX AND KERSHAW, Whitaker-street, Batley, Yorks.

I will exchange a good cabinet lens, nine and a-quarter inches focus, by Burr, for a rapid *carte* lens of short focus, by Ross or other good maker.—Address, W. COX, 20, Upper Baker-street, London, W.

I will exchange first-class fishing tackle, chemical apparatus, or valuable oil paintings. Wanted, half-plate portable camera and view lens, or quarter-plate size.—Address, W., 8, High-street, Kington, Herefordshire.

I will exchange a Meagher's 18 × 18 camera, Meagher's stereo. sliding camera, quarter-plate bellows rack camera, light tripod, Ross's No. 2 portable symmetrical lens, for accessories, tourist whole-plate camera, &c.—Address, PHOTOGRAPHER, 88, Briggate, Leeds.

Wanted, a bellows-body camera, for dry-plate work—one to take two quarter-plate negatives on half-plate preferred; must be perfect. Will give in exchange a quarter-plate, sliding-body camera, thirty-six stereoscopic views, with stereoscope (closes like a book), whole-plate glass bath, with stand and dipper, half-pound of collodion, cyanide, and a few sheets of ferrotype plates, glass mats, preservers, and trays, and silver bath solution, &c.—Address, J. ALSTON, 80, Kemp-street, Fleetwood, Lancashire.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Messrs. Hall Brothers, 26, Westgate, Wakefield.—*Photograph of the Wakefield Trinity Football Team.*

James Downey and Son, 19, Eldon-street, South Shields.—*Two Photographs of the Rev. William Cutts, President of the Primitive Methodist Conference.*

A. DALY.—You cannot make an emulsion in that way, inasmuch as gelatine is not soluble either in ether or alcohol.

L. J. HEALEY.—1. The exposure of the *cartes* sent has been in both cases insufficient.—2. See an article on *Toning* in the present number.

S. BAMFORTH.—For some reason or other a portion of the oxalate of iron is precipitated. Employ a slightly larger proportion of the oxalate of potash solution.

INQUIRER.—Your best plan is to make your wants known through the medium of our advertisement columns; you will then, no doubt, obtain what you require.

CHESTER.—The effect may be obtained by dexterously splashing the negatives with an opaque material. That which you employ for small will answer as well for large negatives.

R. S.—Try the effect of washing the print over with a little very dilute ox-gall; that will cause the colour to work more freely. Use plenty of gum in the colour you apply to the shadows.

SILVER.—Your experience is curious; but unless you send us fuller information as to how you proceeded in mixing the solutions, and also as to their strength, we cannot offer any opinion on the subject.

E. W. D.—From this correspondent we have received some prints and a number of queries, but he has not conformed to our rule by enclosing his name and address; hence the queries remain unanswered.

INQUIRING NOVICE.—Several good receipts for varnish will be found in our ALMANAC for the current year. Read Mr. H. Y. E. Cotesworth's article on *Varnishing Gelatine Negatives* in our last week's issue.

POSITIVE OPERATOR.—We believe the powder colours, such as were at one time used for daguerreotypes and for glass positives, may still be had from Mr. Solomon, Red Lion-square, and possibly from other dealers.

JAS. FLETCHER.—By "dry mounting" we presume is meant that the prints are not wetted with water prior to the application of the mounting material. By this plan there will be less risk of the paper expanding than when it is soaked in water and then kept moist for a considerable time.

A. P. INALE.—If you mount the prints with a solution of india-rubber there will be no fear of the paper expanding and thus causing distortion in the prints. The unfortunate fact connected with the india-rubber mountant is that after a time the rubber perishes and the prints then leave the mounts.

O. A. J. (London, S.E.).—If the plates frill as badly as you say the only chance you have of working them is to immerse them in a solution of alum immediately after they are developed. After remaining in the solution for a few minutes take them out and rinse them, fix, and wash as is your usual custom.

1, 2, 3.—The difficulty in toning some samples of the ready-sensitised paper is much greater than that which is sensitised, and used up at once. Various plans have been suggested for overcoming the difficulty; but what is a remedy with one sample of paper is not so with all. You had better write to the maker or use the formula he recommends.

S. A. BROWNING.—1. Dissolve off the varnish with strong methylated spirit, and then treat the negative with a solution of cyanide of potassium. If that do not remove the stains we fear that nothing will do so.—2. Not more than thirty grains to the ounce of alcohol should be employed.—3. A weak solution of the chloride of lime of the oil shops will answer as well as anything we can recommend.

J. F. BRENT.—There are so many methods of enlarging from small negatives we require to know which plan it is upon which you desire information. For small sizes you cannot do better than follow the plan recommended in another page. Half the quantity of citric acid that there is nitrate of silver in the sensitising solution will prevent the paper discolouring; but it will not tone readily.

GELATINE.—The cause of the shining spots showing on the pictures mounted on glass may probably be traced to minute bubbles of air being enclosed between the prints and surface of the glass, and not to the particular sample of gelatine employed. Avoid the bubbles, and we have little doubt you will no longer be troubled with the spots. If you cannot overcome the difficulty with this hint send us an example, and we will endeavour to help you further.

RECEIVED.—George Smith; Wm. Brooks; W. H. Harrison.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, the 4th July, the subject for discussion will be—*Adjourned Discussion Upon the Most Rapid Lenses for Instantaneous Work, Embracing a Certain Angle.*

A NEW PHOTOGRAPHIC SOCIETY.—At a meeting held at the Coventry Dispensary, on the 20th inst., it was resolved to form a photographic society, to be called "The Coventry and Midland Photographic Society." Mr. Arthur E. Rollason, of 31, Whitefriars-lane, Coventry, is the Honorary Secretary *pro. tem.*, to whom all desirous of joining the new Society should apply.

ALLEGED INFRINGEMENT OF COPYRIGHTS.—At the Court of Queen's Bench, on Saturday last, the 23rd instant, before Mr. Justice Field, the case of Nottage and Another *versus* J. H. Jackson, came on for trial. The plaintiffs in this case carried on the business of photographers, under the name of the London Stereoscopic Company, and the defendant sold photographs and other things at Leeds. The action was for penalties, upon the allegation that the defendant had infringed the plaintiff's copyright in a photograph of the Earl of Derby, and another of the Australian Cricketers of 1882, by copying and selling the copies of these pictures. They also asked for an injunction to restrain the defendant from doing these things in future. The case was tried a short time ago, and it now came on for further consideration.—Mr. Petheram, Q.C., with him Mr. Shortt, appeared for the plaintiffs, and submitted that his clients were entitled to six penalties of £10 each with reference to the Australian Cricketers.—Mr. Justice Field said that he had already ruled that there was no guilty knowledge on the part of the defendant as to the photograph of Lord Derby.—Mr. Crump, for the defendant, submitted a variety of points to his Lordship. He contended that the plaintiffs were not authors of the photograph, "The Australian Cricketers," within the meaning of the Act. It was the person who took the pictures who was the author, and in this case the author was a Mr. Reynolds. The statute contemplated a personal authorship, because the copyright was to continue for a certain number of years after the author's death. The statute required the place of abode of the proprietors of the copyright to be registered, and this, he submitted, meant the place where the proprietors slept. In this case the plaintiffs had registered only their business premises, and where, of course, they did not live, and this, it was submitted, was not sufficient.—The case was not concluded when the Court rose.

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THE BRITISH
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LIGHT IN THE DARK ROOM.

The various phases of opinion respecting the amount of light to be admitted into the dark room have not run an entirely similar course in dry-plate practice to that taken in wet-plate work. The dark room, as its name implies, at one time was dark, and the light first permitted to enter was low as to colour and slight as to quantity; and it was not till our art-science had been practised for several years before its professors fully recognised the fact that it was quite possible to do the best of work in a room bathed with yellow light, and so strongly that the smallest print could be read with perfect ease.

When, however, gelatine plates began to make their mark it took some time for photographers to thoroughly grasp the new conditions, and many of them worked with windows little, if any, altered to suit a new practice. In many places fog was the inevitable result, and greatly were the minds of dry-plate makers exercised to discover whether complaints of fog were justified by the quality of the plates they sent out, or were merely founded upon imperfect or improper illumination of the dark room.

Repeated failures, however, taught the user of gelatine that his light required overhauling, and gradually it was discovered that a light sufficiently obscure to produce brilliant wet plates might yet be quite unsuitable for the new order of things; and the result was an almost universal darkening of the windows of the laboratory.

Gradually it was discovered that there was something besides the mere strength of the light allowed to filter through the window into the room that governed the question, and attention became centered in its colour rather than its intensity, as the fact came home to the mind of the average photographer that a gelatine plate was sensitive to rays which, even when their action was greatly prolonged, did not affect a bromo-iodised collodion plate.

At this juncture pure science stepped in. Gelatine plates were critically examined and shown to be sensitive to rays far on towards the red, the results being so conclusive that a reaction in an opposite direction set in. Most absurd statements were made as to the sensitiveness of these plates to red rays, the remarks made by some experimentalists having the tendency to suggest that red rays would produce an image in as short time as the old favourite—the "ultra-violet" rays. To this day much confusion exists as to the power of an ordinary gelatine plate to be impressed by red light.

Not to wander from our subject, we may note the prominence that was next given to the use of the spectroscope in the examination of glass supplied for dark-room windows; and in some cases it may be found a sufficiently-handy instrument for the purpose, though the everyday photographer must naturally be content with the less special means he is likely to have at command. A plate exposed under a questionable piece of glass for various lengths of time and then developed is an exceedingly practical way of testing its quality for dark-room work.

Here, however, a very important consideration must be taken note of. The illumination of the dark room may be described under two heads—lighting, where the light comes direct from the sky into the room; and that where no sky can be seen from the room and all the light which enters is borrowed. Naturally, in the latter case a colour may be used for a window that would be utterly out of question when the sky was the direct illuminant of the room unaltered by specific reflection. The failure to note the radical difference between these two classes of lighting accounts, in most instances, for the discrepant accounts as to the light permissible in the dark room—some photographers, as our readers are aware, having gone the length of saying they developed with subdued white light.

A spectroscope, for those who possess or can obtain the use of one, is a most serviceable instrument, the little "direct-vision" pocket ones that can be obtained for a guinea or a guinea and a-half each answering all purposes. They are all at times likely to be beneficial in the photographer's dark room, and constitute most instructive and useful instruments.

The facts revealed by the spectroscope as to the permeability of many kinds of coloured glass to rays shown to act upon gelatine plates led to the institution of experiments upon various coloured media, and it was shown that among the many beautiful dyes given to us through the agency of coal tar some useful ones could be selected, and there were two particularly recommended—aurine and roseine—that formed a complete safeguard against the entrance of active light, the combined absorptive action of the two substances eliminating all but the least active rays; and in many establishments windows coated with a varnish of these two substances, either mixed or upon opposite sides of the glass, have been utilised. Glasses so coated form, we scarcely need say, the most actinic-light-obstructing screen it is possible to possess.

But, as perfection cannot be obtained in anything, we must here state, as the result of investigations we have been making, that windows so coated are deceptive, and we urgently recommend every photographer possessing such a one to examine, either by spectroscope or trial plate, its power of obstructing actinic light. We have found that in cases where the direct light from the sky—not to say sunlight—has shone upon windows so coated they were liable to fade and change colour, and so after a time to become transparent to those rays which every effort is made to exclude from the room.

Where the light that enters is borrowed there is little danger of evil resulting, either from fading of the coloured windows or the entry of strong light. But in those cases where a dark-room window has been constructed of glass so coloured, and has for any length of time been exposed to pure daylight, we earnestly advise its owners to examine its light-arresting powers at once, or they may find "light in the dark room" of a character inconsistent with their desires. This is a serious contingency, and one that must not be lightly regarded.

MULTIPLEX SIZES IN PORTRAITURE: IS IT POLICY?

It is not often that we say much in connection with photography from a purely business point of view; but there are occasions when it is desirable to treat the subject in its commercial aspects. In a letter just received from a photographer carrying on an extensive business in one of the fashionable thoroughfares of our metropolis, he calls attention to a somewhat important matter, and, as it conveys ideas very much in accord with others we have heard recently

expressed, we give it place here instead of in our usual correspondence columns.

Our correspondent says :—

"In one of your able leading articles last week it was incidentally mentioned that you think the attempt now being made to introduce pictures smaller than the *carte* is a step in the wrong direction. So do I. But do you not think it is very unwise to have so many different sizes as we have now?—and we are threatened with still more. I, wishing to keep pace with the times, have hitherto shown specimens of each (except the new *mignonnes*) without much success with them commercially; as I find that many who have come for the purpose of sitting, when shown the new sizes, have got so confused with them that they cannot decide whether they will have one of these or the old cabinet, and frequently they leave without being taken, saying they will consider and call again, with the usual result—they *don't.* I feel convinced if we had fewer sizes, and a greater difference between them, it would be better in the long run. This, of course, can only be arranged by the unanimous action of photographers as a body. By kindly inserting this letter it may possibly elicit the views of others on the subject.—I am, yours, &c., A London Photographer."

There is much in our correspondent's letter that is, we are sure, worthy of the attention of our professional brethren.

Before the introduction of the *carte-de-visite* the "whole plate" was considered to be the standard size for portraits, this being subdivided into the half-plate, third (5 x 4), quarter, sixth, and ninth size, the last measuring two and a-half inches by two. The smaller sizes were usually preserved in morocco cases, the larger ones being framed. When the *carte* was introduced (ostensibly to be used as a visiting card) it rapidly gained favour—indeed, created quite a mania—not more on account of the style of the picture than for its uniformity in size, and albums were quickly in the market for preserving them.

Had the full-length style of portrait been introduced in several different sizes it is more than probable that little or no success would have attended its introduction. It was the one uniform size which ensured its success. In proof of this we see that, after the lapse of nearly a-quarter of a century, the *carte* is still the most generally popular picture. The style of portrait, and the proportions of figure included, have at different periods undergone a change, according to fashion, but the size itself remains as formerly.

When the cabinet size was introduced, for a long time it met with little favour from the public, inasmuch as they were not provided with albums for its reception, as they were for the *cartes.* However, gradually they became possessed of them, as the manufacturers introduced some leaves with cabinet openings in the better class of *carte* albums. In the course of a somewhat long period the cabinet portrait became well established, and has since continued a popular size. During the last few years several new sizes of portraits have been introduced, and some of them so closely allied to others that it is no wonder, as our correspondent says, the public should get confused between them.

From a trade catalogue now before us, we find that the size of the "Malvern" mount is the same in length as that of the old cabinet, and it is in the width only that the dimensions differ—to the extent of an inch. Again: "promenades" and "boudoirs" are equal in length, but the former is a trifle over an inch narrower than the latter. Surely, if this length of picture were desirable, the width could have been so arranged that it might be intermediate between the two, and thus one size would have sufficed. The public cannot well be expected to provide themselves with albums or other receptacles for each new size that may be introduced, particularly when there is so little difference between them; hence, as a consequence, such pictures, when taken, are little valued by their possessors, they lie about and get soiled, or are kept in their envelopes and seldom seen—or, more frequently, they are mutilated to make them fit any aperture that may be vacant in the album.

We recently saw some "promenades" which had been cut down to fit into the cabinet openings, and, as these were somewhat larger than usual, the edges of the print did not fill them to the sides. In another instance we saw a "Malvern" in a cabinet album, with an empty space on either side, because its mount was smaller than the opening. This certainly had a very unsightly appearance, and it gave rise to very unfavourable expressions with regard to this style of picture on the part of the owner of the album.

A provincial photographer, a few days back, remarked to us on this subject, that he was compelled to show all these new sizes—not because he thought it good policy to have them, but because another artist in his town was doing so, and he could not afford to let him have it all his own way. One of the most successful business men in the metropolis on one occasion told us that he only showed three sizes of enlargements, and these with a wide difference between them, adding that it was quite a mistake, from a business point of view, to have too many different sizes displayed, as the client becomes perplexed as to which to select, and thus an order is frequently delayed and sometimes lost. In reply to our query as to how he managed if a picture were required to match another already in existence, his response was—"Simply this: I do it, and charge the price of my next larger size, and this always proves satisfactory to both parties."

After all, we strongly suspect that each photographer will consult his own interests, and work those sizes which pay him best or bring most business to his establishment. In future, when new sizes are considered necessary, some concerted action (if it be possible) amongst photographers generally may be desirable, so as to fix upon a definite and suitable size. Had this been done hitherto, we cannot avoid believing that we should not have had such a multitude of sizes, differing only in merely trifling proportions, as at present, and which, in the opinion of many, we know is considered very undesirable. But perhaps, after all, this is only a matter of opinion.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter X.—Rapid Landscape, Group, and Copying Lenses.

What constitutes a "rapid" lens is not very easy to define. That a portrait combination, having a large angular aperture, is really the most rapid worker of all no one can for a moment entertain any doubt; and yet it is not "rapid" in the sense in which we have now to speak of the instrument, but must be suffered to remain outstanding, and yield the phraseological distinction to others much slower.

The term may be considered as applying to combinations constructed for the purpose of including a much wider angle than the portrait lens on the one hand, and a smaller angle on the other, than can so easily be obtained by the wide-angle, non-distorting lenses which were described in the preceding chapter. Any combination which will include a moderate angle of view, such as two-thirds of its focus, with an aperture ranging between $\frac{f}{7}$ and $\frac{f}{10}$, and be free from distortion, is entitled to be considered a "rapid" lens.

The first "rapid" lens of which we possess any record was issued in July, 1866, by the late Dr. Steinheil, at the suggestion of the late Dr. Monckhoven, who supplied the required data which should be kept in view in the construction of such a lens as was at that time considered a desideratum. The instrument which resulted from a conference between the two *savants* possessed an aperture equalling one-seventh of the focus. It was formed of two different kinds of flint glass. But in a patent obtained by Mr. J. H. Dallmeyer about the time of the issuing of the Steinheil aplanatic lens—as the new claimant for public favour was designated—the principle upon which this lens is constructed was embraced; for in the specification of the patent which has primary reference to the wide-angle rectilinear described and figured in our last chapter, together with the back combination of his portrait objective, and which patent was obtained in the course of the year above mentioned, he says :—"A lens may be constructed according to my invention of flint glass only, necessarily of two different kinds as regards density for the production of achromaticity, instead of, as is usual, crown and flint glass." Without entering into disputative details the Steinheil aplanatic, composed of two kinds of flint glass, and the Dallmeyer rapid rectilinear, of flint and crown, were certainly the first lenses of this now well-known class.

Although the general principle of construction is similar in every one of the "rapid" type of lenses, with one exception, yet several modifications as regards curvature and densities of glass have been made by the respective manufacturers of this rapid doublet. The accompanying diagram (*fig.* 18) is sufficiently accurate to describe all these rapid lenses (with the one exception alluded to) by whomsoever they are constructed. Each achromatic lens in the combination is a meniscus formed of dense glass, the denser element forming the side that is convex. The elements in each are a concavo-convex and a meniscus cemented together, and two of these form the objective, the apertures of which, according to the maker, may be considered as varying from $\frac{f}{6}$ to $\frac{f}{10}$. The former of these, however, implies that glass has been made use of having a degree of density scarcely safe to be employed for photographic lenses on account of its tendency to become discoloured.

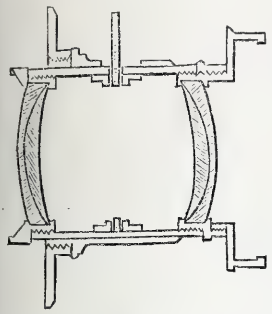


FIG. 18.

Why, it may be asked, employ glass of such great density? Or what advantage does heavy, dense glass possess over the lighter sort which is known to be stable and unalterable by either light or time? We reply:—the greater the density of the material of which a lens is constructed the greater is its refractive power, and, consequently, the flatter is the curvature required to produce a lens of any definite focus. If three single lenses are required of similar short foci, all being the same diameter, and the first be composed of diamond (if that were practicable), the second of dense flint glass, and the third of light crown glass, then, while the first would be comparatively flat, the last would be very thick, owing to its short radius of curvature, while the second would be between the two. Now, seeing that the radius of curvature of a dense glass is so much greater, for its diameter and focus, than one of light material, the spherical aberration is diminished in a corresponding degree. It is impossible to produce with ordinary flint and crown glass a combination of the form shown in the foregoing diagram which shall work with an aperture as great as those formed of dense glass. Hence the advantage of the latter kind of glass.

Symmetry in a *rapid doublet* (by which name we shall designate this class of lens, by whomsoever manufactured) is not at all a requisite condition towards obtaining either a large angular aperture, covering power, or rectilinearity of projection. Some years ago a statement was made by one of the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY to the effect that for all purposes, except that of copying an object the size of the original, the lenses of a rapid doublet, examined from the non-distorting point of view, should not be symmetrical. This drew forth, first, the animadversions of the deceased Mr. Thomas Sutton, whose mathematical ability no one doubts; and, secondly, a private expression of opinion from the then mathematical adviser of a large optical firm who now in practice *ignore* strict symmetry. Such is the irony of fate! Verily, as says some old proverb, "they laugh best who laugh last." The reason underlying this dissimilarity of elements in an objective have relation to the law of conjugate foci. But photographic optics is so much a series of compromises that it is unwise to dogmatise upon what should be the way to carry into effect a certain idea, as it is impossible to indicate any one mode as being the best. The form of rapid doublet shown above in *fig.* 18 is that which is adopted by all European manufacturers, and it is a necessity of their construction that glass of greater than ordinary density be employed in their formation. It may be an abnormally dense crown glass united with flint glass of a corresponding ratio of density to secure the requisite actinic correction; or it may be a light flint glass combined with heavy flint, the result being the same.

The rapid doublet of Mr. Morrison, a popular American manufacturing photographic optician, appears to have been projected on lines totally different from those of European opticians; for, not only is it formed of the ordinary optical flint and crown, but the very principles involved in its manner of correction differ from them. In *fig.* 19 we present a diagram of the American rapid doublet, the curves of which are none of them deep in any part, differing in this respect from the internal or contact surfaces of the European class, the radius of which is always very short. From what we have seen of the American rapid doublet when tried in comparison with those of the European form there does not appear to be much difference between them. There are numerous particular instances in both classes in which one has proved much superior to the other; but in the best specimens of each the difference between the photographic results is not readily apparent. *A priori*, the European form should possess such an advantage over the American as is to be obtained from the reflecting surfaces being only half the number; for the interior surfaces of the Morrison lenses being dissimilar as regards curvature, it is, of course, impossible that they can be cemented. This in practice, however, is not a matter of the importance that might at first be imagined from the "loss of light" point of view, because a very slightly-increased diameter of lens will amply compensate this.

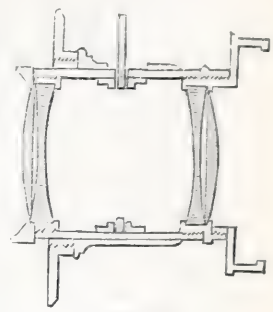


FIG. 19.

Where the real point of danger is apt to lie, if care be not taken in properly adjusting their various parts, is in the increased number of images formed along the posterior axis by these various reflecting surfaces. The Morrison rapid doubtlet, if gifted with speech, might hurl a *tu quoque* against its European rivals; for it is the case that by many of the rapid doublets a central flare spot will be produced if the conditions are such as to favour its production. These conditions are a bright sky, a landscape or building any portion of which covers the centre of the plate, and a stop moderately small.

A good way by which to discover the presence of this flare propensity in any lens is to screw it into a camera and focus a view of an ordinary gas flame on the screen, the room being otherwise darkened. This image will be sharp, bright, and inverted. Now move the camera slightly so as to cause the inverted image to be a little to one side of the centre of the focussing-screen, and in nine cases out of ten there will be seen a ghostly image at the opposite side of the centre. This secondary image is non-inverted, and upon rotating the camera it moves in the opposite direction to the primary image. The nature of this secondary image and the cause of its formation may be examined in the following way: move the camera so that the ghostly image shall be near the margin, and then, placing the eye in the line of that image and the lens, withdraw the ground glass, when the posterior surface of the lens will be found to be quite luminous. That the false image is, in this case, caused by a reflection from the back surface of the anterior lens is demonstrable by unscrewing the cell containing it until it is almost ready to drop out of its tube, and then, keeping an eye upon both the primary and the secondary images on the ground glass, move or slightly wriggle the front cell, which, by its looseness in the mount may now be easily done, when it will be seen that, while the primary or legitimate image of the flame remains motionless, the flare image, caused by the reflection from the surface of the front lens, dances about all over the plate. But observe, further, that there is a certain distance between the front and back lenses at which this secondary image is sharp and bright; and in proportion as either the front or the back lens cells is screwed out or in, so does the image become more attenuated and expanded till at last it ceases to be seen altogether, while all this time the real image is not seen to suffer in any way.

This tendency of the ghostly image to pass out of focus with such extreme rapidity upon separating the lenses by a few turns of the screw, or even by making them come nearer to each other, provides the means by which this annoying evil may be cured. A rapid doublet may be excellent for groups, copying, and every other purpose, and yet may break down when employed with a small stop in landscape work. This class of flare-spot is seldom, if ever, seen unless a small stop be used.

For outdoor purposes requiring a greater degree of rapidity of action than can be obtained by a rapid doublet, the best lens is that peculiar modification of the portrait lens which is known commercially as the "D" series of Dallmeyer, or the "Universal" of Ross. In these the posterior combination, like that in Morrison's rapid doublet, is not cemented, and hence there exists the objection of two more reflecting surfaces existing in them; but this is not appreciable in practice, nor, so far as we have examined them, is there any flare arising from this, while the advantages of the causes which exist for their separation or non-cementation are very decided. We have frequently employed an objective of the type now spoken of for landscapes, and in no case ever discovered any flare-spot no matter how closely it was stopped down. It forms, when used with full aperture, an invaluable half-way tool between the portrait combination and rapid doublet.

Our readers will peruse with extreme interest the communication from Mr. H. A. Lawrance, the head of the English eclipse party, which appears in another portion of our issue. His graphic recountal of the difficulties surrounding the landing and installation of the apparatus, and his picturesque description of the beauties of the marine fauna of the lonely island, will possess a double interest, seeing that it is, we believe, the first detailed account yet published of the proceedings of the expedition, the whole conduct of which—the necessary rapidity of preparation and the celerity of the workers engaged—reflect the highest credit upon all concerned. He further bears testimony to the extent to which the successful results were aided by Mr. P. Meagher's excellent camera work, and by Mr. Hilger's spectroscope. Mr. Lawrance's account gives full details of many important points—of some old questions still unanswered, but of others satisfactorily solved—while, as might be expected, new ones have arisen. The evidence of photographers have hitherto been of so opposite a character to that of eye observations that great value will attach to those now made with the purpose of forming a trustworthy conclusion. Perhaps the most exciting results of all are those of Dr. Hastings. He does not appear to have thoroughly appreciated the difference between what might be termed "the photographic and the visual corona;" and hence his conclusions will not be entirely accepted by other scientific men. Should they, however, be—and Mr. Lawrance fully explains the results—obtained, the whole theory of the corona will have to be recast. Our readers will look forward, we are sure, with much interest to our esteemed correspondent's next communication.

A large number of details as to the success of the various eclipse expeditions are now in the hands of the several authorities. At the Paris Academy of Sciences last Monday week telegrams from the different observers were read, and it is evident that on all hands substantial additions to our knowledge have been made. Dr. Janssen telegraphs:—"Discovery of the Fraunhofer spectrum and the dark lines of the solar spectrum in the corona, showing cosmical matter round the sun. Large photographs of the corona and the circum solar regions to a distance of 15° in search for intra-Mercurial planets." Palisa and Trouvelôt say—"No intra-Mercurial planet found." "Sketch of corona." Professor Tacchini:—"Polarisation of the corona and streamers; spectrum of the streamers, showing analogy with the spectrum of comet; continuous spectrum corona; spectrum of protuberance; plates and drawings of protuberance." It is thus seen how important a part photography has played in the observations.

The next eclipse "on" is the annular one for October 31st, this year; but, something like the last eclipse, it can only be seen from land in one place—the island of Niphon, Japan. Then, in 1885, there will be another total eclipse, which also is invisible from any country but New Zealand.

The soldier courting danger "even in the cannon's mouth" is a sufficiently familiar image; but the photographer equally hardy at the elephant's trunk is a new idea, yet it was realised the other day. Mr. Cross, the great wild beast dealer, Liverpool, wished to have his elephant Jumbo the Second taken, and, accordingly, a representative of Messrs. Brown, Barnes, and Bell was quickly on the spot to do his bidding. As soon as the huge monster was untied and saw the weird camera he "went in for" the photographer and his apparatus, demolishing the former with a blow of his trunk, and was just ready to make a sandwich of the latter when he wisely beat a retreat. However, when assured that the great animal was secured from doing any further damage a fresh camera was obtained, and our photographer gallantly came to the charge once more—this time with no ill results. Several plates were exposed and some successful negatives secured. We feel inclined to say—"Bravo! Mr. Photographer."

We learn from *Nature* that an extensive series of investigations of those mysterious cavities in the earth named "dene holes," which are to be found in various parts of the country about the Thames, is shortly to be commenced, and the aid of photography has been called in—possibly as a help to obtain subscriptions—Mr. A. J. Spiller, by the aid of magnesium light, having, it is stated, secured a successful photograph of the interior of one well-known dene hole.

M. Marey, whose photographic studies of animals in motion we have so often alluded to, is indefatigable in his work in this direction, and appears determined to outrival Mr. Muybridge. He has been for some time experimenting upon the photographing of the various gaits of a pedestrian, his first attempts being with a subject clothed in white. So much confusion was caused by the overlapping of the image in places that he tried a part black and a part white garment, and thus photographed the half of his subject. Not content with the results thus obtained he has at last hit upon a novel expedient. His model is clothed in black; but the outline of his trousers, as seen from the camera, is covered with very brilliant silver buttons, which allow a rigorously-geometrical representation to be produced of the exact position of leg, thigh, and foot. The proofs of his photographs, which he submitted to the Academy of Sciences, will, it is anticipated, excite a lively interest.

Apropos of the fixing of negatives: though we have in our articles of the last week or two indicated a completely successful mode of encountering frilling, the operator must not neglect ordinary precautions; for, during the hot weather prevailing for some days past, ill-ventilated studios became so warm as almost to boil the plates when put into solutions that are always standing ready for use. The "hypo." in particular is liable so to become warm, and, where it is not repeatedly changed, soon takes such an inky character that it is very easy to lose, or, at anyrate, lose sight of, a negative if placed therein to fix and left for a while in such a contingency. If the photographer happen to be using a plate in which there is not a very large proportion of hard gelatine, he may if he leave the plate a few hours, or, say, for example, overnight, in his solution, find when he comes to take it up nothing but clear glass, for the film will slip off like some samples of collodion films. Further: it may be said that, looked at only from a frilling standpoint, the indications of theory and practice point to the plate being removed from the fixing bath the moment the last trace of bromide disappears.

WITH THE ECLIPSE EXPEDITION.

In my last communication, sent to you from Guayaquil, I described the equipments of the American and English expeditions and the observations that were to be made. On arrival at Callao the combined expeditions found the U.S.S. "Hartford" ready to receive them. She had been fitted up as a flagship for the Pacific squadron; but, as the Admiral had not transferred his flag to her, his cabin and that of his chaplain were vacant. The Admiral's cabin was very spacious, so it was assigned to the American party, while the English observers were accommodated in the ward-room. The captain and officers received the expedition with "open arms," and did their best to make our stay on board as pleasant as possible.

We left Callao on the 22nd of March, about four o'clock in the afternoon, and, after a very pleasant voyage, came in sight of Caroline

Island at seven o'clock on the morning of the 20th of April. The only break on the sea horizon we saw during the voyage was a distant view of Magdalena Island; but, although no sails were seen, the voyage was not dull, as the monotony was broken by the drills and by entertainments given by some of the scientists who possessed good voices.

Great was the interest with which we viewed the palm trees on Caroline Island when they appeared above the horizon, and we were surprised at the size of it. On nearer approach we saw houses hidden among the palm trees, and at last descried the flagstaff described in the sailing directions; but we could not find a bifurcated reef, so a boat was sent off, under the command of Lieutenant C. W. Qualtrough, to hunt for the landing. Shortly after the boat left the ship a quarter-master reported that he saw a man with a dog running across a distant reef. It was some time before the boat found an opening in the reef, but at last it did, so just as the boat touched the shore the Union Jack with its red field floated out over the palm trees and was saluted by a gun.

When the boat returned it brought off the principal native, and we learnt that there were two good frame houses; that the island possessed seven inhabitants—four men, a woman, and two children; that the landing was difficult; that the coral rocks were exceedingly sharp; and that the island was leased to Messrs. Holden Brothers, of London, who had planted it with cocoanut trees. After the Captain had questioned the Kanaca, and the men had dined, he was sent ashore; but ere long he returned bringing with him crayfish and other fish for sale. The disembarkation was carried on quickly, and ere nightfall there was a goodly pile of boxes on the beach above high-water mark.

By noon of the following day everything was landed, but a great many cases had still to be carried up to the site of the observatory—a distance of about a-quarter of a mile. As soon as all the cases were ashore the astronomers followed, and then they learnt the difficulties that had to be encountered. Soon after passing the reef the boat grounded, and they had to wade for fifty yards through water varying from two to three feet deep; then came fifty yards of very sharp and irregular coral rock, and, finally, over a-quarter of a mile of soft loose sand. A large number of cases were carried up that afternoon, but the temptation offered by cocoanut trees hindered the work a great deal. By noon of the following day, however, everything except lumber and bricks had been brought up to where a few men were laying the foundations for the piers. Just before sundown we learnt that the "L'Elaneur" was coming in, and after dark we saw that the two vessels were close together. The "Hartford" left that night, but soon after dawn next day the French vessel sent a boat ashore bringing with it mails for the officers and men of the "Hartford" who formed the landing party. About breakfast time the French party landed, we found it consisted of MM. Janssen, Trouvelôt, Pasteur, Tacchini, and Palisa. That evening the two expeditions dined together, and we learned what our colleagues intended to do.

During that week great progress was made in erecting and adjusting instruments, and most of the American party commenced observing. Professor Holden and Dr. Hastings worked at double stars; Messrs. Preston and Brown at the pendulum and transit instrument; Mr. Upton at meteorological observations; and Cadets Fletcher and Doyle at surveying the island.

On Sunday, the 29th of April, it was decided that all hands should take a holiday. The men were granted liberty, and a party, consisting of the officers of the ship, Dr. Hastings, and the Englishmen, started for a voyage of discovery up the lagoon.

At present I have not said anything about the island itself. We found it was about seven and a-half miles long by one and a-half broad, with a lagoon in the centre about six miles long by one wide. The reef was subdivided by barren intervals into about thirty well-wooded islets, on which, at intervals of thirty feet, cocoanut trees had been planted. The houses near which the observatory was situated were on the largest of the southern islands. As we sailed up the lagoon we startled the seabirds which swarmed around us in great numbers, making a tremendous disturbance; in fact, the noise was so great that it was nearly impossible for us to hear one another speak. After two hours and a-half we arrived at the northern island, seeing on one way in the deep water very huge tridacna, and on the reefs smaller ones, which squirted jets of water into the air. On another trip, when some of our party landed on these reefs to obtain specimens of coral, they found that these shellfish had most beautiful cilia of all colours—violet, green, and blue predominating. The water was swarming with most beautiful fish—some striped like basket work, others of a most beautiful green colour with blue fins and a few red marks; another of a deep purple colour; others the size of minnows, of a most superb azure blue, and some others the same size marked like zebras. Indeed, I never witnessed anything so beautiful as the submarine landscapes I saw on that and subsequent occasions.

After reaching the northern island we sauntered through its forest, eat our lunch, looked at the frigate birds and ganets sitting on their nest, and then paddled through the water in search of shells. Several photographs were taken; but, unfortunately, all the plates frilled on development. On the way back I went in search of Dr. Dixon, one of the "Hartford's" officers, and tried to catch a large sea bird, but the creature retaliated and caught me instead, drawing blood from seventeen places on my hand. We returned to the southern island in a very short time, the breeze and tide being in our favour, and got in in time for our evening swim, that being one of the luxuries in which we all indulged.

The following week up to the 5th was spent in adjusting instruments, but the work was frequently interrupted by very heavy showers; indeed, the 4th was a lost day, for it commenced to rain about eleven o'clock in the evening of the 3rd, and before twelve hours passed over more than five inches of rain had fallen. During the remainder of that day the sky was overcast.

The morning of the 6th—the day of the eclipse—opened badly. From dawn to nine o'clock the sky was overcast, and several showers fell; so did our spirits. About that time blue sky appeared, and soon the sun shone out. We opened our instruments, and all hands began to prepare for the great event. Shortly after ten o'clock the first contact took place, Mr. Preston observing it. About eleven guards were stationed to prevent the observers being interrupted by the natives. The observers took up their stations and the photographic plates were served out. Ten minutes before totality Mr. Fletcher began to call out the time and I commenced my work. At five minutes before the calculated time Mr. Woods was seen to go to the dark house and return to his station with a plate-holder in his hand. At last Mr. Fletcher sang out "zero." Then came a long (or, rather, what seemed a long) pause, for it was only a second, when Mr. Preston, who was watching the contact, called out "time." The eclipse had commenced, and there nearly overhead hung the black moon surrounded by an exquisite halo with five streamers running from it. A strict silence was maintained by the observers, broken only by Mr. Fletcher, who called out in a strong voice the number of seconds remaining, and by the instructions, in an undertone, of Lieutenant Qualtrough, who was running the English photoheliographs, to Mr. Yewell, seaman gunner, who was exposing the instruments. At last Mr. Fletcher called "zero." Then came an interval; next a voice—"I see the sun." Still Mr. Preston gave no sign. At last, a few seconds later, came the signal "time," and the eclipse was over. I kept to my post till ten minutes after, although a cloud which passed five minutes after totality must have interfered with my observations.

What was the result of the eclipse? In answering this question I will go over the observations that were to be made and give the results. Professor Holden intended to hunt for the stars Watson saw in 1878. He did so, but could not find them. Dr. Hastings was going to examine the 1474 line in the corona on each side of the sun simultaneously. He did so, and states that at the beginning of totality the 1474 line was about twelve minutes in length on the eastern limb, and extremely short and faint on the western. As the eclipse progressed this inequality vanished, so that at mid eclipse the lines were sensibly equal, while at the end of totality the conditions at the beginning were reversed. This change, so he asserts, was many times greater than any change due to the moon's motion, and he considers that it is a conclusive proof that the outer corona is due to diffraction. Dr. Hastings also saw the D line double and dark in the corona.

Mr. Rockwell used an analysing spectroscope, he saw b and b_2, besides 1474, extending a long way up into the corona. Mr. Preston observed all four contacts, and also made polariscopic observation. Mr. Brown used an integrating spectroscope. He saw the line 1474 very brilliant, but missed the flash. Mr. Upton, using a telescope with a prism before it, says he saw the flash and also rings—amongst others C, D_3, F, and 1474. Messrs. Emsus and Murphy, carpenters on the "Hartford," observed the coloured rings crossing the earth, ascertained their direction, which was not the same at the commencement and end of totality, and estimated the distance between them and the rate they went per minute. As the rain on the 4th had destroyed the Englishmen's dark room, they had to wait till nightfall to develope their plates.

Next day I learnt that the photographs taken by Lieut. Qualtrough and Mr. Yewell with the photoheliographs were good, especially

those with the smaller instruments; and that Mr. Woods had obtained very fair results with three out of his five cameras. I had been moderately successful with two out of three cameras. I also learnt the fate of the French astronomers and their colleagues. M. Janssen, who had a twelve-inch reflector with spectroscope attached, saw many dark lines in the corona; he also, with M. Pasteur's assistance, took twelve photographs of the corona and sky in the neighbourhood, exposing all his plates for the whole period of totality. I saw two of them and they certainly are very fine. M. Trouvelôt hunted for Vulcan. I believe he saw a star, but was unable to fix its position owing to a slight mishap. M. Palisa was not able to see Vulcan. M. Tacchini made an exceedingly interesting observation. He saw, so he told me, on a streamer with a wide slit, two bright maxima, which correspond, he thinks, with two of the hydrocarbon bands seen in cometary spectra. This is a most important observation, and will require confirmation at the next eclipse.

All the observers were astonished at the amount of light from the corona. There was fully as much light as from a full moon. Mr. Woods says that the light was not so weird as in Egypt, and I think it was not so violet as in the 1882 eclipse. I made some spectroscopic observations with a pocket spectroscope, and saw, soon after totality commenced, the C, D_3 and 1474 rings, the latter being the brightest. At mid-totality I witnessed only 1474, and towards the end I saw the others again. I could not see the F ring, although I looked especially for it, as the continuous spectrum was very bright.

I find I have omitted to mention Mr. Upton's meteorological observations, which are full of interest. Before the date of the eclipse he made several important observations that I may not mention at present. During totality there was a rise of barometric pressure, a fall in temperature to that of night, a rise in humidity, but no change in the velocity of the wind, as is usually assumed. Radiation observations showed that the receipt of heat by the earth was almost wholly checked.

So far for the results. They will probably compare favourably with those of former eclipses, and will give rise to considerable discussion. Mr. Woods and myself are thoroughly content with the way in which the cameras and their new backs (made by Mr. P. Meagher in great haste) worked, and consider that they contributed largely to our success. A grating spectroscope made by Mr. A. Hilger in a few hours also worked admirably.

Packing up was commenced the day after the eclipse, but a dinner given by the European astronomers made a great inroad into the day. Everything, however, was packed by the 9th, and at five o'clock that day we left Caroline Island and our French colleagues with many regrets, and embarked on the "Hartford," which had arrived from Tahiti the day previously, and made sail for the Sandwich Islands. We were warmly welcomed by the officers, and many were the inquiries they made concerning our success.

In my next communication I will describe the return journey of the expedition. The English expedition leave here on the 13th by the "San Jose" for Panama and thence to England by the steamer leaving Colon on the 7th of July, so they will arrive in England at the end of the month or early in August.

San Francisco, June 12, 1883. H. A. Lawrance, F.C.S.

ENLARGEMENTS.

At the two last meetings of the South London Photographic Society the question—"Is it better to take large negatives direct or enlarge from small ones?" has occupied the attention of the members. Only one phase of the matter seems to have been considered if we may judge by the reports, and that is the manipulative or mechanical side. Of course this is very important, and if enlargements were confined to the reproduction on a large scale of maps, works of art, or similar matters, the mechanical qualities are really the principal matters to be considered. If the original negative is increased or reduced in size, so long as it is perfectly sharp and of good quality all requirements will have been provided for, and there is not a pin to choose between the original and the reproduction.

It is allowed on all hands that an original negative may often be vastly improved upon by the process of reproduction, especially if the original suffers from flatness. If, however, it be perfect, as a matter of course other negatives made from it cannot be any better; but the probability is they will be worse, whether increased or diminished in size. So far, then, I think the discussion landed us where we started. Works of art and plans are not, however, the only sort of negatives that have to be amplified, and since gelatine dry plates came to the fore taking landscapes for their *artistic beauties* has occupied the attention of thousands, consequently engendering a desire to obtain large work with the convenience of small apparatus. Here, then, comes in a consideration of the first importance. When these small works are increased in size, will they retain their artistic qualities? I think I am within bounds in saying that in all probability there is not one in a dozen but would suffer in artistic qualities by enlargement. That size is an important factor in picture-making every artist knows. Suppose, for instance, one of David Cox's water-colours to be enlarged three or four diameters, what would be the result? Is it to be supposed, even if the colours could be reproduced, that the enlarged copy would possess the same charm as the original? It is, I think, not likely. Blotches of colour three or four times the size would convey quite a different effect to the mind than when of small size, presuming they are to be viewed from the same distance that pictures usually are.

Some may take exception to this illustration as not being a parallel case; but from my point of argument it is precisely similar. Patches of light and shade have to be enlarged in either one case or the other. A patch of light in the small negative that would be unobtrusive and unobjectionable when increased in size would be sufficient to spoil the picture by apparently upsetting the balance, although it might and would continue to bear the same proportion to the rest of the composition as it did originally. It may be taken for granted that as soon as a light portion of the photograph is enlarged, or, rather, made conspicuous by enlargement, attention is at once directed to it, and detail and design are necessary to fill up. If they are absent the picture at once loses in artistic qualities; the frequent examples we see of enlargements is sufficient proof of this failing. The lights and shadows, however brilliant, *are not artistically distributed*, and an ever unsatisfactory result is the consequence.

At the discussion before alluded to one speaker thought the same rules would apply to reducing a picture as to enlarging it. A more erroneous view could scarcely be indulged in. Faults are never made more conspicuous by reduction; and a large photograph suffering from the complaint of bad composition would, undoubtedly, be improved by reduction, and might in some cases become a presentable and even artistic picture.

For all this, it is quite possible to produce a small photograph that will enlarge satisfactorily; but it must be taken with that intention. The composition must be arranged for the larger size, and some considerable experience is necessary to know what is required. Good things are sometimes accidentally secured; that does not, however, disprove what I have said—that in the majority of cases a small photograph loses in artistic qualities by enlargement. Until the reason of this is thoroughly understood, and the principles involved mastered, it will only be now and again that enlarged pictures will satisfy the artistic eye. Edward Dunmore.

ON HYDROKINONE AS A DEVELOPER.

[A communication to the Liverpool Amateur Photographic Association.]

In response to a request from the Hon. Secretary that I should read a paper before you this evening, I thought that the subject of development and developers, with a short account of the newest addition to the list, namely, hydrokinone, would perhaps be of some interest. The theory of processes and formulæ for obtaining sensitiveness and vigour in sensitive plates has been discussed over and over again for years past, and still remains as open to discussion as ever. Every process in photography is capable of many variations, each one of which will produce good or bad results according to the skill or practice of the operator, and what one person succeeds with another is apt to condemn as useless.

The subject of development, however, has not proved capable of so many variations as other parts of the routine in producing a picture. The number of developers in use is also very limited. Until about six years ago we only had two that were available in negative work, namely, ferrous sulphate and pyrogallic acid. The iron developer, made acid with acetic acid, was employed for wet plates and pyrogallic acid principally for the various dry processes. Sulphate of iron development underwent very little change during its whole history. The formula recommended thirty years ago, although repeatedly modified by the addition of various organic substances, still stands as the best in the wet process at the present day. Pyrogallic acid, however, has had many changes. Originally employed as the developer for negatives with a bath it gave way to the more energetic sulphate of iron, took second rank, and was used as an intensifier or redeveloper. In all dry processes it always held its place, its organic constitution rendering it better capable of de-

veloping a dried film than iron proved to be. Most of you will remember the impetus given to dry-plate photography by the discovery that an alkaline solution of pyro. would develope a dry plate far more energetically than would an acid solution with silver. It was from this period that dry processes began to advance into the rank of practical utility, until, by the accumulated researches of so many minds, they have advanced to their present prominent position. If it had not been for this variation in the method of development all our modern processes would have been unknown; and, in all probability, further advances in the science will be brought about by researches in the same direction. There is in development and developers an almost unlimited field for investigation.

About six years ago Mr. M. Carey Lea published a series of papers on new modes of development, and announced the discovery of the developing power of ferrous oxalate when held in solution by oxalate of potash upon films containing no free silver; that is to say, development took place at the expense of the film itself and not by precipitation upon its surface. Most of you have employed this developer and are familiar enough with its valuable properties, and for many purposes it still holds first rank. In the same paper Mr. Lea gives the result of a great many experiments with a large variety of organic substances, which, from their chemical constitution, might be regarded as possible developers. It is a communication full of interest, and suggests many directions for research; but it is unfortunate that more attention is not given to improvements in using and variation in the substances employed for development. That the possible developers are extremely numerous will be seen at once by referring to the experiments of Mr. Lea to which I have referred. All the experiments were tried upon paper prepared with iodide, bromide, and chloride of silver washed free from all trace of nitrate.

For the benefit of those present who cannot conveniently refer to the article, I will mention briefly a few of them which were successful in giving a vigorous development, and which seemed to be worthy of further experiment. Ferrous oxalate is well known, and also Captain Abney's modification of it, when dissolved in citrate instead of oxalate of potash; but almost any organic acid saturated with a ferrous oxide will develope an image, especially the lactate, salicylate, and succinate. Amongst the glucosides, sugars, and resins many were found capable of giving very promising development, especially guiacum, which, dissolved with an alkali, gave development not far inferior to pyrogallic.

Everyone knows that a developer which is eminently suited for one process is not adapted to another. Pyro. and ammonia succeed well with gelatino-bromide dry plates, but is unsuited for gelatino-bromide paper. Where one developer begins to fail another steps in and supplies the deficiency; hence my reason for drawing attention to the wide field open for research for those who have time, inclination, and, most important of all, patience. In the numerous applications to which photography is applied, every variety of developer would readily find its appropriate sphere of usefulness.

The latest, and what bids fair to be perhaps the most useful, addition to our developers is the more immediate subject of this paper. Hydroquinone, or hydrokinone, or quinol—for it is known by all these names—partakes very much of the nature of, and is closely allied to, pyrogallol. Like pyrogallol it is a derivative of benzine. The solution of it is neutral to litmus paper. It has a powerful attraction for oxygen, absorbing it when dissolved in water from the atmosphere, and more rapidly when rendered alkaline, though in neither case does it do so as rapidly as pyro.; hence its solution will keep better, and, when mixed with alkali, retain its developing power a longer time than pyro. The chemical formula is also very similar. Pyrogallol has C_6, H_3, $(OH)_3$, and quinol C_6, H_4, $(OH)_2$; so that, it will be observed, whilst each contains six atoms of carbon and six atoms of hydrogen, which is the composition of benzine, pyrogallic contains three atoms of oxygen and quinol only two. Another resemblance to pyro. consists in the fact that both exist in nature in certain vegetable productions: pyro. exists as gallic acid in gall nuts and oak bark, and quinol as arbutive in the leaves of the arbutus, or bearberry, and other *Ericaciæ.*

Commercially, quinol is made from aniline and from carbolic acid, both also benzine derivatives. It is first obtained as quinone ($C_6H_4O_2$) by the oxidation of aniline. One part of aniline is dissolved in eight parts of sulphuric acid diluted with twice its bulk of water. After cooling a saturated solution of two and a-half parts of bichromate of potassium is added very gradually to avoid too great rise in temperature. At first a thick, pulpy mass of aniline black is formed, the reaction being the same as that which takes place in the aniline printing process. This shortly changes to a dirty brown solution. It is then treated with sulphurous acid in excess, when quinol or hydrokinone is formed. This is extracted from the solution by ether, and on evaporation crude quinol is left. Other methods are given, but sufficient has been said to give an idea of its nature. Its characteristics as a developer are what possess the most interest to photographers.

Captain Abney—who, I believe, was the first in this country to draw attention to its developing power—says that it is twice as powerful as pyro. It is very certain that it will bring out a fully-developed picture with at least half the exposure necessary when pyro. is employed. At first sight this appears strange when it is observed how much more powerfully pyro. absorbs oxygen; but the explanation probably is in the fact that hydrokinone is more gradual in its action, and has a more "selective" power than pyro. With a collodio-bromide film, for instance, which is not so much protected from chemical action as a gelatine one, pyrogallic acts with such energy when mixed with an alkali that the whole film is reduced immediately, and no image, or only a faint one enveloped in fog, appears; hence there must be used a powerful restrainer to keep this action within bounds. A soluble bromide which is usually used has this effect, but, unfortunately, at the same time, partially undoes the work which the light has done, rendering it necessary to give longer exposure. But with hydrokinone no restrainer is necessary unless a great error in exposure has been made. It does its work rapidly and cleanly, in this resembling the ferrous oxalate. It does not discolour during development so much as pyro., and consequently does not stain the film so much, whilst full printing vigour is very easily obtained without having to resort to intensification. The colour and general appearance of the negative also is more like the wet-plate process, since the shadows remain so clear and free from fog. It seems almost impossible to fog a plate with it.

A collodio-bromide or even a collodio-chloride plate exposed in the camera will develope cleanly and rapidly without any restrainer. This property of developing a chloride is very surprising, and will probably be very important. I have tried a collodion containing all chloride, with no trace of iodide or bromide or of free silver, and in the camera it is nearly if not quite as rapid as a bromide when developed with hydrokinone and an alkali; whilst I think it has the advantage in roundness and vigour. One grain to the ounce is strong enough for most purposes. With some samples of hard gelatine it is advisable to use two; but with most kinds and with collodion one grain is quite sufficient. I prefer using it with a saturated solution of washing soda as an alkali. Two or three drops of this to the ounce of solution of hydrokinone rapidly developes the image, and the addition of a few drops more to complete development is all that is needed. A soluble bromide acts very powerfully as a retarder and restrainer. With a mere trace added, development is very much slower.

Although its cost per ounce is greater than pyro., an ounce of it will go as far as two of pyro., so the difference is not so much as at first appears. No doubt, if a demand sprung up for it the price would also be reduced considerably. Many of you, I daresay, can remember the time when pyro. was seven shillings and sixpence per ounce, and hypo. two shillings per pound; but greater consumption, and consequent demand for them, soon brought these prices down. The same will doubtless take place when the value of hydrokinone becomes recognised.

I must not omit to mention, before concluding, another useful property of this developer; that is, its suitability for developing on paper either a bromide or a chloride film, whether it be produced by an emulsion or by the older method of first brushing over the paper the haloid and afterwards the silver. The clearness with which it works renders it very suitable for this purpose, and for enlargement or printing enables pictures to be obtained with very short exposures. EDWIN BANKS.

PERSPECTIVE IN PHOTOGRAPHY.

FEW points connected with photography have given rise to more apparently fruitless discussion than perspective. Take, for instance, the interior of a long room or gallery. All the horizontal lines are really parallel; but in perspective, as in a photograph, they are convergent, and will all be found—if prolonged—to meet in one point, termed the "vanishing point." Thus far, all are agreed that the representation is pictorially and theoretically correct. But how about the vertical lines? Should they be represented in the drawing as parallel or convergent? Do not the same laws apply to the vertical as the horizontal lines? Most certainly; the laws of per-

spective are like those of the Medes and Persians — fixed and unalterable. Then diagrams are drawn, positions assumed, and the professors proceed to show that, as the top of (say) a square, perpendicular tower is further removed from the eye than the base of the said tower, the top must subtend a smaller angle than the base; and that, therefore, in order to represent the tower *as it is seen* the lines must be made convergent. But, they will say, practically this difference is so slight that it may be neglected, and that better pictorial effect is produced by drawing the sides of the tower parallel. Yet, how foolish it looks if such a tower be drawn (or, as still more frequently happens, photographed) with the lines convergent!

Now, it happened to me the other day that a friend, discussing the question of perspective, assumed this position: that, theoretically, the perpendicular lines had a vanishing point as well as the horizontal lines, and actually brought forward photographs in which the lines were convergent as a proof of the correctness of the theory. The argument, at first sight, appears reasonable enough—the top of the tower *is* more distant and *does* appear smaller to the eye; but take, for example, the Crystal Palace, with its two lofty water towers. Which would be considered the truer representation of it—one with the two towers perpendicular and parallel, or the one which made them both converging and leaning over the main building? No one could hesitate for a moment, and, laws or no laws, would choose the one with the vertical lines.

I next asked my friend how he would draw in perspective an oblong building — say, for instance, a row of houses or a large factory, viewed direct in front. This was a puzzle; for, if the horizontal lines were to have a vanishing point, they would require two—one at each end. Supposing the point of view to be opposite the centre of the buildings we should have wanted four vanishing points—two for the horizontal and two for the vertical lines—which is something, indeed, very nearly like the barrel-shaped distortion caused by a single lens, only, as the lines would have to be straight, and not curved, theory did not seem to help much. Of course, this barrel-shaped distortion was spoken of too, and a bystander produced a drawing of the interior of a room (sketched as it really appeared at the time to the draughtsman) in which the lines *were* barrel-shaped.

Now, we all know that a rectilinear lens makes the perpendicular lines upright and parallel; as a matter of fact, it renders them in true perspective. There is no mystery whatever in a rectilinear lens; no cunning contrivance of the optician which *corrects* the error of one lens by an error in the exactly opposite sense of the other lens. Any pair of spectacle glasses would form a rectilinear lens. The only mystery connected with it is why any should have been imagined. But how would the rectilinear lens portray the row of houses taken directly in front? Why, with the vertical lines vertical and the horizontal ones horizontal and parallel too, and this is according to the laws of perspective—"The projection of a line parallel to the picture is parallel to the original."

Herein lies the key of the whole subject. The term "projection" applies exactly to the image on the ground glass. Whatever lines in the original, whether horizontal or vertical, are parallel to the picture will be represented parallel.

Now, almost without exception, pictures are supposed to be drawn upon a vertical plane. One such exception is a photograph taken from a balloon, or, more familiarly, a bird's-eye view. In the former case, supposing the camera to be pointed directly downwards, and the country underneath to be a plain divided out into plots, the picture we should obtain would be an *exact plan*. If, for instance, it contained a number of isolated square buildings with flat roofs, every building would be represented by a square, and every roof square too, but smaller, by reason that it would be nearer to the camera. The lines would be parallel because they are parallel to the picture; the vertical lines, being perpendicular to the plane of the picture, would all have their vanishing point in the centre of the picture. From this it will be seen that if the country is undulating the picture will no longer be a *plan* from which measurements could be taken without first surveying and ascertaining the levels and making the necessary allowance. Now, take the case of the bird's-eye view where the eye (or camera) is supposed to be inclined towards the distant horizon. Some of the horizontal lines may still be parallel to the picture; but the great majority will not, and will, therefore, converge to innumerable "points of sight."

These, however, are the exceptions; and, although it is perfectly within the laws of perspective for the walls of a perpendicular tower to be rendered convergent—exactly as they would be by a rectilinear lens if the camera had to be tilted—it is not the usual practice to do so. Custom has made it orthodox to represent them as they would be projected on a vertical plane. This, therefore, is the use of the swing-back, and if it be made parallel to the original the picture will be in true perspective. GEORGE SMITH.

LIGHT AND LENSES.

[A communication to the North Staffordshire Photographic Association.]

THE phenomena of light are threefold:—1st, illuminating; 2nd, heating; and 3rd, chemical.

Now light is in itself invisible. If a beam of light be allowed to enter a darkened room in which the dust has been allowed to settle it would not be visible, because there are no particles of dust by which it can be brought to the cognisance of our senses. This and other experiments prove that light, as light, is merely a sensation. It is supposed that all space is pervaded with an imponderable elastic fluid called "ether," and that a luminous or a heat source is able to generate a series of waves in this ether flowing continually from it. These waves make themselves manifest in different phenomena, varying with the different lengths of the waves, just the same as those on the water. A wave might be produced on one side of the channel and break on the other; also a wave might only be a few inches from crest to crest. These different undulations or wave-lengths show themselves in various ways. Some waves affect the nerves which line the retina of the eye, and so produce a sensation of light; other wave-lengths affect the nerves of different parts of the body, and so produce the sensation of heat; while some there are whose influence is only made manifest by chemical action. It is these, the short series of waves, with which I wish now to deal, as in these the photographer is most concerned.

I suppose there are not many—if any at all—who are not conversant with the great Sir Isaac Newton's experiments demonstrating the composition of light. He allowed a beam of white light to enter a darkened chamber after passing through a prism, so that the light was decomposed into its constituent colours, namely, violet, indigo, blue, green, yellow, orange, and red, the light passing through the prism being bent out of its original course—the red being refracted least and the violet most, because a beam of light travelling from one transparent medium to another continues in a straight line as long as the density of the medium continues unchanged; but, if the medium vary, then the ray of light is bent out of the course which it originally pursued. The degree of refractibility depends on the variations in the media through which it passes.

Now, a lens may be likened to two prisms joined base to base, with the corners rounded off. From what I have already said it can readily be understood that a beam of light would be brought to a point, consequently the lens would be termed a "converging lens." If the prisms were reversed and brought apex to apex it would constitute a "diverging lens." It can also be understood that since a prism splits up light into its constituent colours so would a lens, and that the different colours would have different focal lengths. Thus the violet would be brought to a focus much nearer to the lens than the red. Photographic artists have long noticed these points, and when single, uncorrected lenses were used with plates sensitive to the violet rays a certain distance was measured, and the plate moved that much nearer after the picture was focussed, the visual and chemical foci being on different planes. Suppose the rays, after passing through one lens, were allowed to pass through another, the ray would recombine to form white light; but, unfortunately, up to the present time no two media have been found whose dispersive powers exactly correct one another. Chromatic aberration, however, is corrected for actinic aberration by combining two lenses cut from varieties of glass which differ in their power of separating the coloured rays.

These glasses are dense flint containing plumbic oxide and light crown glass. Of the two first lenses of a single combination, the first is the flint, and the second, or convex, is the crown. Now, as a beam of light is bent towards the base in a prism, so it is when it proceeds from an object, an image of the object being the result. When an object is placed some distance in front of a lens an image much smaller than the original is produced; but if the lens be advanced nearer to the object the image first becomes equal to, and then larger than, the object, at the same time the focus recedes to a greater distance from the lens. This explains why long-focussed lenses produce large images and short-focussed lenses small images, the diameter of the lens having nothing to do with the size of the image; though with long-focussed lenses a considerable aperture is given, because the light has to travel a greater distance after passing through the lens, and is consequently weaker the further it travels.

The lens I have just described was a single landscape lens. There are several modifications of this lens according to different makers' ideas; but they all take the meniscus form, some being made by cementing a concavo-convex flint lens to a double-convex crown lens, and some having a double-convex crown cemented to a double-concave flint. These lenses are not recommended for portraiture, although I myself have got beautiful, large heads with a single landscape lens; but one must use a lens of the same focal length as you would for a landscape

on the same-sized plate. Such a lens must not be used for architectural subjects unless the same occupy only a small portion of the plate, as, owing to the spherical form given to this lens, it refracts light so powerfully that each object situated at different distances will have a different focus, thus causing much confusion and indistinctness in the image. Other spherical aberration can be overcome by using a stop which is placed a little distance in front of the lens, which narrow opening draws out both pencils of light, so that the oblique and parallel rays are brought to a pictorial sharp focus at right angles to the lens; it also gives considerable depth. The depth of focus varies with the different lenses. A short-focus lens gives considerably more depth of focus than a long-focus lens. I may say that when focussing with a lens of long focal length it is always best to focus with a stop inserted which you are going to use; but with short-focussed lenses it does not so much matter, as there is generally considerable depth.

Distortion, as in the case of single lenses when used for architectural subjects, is eliminated by using a compound lens with a stop between the lenses, and even these lenses will give apparent distortion if not treated well. If the camera be tilted much, the perpendicular will be out of truth; or, if you force the lens to take a picture larger than that for which it was intended, or a very wide angle on a small plate, incorrect perspective will be the result. A little while ago I was taking some interiors in Stoke. In one of the rooms there was a lamp with a globe, and as I was using a wide-angle lens of short focus for large pictures the globe appeared in the negative to be drawn out barrel-shaped at the ordinary distance; but when brought nearer to the eye—to a distance equal to the focal length of the lens by which it was taken—the apparent distortion was not visible, but then only a small portion of the picture could be seen.

I once had a watch round the face of which was written—

"Keep me clean and use me well,
And I to you the truth will tell."

It is the same with lenses. Keep them clean. If you are not in the habit of cleaning them, get a piece of chamois leather and give them a good polishing, and you will be surprised at the difference in the exposure necessary. Of course, any dirt on the lens keeps out a certain amount of light; but, apart from this, there is a peculiar brilliancy given to a lens when friction is applied either with a leather or a silk handkerchief. How it happens I am not sufficiently clever to be able to inform you. It may be due to the electricity generated, or it may not. Perhaps some other time our President could give us his opinion.

HERBERT GOVER.

THE PHOTOGRAPHING OF REICHENBACH'S MAGNETIC FLAMES.

An article by Mr. William Brooks, published recently in these pages, deals with the question of the possibility of photographing the feeble flames alleged by Baron Carl von Reichenbach to have been seen issuing from magnets in the dark by certain exceptionally sensitive persons. Another article raising the question of the reality of these flames appeared in a recent number of the *Philosophical Magazine*, and the new Society for Psychical Research, under the presidency of Professor Henry Sidgwick, of Cambridge University, has appointed a committee to experimentally investigate this subject, which during the last thirty years has been cropping up every now and then to be again forgotten for a time, but without ever being satisfactorily settled. If these magnetic flames have any real existence in the world of physics, photography is more likely perhaps than any other branch of science to give the best evidence of the fact, so perhaps a brief outline of the origin and present position of the problem may be useful to those of your readers who have never given it their attention.

Baron Carl von Reichenbach, according to a sketch of his life published in 1862 by Messrs. Firmin Didot Frères, of Paris, was born on the 12th of February, 1788, at Stuttgard. He was a German physicist and naturalist who, after attaining the position of doctor in philosophy, for several years tried to carry out a chimerical project to establish a new German state in some of the Mediterranean islands. His travels, with this end in view, brought him under the notice of the police of Napoleon I; he was, consequently, imprisoned for several years in the fortress of Hohenasperg. When he was released he followed his favourite pursuit of the study of the natural sciences and their application to industrial purposes. He visited some of the chief ironworks of Germany and France, and afterwards erected a great smelting furnace at Villingen, also several kilns at Hausach, for carbonising wood. Afterwards, in 1821, he established smelting works at Blansko, in Moravia, by permission of Count Hugo de Salm. He gradually, by these means acquired a considerable fortune, with which he purchased large domains, and bought, among other residences, the château of Reisenberg, in which he placed a magnificent collection of meteoric stones. The works written by him include *Creosote and its Uses*, Vienna, 1832; *Geological Researches in Moravia*, Vienna, 1834; *Physico-Physiological Researches on Magnetism and Electricity, and their Relation to Vital Force*, Brunswick, 1847-49 (3 vols.); *Letters on Od and Magnetism*, Stuttgard, 1852-56 (a French edition of this was published in Paris in 1854); *The Sensitive Man and his Relation to Od*, Stuttgard, 1854 (2 vols.); and, in reply to Carl Vogt, *The Faith of a Collier and False Science*, Stuttgard, 1856. Such is the record relating to Reichenbach given in the French work; but after the publication of that outline of his career he brought out four or five other books, chiefly in relation to what he called *Odic Force*. These later works were published, some in Vienna, others in Berlin.

After the death of Reichenbach some unpublished love-letters between Caroline von Linsingen and William IV. of England were discovered among his papers. These were published in 1881 by Messrs. Sonnenschein and Allen, London. The introduction contains a little about Reichenbach's life between 1815 and 1817, written by himself.

The first to make known in this country the details of Reichenbach's researches on the flames alleged to issue from magnets was Dr. William Gregory, late Professor of Chemistry at Edinburgh University, who wrote two books on the subject. The first of these, entitled *Abstract of Researches on Magnetism and on Certain Allied Subjects, including a supposed New Imponderable, by Baron von Reichenbach*, was printed in Edinburgh, and published in 1846 by Taylor and Walton, of Gower-street, London. The second work on the subject by Dr. Gregory is sometimes obtainable, but this earlier one is exceedingly scarce and but little known; its contents consist of a translation of a description of Reichenbach's researches, printed as a supplement of 270 pages to the 53rd volume of the "*Annalen der Chemie und Pharmacie*," conducted by Baron Liebig and Professor Wöhler. On page 7 of the preface to the English translation Professor Gregory says that Reichenbach's discoveries furnish a very interesting and beautiful explanation of a frequent kind of ghost stories, "which," he says, "is thus reduced to a simple and natural result of a chemical process." From a letter to Dr. Gregory, at the end of this book, it seems that Berzelius was interested in Reichenbach's researches on odic force. Dr. Gregory's second translation of some of Reichenbach's writings appeared as a thick volume, with three large plates and twenty-three woodcuts, in 1850. This volume has on its title-page the words "Parts I. and II.," but no more parts of the translation were ever published. In the very same year Dr. John Ashburner published a translation of the same work, and dedicated it to Dr. Elliotson. In the following year he brought out another volume containing further translations. The four books mentioned in this paragraph contain all, I believe, about Reichenbach's researches which have been published in book form in this country. Reichenbach's later works on the same subject, which are numerous and voluminous, have not been translated into English, with the exception of a small portion of one of them translated and published at New York.

Reichenbach states that when a strong permanent horse-shoe or bar magnet, having a supporting power of about ten pounds, is drawn along near the bodies of some fifteen or twenty individuals, but without touching them, one or more will be found among the number who feel affected thereby in a peculiar manner, experiencing pricking or other sensations. As he gained more experience he found that the persons thus sensitive were almost always perceptibly more or less sick or diseased, and he was so successful with individuals, chiefly women, who suffered much from cramps, that he devoted a great portion of one of his books to the consideration of this special complaint. He further discovered that most of these people, when shut up for a long time near a magnet in a room from which even the feeblest trace of light was excluded with the most scrupulous care, saw, or believed they saw, lambent flames issuing from the poles of the magnet. He describes the alleged light as containing no heat measurable by the most sensitive instruments he could employ; he also states that the rays could be brought to a focus by means of a lens.

Naturally, if light be there, the best step to take is to try to photograph it, and to obtain the unbiassed testimony of a sensitive plate, troubled neither by disease nor cramps. Reichenbach himself was the first to make the attempt, and in the following manner, as given in Gregory's translation:—

"In order, if possible, to convince myself that it was really light, and not a phenomenon of a different nature, which was perceived by sensitive persons, I was desirous to make an experiment with the daguerreotype, and to see whether it were possible to produce an impression on the prepared silver plate. For the performance of this experiment I applied to my obliging friend, M. Carl Schuh, a private gentleman in Vienna, devoted to physical science, and known by his improvements on the gas-microscope, and his dexterity in daguerreotype. He shut up an iodised silver plate, in front of which the magnet was placed, in a dark box; a similar plate was shut up in a dark drawer without any magnet at the same time. After some hours he found the first plate, when exposed to mercurial vapour, was affected by light; the other not. But the difference was not very great. To bring it out more fully he placed the magnet opposite the prepared plate, in a box, wrapped up in thick bedding, and with the most anxious precautions to exclude light during the experiment, of which I was myself witness. It was allowed to remain sixty-four hours; and then, in the dark, exposed to the vapour of mercury. The plate now showed on its whole surface the effect of light. From this it appeared that, provided other causes be not capable of affecting the prepared plate when exposed to them for a long time, it must be real light—although feeble, and slowly acting on the plate—which flows from the magnet."

Here, then, after but two experiments of a kind calculated if successful to settle the whole question without the aid of diseased indi-

viduals, Reichenbach appears, nevertheless, to have been so dissatisfied in his own mind with the results that he abandoned further work in the same direction. Probably the differences between the plates were really due merely to fogging produced by slight differences in development. Besides, how can the similarity of two silver plates, iodised separately, be guaranteed? A plate should have been cut in two, and one half subjected to the influence of the magnet for subsequent comparison with the other half, as in comparative photographic experiments of the kind as ordinarily conducted now-a-days.

Some years ago Mr. Charles Blackburn, of Blackburn Park, near Manchester, Mr. C. F. Varley, the Atlantic telegraph electrician, and myself carried on an extensive course of careful experiments continuously for some weeks in the attempt to photograph the alleged magnetic flames of Reichenbach. Sometimes we used a permanent horse-shoe magnet and sometimes a large electro-magnet, and when I state that the latter was excited by means of a Grove's battery containing platinum plates a foot long in each porous cell, the enormous amount of current and magnetism we obtained may be imagined. Yet, whether we used weak or powerful magnets, no photographic results indicating the reality of the flames could be obtained. The photographic method employed was the glycerine process of Mr. Valentine Blanchard. When the plates were left for many hours, face downwards, within a small fraction of an inch from the poles, images of the poles appeared, it is true, on development; but this phenomenon was subsequently discovered to be due to retarded evaporation from the surface of the plate in the neighbourhood of the poles. Wooden poles, and other dummy poles also tried, produced the same effect at the same close proximity. Finally the experiments were abandoned, no indications of the presence of the alleged flames having been obtained.

It is a curious fact in molecular physics that, when photographic wet plates were developed in the most powerful magnetic field of the electro-magnet just described, no visible effect was produced either by magnetic or diamagnetic action on the chemical substances in such a state of unstable and ever-changing equilibrium on the plate. Yet Faraday's experiments with heavy glass prove that the very particles of the glass plate itself must have been put under conditions of stress and strain.

When once a man has actually photographed the alleged magnetic flames he will have no difficulty in establishing a great reputation for himself by, in plain and simple language, describing his experiments with precision and in a scientific manner, so that anyone can repeat the operations for himself from the published description, and obtain the same results. But the vague rumours occasionally floating about in conversation as to Mr. A. or Mr. B. having photographed the flames, or the vague paragraphs written in newspapers by Mr. A. or Mr. B. himself, that he actually has done so, are always lacking in that scientific precision which inspires confidence at the time of reading, and which enables the reader to repeat the experiments in his own laboratory. Judged by this test, nobody, I think, has yet told the world how to photograph the alleged flames of Reichenbach clearly enough for the result to be obtained by anyone who follows the instructions; nor is the experimentalist prepared to offer to repeat his own experiments before the Photographic Society of London, and prove the actinic influence of the alleged flames. There is always an unfortunate hitch.

Without being dogmatic on the point, my opinion is that the probabilities are in favour of Reichenbach's magnetic flames having no real existence, but being in all probability founded upon the waking dreams of diseased persons. Imposture all through is out of the question as an explanation, the sensitives being too numerous for all of them to have been successful in tricks without detection, and the witnesses being too numerous and respectable, their capacity also being in some cases unquestionably good. Medical men know well, to quote the emphatic expression of an experienced man, that some hysterical patients "lie like the Devil," and although Reichenbach may have been much led by such persons, as men of fair ability often are, it is not necessary to include all his diseased subjects in the same untrustworthy category. They were people accustomed to waking visions; they often saw exactly what they and he believed they ought to see, and stated their experiences quite honestly. At the present time the Psychical Research Society has a sensitive who sees Reichenbach's flames; he has also seen an arrow in the air when persons near him thought he ought to do so, and it is easy to suppose that the flames no more issued from the magnet in reality than did the arrow, the visions being most likely produced by the same cause in both instances.

Reichenbach was an able commercial and business man, with a taste for scientific pursuits. The most important outcome of his scientific work was the discovery of the two valuable substances creosote and paraffine; but, as he was a maker of charcoal on a large scale, it required not much more ability than that of any educated charcoal burner to discover these two substances among the products of the destructive distillation of wood or coal tar, in which they are always present.

William H. Harrison.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequen[t in]tervals during the vacation months, and we shall be glad to receive contributio[ns to] the series from any friends able to treat of new and interesting ground.]

THE ANTIQUITIES OF WEST CORNWALL, AND HOW T[O] GET TO THEM.

Photography is at present not only followed as a pastime but i[s] employed in almost every branch of science and art, and there is [no] department where photography does not lend its aid. Painters [are] now beginning to openly acknowledge the help it is to them for f[ore]ground and figure studies; in surgery it is used in depicting [the] different stages of complicated cases as they progress, for referen[ce]; and the antiquary at the present day is enabled, by means of [the] portable apparatus now at his command and the keeping qualitie[s of] dry plates, to depict various relics of bygone days, by the aid of ph[oto]graphy far more truthfully than by the aid of either pen or pencil, [in] much less time, and with but little addition as regards weight [of] personal luggage.

The western part of the county of Cornwall is full of antiquit[ies], and I have no doubt that a good collection, well-photographed [and] classified, would be very valuable. This interesting corner of [our] small island—which seems to be but very little known to the ma[jor] part of the inhabitants—is full of interest in every possible w[ay]. The botanist finds a very large field for research; the geologist also [has] plenty of scope, this being a very large mining district. The rocks [are] also very fine, and which I have described in former articles; but [the] best way to gain a full knowledge of them is to go and see them, as i[t is] perfectly impossible to give even a very faint idea of the natural be[au]ties with the pen. In this article I intend dealing only with s[uch] antiquities as cromlêhs, inscribed stones, Druidical remains, and anci[ent] crosses; and those who make a study in this kind of way would [be] delighted with this portion of our country.

One important thing is to know how to get to them, and as I h[ave] been all over the ground I will do my best to give the desired inform[a]tion. In the summer time it is best to take a through tourist ret[urn] ticket to Penzance, which is the most westerly town in England, fr[om] London (Paddington station). This will cover the whole of the dista[nce]. The charge for these tourists' tickets are—First-class, four poun[ds]; second-class, two pounds fifteen shillings; and third-class, two pou[nds] four shillings. This is by booking through by Great Western Railw[ay] Company, who also book through from the great centres, such as Birmi[ng]ham, Liverpool, Manchester, &c. Short journeys, when in the locali[ty], cost very little to get from place to place. The tourist need not [go] through to his destination at once, but can break the journey at alm[ost] any point, either down or up.

The Cromlêhs are supposed to be of Druidical origin. The mean[ing] of the word "cromlêh" is a crooked, flat stone—lêh, Cornish, le[h], Welsh, a flat stone; crom, crooked. Lanyon Cromlêh (or, as it [is] sometimes called, "Quoit," is the most perfect of its kind in the co[un]try. It is about four miles north-west of Penzance. Penzance be[ing] the nearest station it is a very pleasant walk up through Mad[ron] Church Town, as it is called in Cornwall. Every place that ha[s a] church is called "church town," no matter whether there are a[ny] houses in the parish or not. Not very far from here is Madron W[ell] or Baptistry, which is well worthy of a visit. There are some curi[ous] old legends attached to these places which I cannot enter into here, [as] I should far exceed the space at my disposal. At a farm near Lan[yon] Quoit, or Cromlêh, will be found another cromlêh, which is overturn[ed]. This is called "West Lanyon Cromlêh." Permission to visit it [is] easily obtained by asking at the farm-house.

Not far from Lanyon is Men-an-tol (or holed stone), the centre st[one] being a broad one with a hole in it, and two upright stones, one [on] either side, at about ten feet distance. It is sometimes called by t[he] natives "crick stone," through which some of the country people dr[ag] their children in order to cure them of pains in their backs. Wit[hin] half-a-mile, or a little more, is an upright stone called "Mên-Scryf[a]," meaning an inscribed stone. The inscription is "Rialobran-cuno[val] Fil," signifying that Rialobran, the son of Cunoval, was buried he[re]. This is said by antiquaries to be the most ancient inscribed st[one] monument in the kingdom. The inscription is better read in t[he] photograph than on the stone itself.

From Lanyon Quoit, about three miles in a north-easterly directi[on], is Mulfra Quoit or Cromlêh; or it can be reached by road, start[ing] again from Penzance, also about four miles distant. Near here is t[he] ancient Britannic village of Chysauster, consisting of a series of beehi[ve] shaped stone huts. A little further north of Mulfra is Bospre[nnis] (another ancient British settlement), meaning the house of the isla[nd] port. The next Cromlêh, about three miles to the north-west fr[om] Mulfra, is Zennor Quoit or Cromlêh, which is said to be the largest [in] the county. About three miles west of Lanyon is Chûn Cromlêh, a[nd] not far from thence is Chûn Castle.

In the neighbourhood of the cromlêhs are to be found a number [of] small barrows, in some of which that have been opened have be[en] found urns. I have myself been into one of the largest of these barro[ws] when out with a party. There was only just room to crawl in, and

sted of two upright side stones with a cap stone all covered up earth. There is another cromlêh in the neighbourhood of Cam-; and I have also seen on other moors what are supposed to be lêhs much smaller in size. I omitted to mention that St. Ives is earest railway station for Zennor Cromlêh. I have visited them one to the other, but it is rather rough walking. I have also done by the road. They all seem to be perched on the hill tops.

the parish of Gulval, about a mile and a-half from Penzance, is to und an inscribed stone at Bleu bridge. The stone forms an upright e foot bridge across the stream. In the church wall of St. Hilary, ar from the town of Marazion, are some inscribed stones.

ıttered all over the moors and downs are to be found the so-called lical circles, the largest of which is "Dawns Myin," or the Nine-Merry Maidens, at Bolleit, near St. Buryan, about seven miles Penzance. Near here are also two immense granite pillars called Pipers," and there are also several ancient caves said to have been by the Ancient Britons. Near this place, in a hedge, is a holed also said to have belonged to the Druids. It was built in the e when I saw it.

l about Cornwall are to be found the remains of the ancient crosses. said they were placed on the roads to the churches. They are lly upright stones with a rude figure carved on them with a kind elt, but many of them are without the figure, with simply a Greek ıtin cross. Some of them are very fine indeed. The only cross I seen of a similar description out of Cornwall is one at Barking ch, Essex. The entrance to the churchyard is by the old priory It is fixed in the wall in a chamber situated over this gate, and a fair state of preservation. It can be seen by applying, I believe, ıe sexton. At the west end of the Market-house, Penzance, is a which I have heard was removed from the centre of the green et, where it formerly stood. I do not think I can do better than ve a list of the crosses, according to "Blight" (with the nearest ay station), which he has classified :—

GREEK CROSSES.

Crosses.	*Nearest Railway Station.*
Crowz-an-wra, St. Buryan	Penzance.
Trengwainton Cairn, Madron	,,
Cross, Street, Helstone	,,
Vicarage Garden, Zennor	St. Ives.
Trembath, Madron	Penzance.
Clowance, Crowan	Gwinnear Road Station.
Church Town, St. Buryan	Penzance.
St. Levan, Churchyard, St. Levan	,,
Near Boskenna, St. Buryan	,,
Gwinnear Churchyard, Gwinnear	Gwinnear Road.
Rosemooran, Gulval	Penzance.
Roadside from Lelant to St. Ives	St. Ives.
Trivan, St. Erth	St. Erth.
St. Erth, Church Town	,,
St. Levan, Churchyard-wall	Penzance.
Sancreed Churchyard, Sancreed	,,
St. Buryan Churchyard, St. Buryan	,,
St. Paul Churchyard, Paul	,,
Sancreed Churchyard-wall, Sancreed	,,
Phillack Churchyard, Phillack	Hayle.
Madron Church Town, Madron	Penzance.
St. Erth Churchyard, St. Erth	St. Erth.
Illogan, Illogan	Carn Brea.
Lelant Churchyard, Lelant	Hayle.
Gateway, Connordowns, Gwinnear	Gwinnear Road.
Helstone, in the garden of G. Grylls, Esq	Penzance.

TRANSITION CROSSES.

Crosses.	*Nearest Railway Station.*
St. Michael's Mount	Marazion.
Boswharton, Madron	Penzance.
Outside Churchyard Wall, Lelant	Hayle.
Noon Creeg (Nûn Careg), St. Buryan	Penzance.
Hea, Madron	,,
Anjarden, Sancreed	,,
Cury Churchyard, Cury	Penryn.
Opposite Boskenna Gateway, St. Buryan	Penzance.
Vellansajer, St. Buryan	,,

LATIN CROSSES.

Crosses.	*Nearest Railway Station.*
The Garden at Trereiffe	Penzance.
Chûn, or Chyowne, near the Sanctuary, St. Buryan	,,
Sennen Green, Sennen	,,
Higher Drift, Sancreed	,,
Boscathnoe, Madron	,,
St. Paul Downs, Paul	,,
Tremithic, Madron	,,
Ludgvan Churchyard, Ludgvan	Marazion.
Trevelly, Sennen	Penzance.
Brane, Sancreed	,,
Pradenack, Mullion	Penryn.

GOTHIC CROSSES.

Crosses.	*Nearest Railway Station.*
Gulval Churchyard, Gulval	Penzance.
Head of Cross, Courtyard, St. Michael's Mount	Marazion.
Head of Cross, St. Ives Churchyard	St. Ives.
Churchyard, St. Mary's, Penzance	Penzance.
St. Ives Churchyard	St. Ives.
Vicarage Garden, Helstone	Penzance.
Lanteglos Churchyard, Lanteglos	Fowey.

There are also several others that Mr Blight has not mentioned which I have seen, viz., one on the south side, at the top of St. Michael's Mount, which is a Latin cross. There is also one with an upright shaft on the top of St. Michael's Mount, opposite the town of Marazion. I have also noticed, on the causeway across to St. Michael's Mount from the mainland, a large, square base, supposed to be that of a cross—probably that of the one last mentioned. There is also another cross at the Lizard Village, in the road leading to Landewednack Church; while a host of small ones may be seen built in the stone walls along the roads.

It must not be supposed that I have here given a complete list of the crosses and antiquities. I think that would be almost a thing impossible, for there seems no end of them; but all the above-named I have visited. I have heard a great many persons make the remark that if you see one of the crosses you see the whole of them; but that is not the case, for there are very few exactly alike. Some of them have a figure on one side and a cross on the other, and some of them are very prettily situated. The one at Trengwainton is all among the ferns, and makes a very pretty picture. The one at Vellansajer, St. Buryan, is by the roadside, with an old rustic cottage. The head of the cross at the top of the steps leading to the chapel, St. Michael's Mount, is very beautifully carved. One of the crosses at Sancreed, the upright one in the churchyard, is very fine; so also is the one in St. Buryan Churchyard, which is mounted on the top of a square flight of stone steps, the latter being probably modern.

The churches throughout the county are all well worthy of seeing, as many of them contain some good specimens of Norman architecture, and very quaint old carving, portions of rood screens, &c. I intended last year, on my visit to Cornwall, to have visited St. Ives, as there is much interesting matter in that neighbourhood to investigate. Owing, however, to the wet weather I was obliged to return, but hope to do it on some future occasion. WM. BROOKS.

STUDIES OF AND EXPERIMENTS WITH GELATINE EMULSION.*

SECOND SECTION.

WITH the kind permission of the various authors, these studies consist in part of the substance of some correspondence relating to the emulsion process and containing matter of interest, and in part of some repeated experiments of my own, which are appended.

Flexible Supports and Paper Negatives with Gelatine Emulsion.—At present in several quarters attempts are being made to produce emulsion films upon flexible, unbreakable supports. The principal substitutes for glass that come into consideration are paper and insoluble gelatine combined with collodion. Herr F. Wilde, of Gorlitz, has made some attempts in both directions which are very well worth attention, and which have been carried so far that the products might be sent into the market. Herr Wilde has had the goodness to send me samples both of the negative paper and of the gelatine sheets. The negative paper is rendered transparent with vaseline and coated with gelatino-bromide of silver. It is exposed between two sheets of glass, and, before being developed, is laid in water and left until, on the water being poured off, it lies flat upon the bottom of the dish and is then developed with ferrous oxalate.

Herr Wilde's paper negatives, which are lying before me, developed very well, though the rolling up in the bath disturbed the process somewhat. After fixation a good negative resulted, which printed with little granularity. It is worthy of remark that the transparency of the paper may suffer somewhat in the bath; should that be so both sides of the paper must be coated with vaseline.†

Herr Wilde also sent me some flexible supports made of tanned sheets of gelatine, coated with collodion. These supports are remarkable in that they do not become warped in water, and even resist the action of warm water for a considerable time. The gelatine film which contains the picture may be transferred from this support. This property is, however, accompanied by the drawback that the picture film must be carefully tanned in an alum bath if it is not to float off, whether the experimenter wishes it or not.

* Continued from page 331.

† What Herr Wilde says is that should the transparency of the paper suffer in the bath it may be permanently restored. When the negative has been sufficiently washed let it dry until but very little moisture remains in it, and then rub vaseline well into both sides of it. In this state let it become thoroughly dry, remove the superfluous vaseline with soft paper, lay it between sheets of blotting-paper, and go over it with a hot smoothing iron.

Herren Fickeisen and Becker, of Villingen (Baden), also prepare flexible emulsion plates (not supports) which they use for taking all sorts of photographs, both in and out of the studio. As some prints sent me show, these are very useful. The thinness of the plate allows of either side being used to print from. These flexible emulsion plates will be first exhibited when the patent for them is obtained.

Modification of the Ferrous-Oxalate Developer. — The addition of tincture of iodine to the ferrous-oxalate developer, as recommended by Herr Wilde to be used instead of bromide of potassium, behaves well in other hands as well as mine.*

Herr Graeter's Experiments in the Preparation of Emulsion.—A short time ago some very beautiful photographs—portraits, animal studies (study of a lion, &c.)—were issued from the establishment of Herr Boissonas, of Geneva, which were remarkable both for their delicacy and the shortness of their exposure. Herr Graeter, who prepares the emulsion in the above establishment, imparted to me certain data respecting emulsion which are of general interest, and are, therefore, published here. Herr Graeter writes:—"Since you published your recommendation to mix ripened bromide of silver with unripened, in order to produce greater clearness and softness in the emulsion, I have used with good results a modification of your recommendation, which possesses a further advantage. I cook *the whole quantity of emulsion, digest it with ammonia,*† and, finally, after the residue of the gelatine has been added and shortly before the emulsion has become quite stiff, I add as much nitrate of silver solution as shall the least thing supersaturate the excess of bromide. In this way your purpose is perfectly effected, and this, besides:—1. The washing is greatly facilitated, as there is no longer any excess of bromide present. 2. The sensitiveness is increased, as my experience has proved. The digestion with ammonia, or, at least, the addition of ammonia, is absolutely necessary by this method, as, otherwise, even a slight excess of silver would exercise a tanning effect upon the gelatine, and would render it *almost wholly impenetrable.* In this way, however, nitrate of silver oxide of ammonia may be formed, which does not exercise this harmful action. The sensitiveness (with the ferrous-oxalate developer) is always from 18° to 20° Warnerke, while with your original formula I was only able to reach 16°. I have tried to go even below your quantity in the concentration of the emulsion for ripening, but one cannot concentrate much more without the sensitiveness suffering injury. I have discovered the reason of this. The experiments in question are made with bromide of ammonium, and the resulting nitrate of ammonia has the property of being *completely precipitated* in concentrated solutions of gelatine. It will, therefore, even in moderately-dilute solutions, have a contracting effect upon the gelatine and so lessen the movement of the Ag Br where it does not altogether prevent its diffusion and thereby its ripening. I have not yet examined the behaviour in this matter of bromide of potassium. At present I am engaged in experimenting with placing the stiffened emulsion as nodules in a bath of a rather concentrated solution of silver oxide of ammonia. If this method succeed it will give me (after one minute's rest) 25° of Warnerke's phosphorescent plate, perfectly free from fog and beautifully graduated with an exposure of fifteen seconds. Certainly, of ten batches of emulsion directly prepared, nine gave fog (not silver fog, which does not appear usually with silver oxide of ammonia and gelatine, but chemical fog)."‡

Sometime later Herr Graeter communicated the following noteworthy remarks:—"I. Nitrate of silver, fifty parts, in water 300 parts, with twenty parts of gelatine, and the usual excess of bromide, when cooked forty-five minutes, gave no fog. Sensitiveness, 19° to 20° Warnerke (water and gelatine addition afterwards). II. The same quantities, with the addition of 2·4 per cent. ammonia (0.91) cooked for fifteen minutes, *gave fog* and a *coarse grain*, and is *unusable*. III. The same quantities, with the addition of 25 c.c. of a 20 per cent. solution of caustic potash, by which, by the decomposition of the bromate of ammonia, as much gaseous ammonia is formed as in No. II., gave when cooked for fifteen minutes a sensibility of 20° to 21° Warnerke *without fog*, from which it is to be concluded that ammonia in the nascent state acts less dangerously."

On the Soda and Potash Developer.—For a considerable time back I have been experimenting with soda and potash developers, which offer considerable advantages over the ammoniacal developer. This advantage is most conspicuous with ammoniacally-prepared emulsions. Such emulsions, when prepared with much ammonia and concentrated, frequently show, with an ammoniacal pyro. developer, green or red fogs, or fogs which appear clay-coloured when looked at and a sort of pale purplish-red when looked through. The ferrous-oxalate developer, then, generally acts clearly, and so does the soda or potash developer. As a soda developer I use a solution of ten parts of crystallised pure soda in 100 parts of water. For developing 6 c.c. of a 1:10 pyrogallic acid solution is added to 100 c.c. of this soda solution. The devoloper is to be employed without the addition of bromine.

* Here follows Herr Wilde's communication containing his formula, which need not be repeated, having been given in these pages.

† Here absolutely necessary.

‡ Such plates have only a theoretical value, as they are decidedly too sensitive for camera work.

It is much more agreeable to work with Stolze's potash developer, while the photographic effect is much the same as with the soda developer. Two solutions are used:—No. I.: water 200 c.c., chemically-pure carbonate of potassium (potash) ninety grammes, hyposulphite of soda twenty-five grammes. No. II.: water 100 c.c., citric acid 1·5 gramme, hyposulphite of soda twenty-five grammes, pyrogallic acid twelve grammes. I prefer solution No. II. to that given by Stolze, on account of its greater keeping qualities.* Both solutions should be stored in closed bottles and will keep for weeks. To use I mix for my plates 100 c.c. of water with forty drops of the potash solution No. I. and fifty drops of the pyro. solution No. II. The picture comes rapidly and powerfully, more powerfully than with the ferrous-oxalate developer. Should the negatives become thin, I use twice the quantity of water. After fixation the negatives appear a greenish-brown or olive-green colour at those places where the silver is reduced. A beautiful grey-black† colour may be obtained if an alum bath be interposed between the development and fixation.

A bath of equal volumes of saturated solutions of alum and of ferrous sulphate, when used after fixation, produce a deep olive-green which covers very well and renders intensification superfluous. The sensitiveness with this developer is at least as great as with ferrous oxalate, generally somewhat greater—consisting not so much in that higher numbers (1 or 2 numbers) of the sensitometer appear, but more in the greater power shown by the higher numbers. This developer is, therefore, especially suitable for instantaneous pictures, and remarkably suitable when used with my alum iron bath. Of course the picture must be well washed both before and after this bath.

The addition of bromide of potassium is not only superfluous but generally harmful. If one were to add as much bromide of potassium as one is accustomed to do when working with ammoniacal pyro. scarcely any picture would be produced; after the addition of twenty to fifty drops of bromide of potassium (1:10) the sensitiveness sinks to a tenth or a twentieth. Bromide of potassium should, therefore, only be added in the smallest quantities, say one to three drops.

Emulsion with Carbonate of Silver and Ammonia.—In the first section of these studies in the *Correspondenz*, No. 249, page 89, a misprint occurs. For the sentence—"a good solution is got by heating nitrate of silver one part, ammonia one part, and water two hundred parts," *read* "water *twenty* parts."‡

J. M. Eder, M.D.

ALLEGED INFRINGEMENT OF COPYRIGHTS.

Court of Queen's Bench.

Nottage and Another *versus* J. H. Jackson. Before Mr. Justice Field.

This case again came on for reconsideration on Saturday last, the 30th ult. The plaintiffs sued for penalties for alleged infringement in copying the Australian Cricketers, and for which the plaintiffs were entitled to the amount of £60—the penalties of the six copies, at £10 each, proved to have been sold. At the suggestion of Mr. Justice Field, it was left to counsel to arrange terms if possible; also another action, Elliott and Fry *versus* the same. Counsel not agreeing, the arguments as to authorship, &c., which had not concluded when the court rose on Saturday, the 23rd ult., were continued.

At the commencement of the proceedings on the 30th ult., Mr. Petheram, Q.C., for plaintiffs, offered to withdraw all claim for penalties if defendant would give an undertaking not to deal in copyright pictures. This was not accepted by Mr. Crump, defendant's counsel, and the arguments were continued as to authorship, &c.

Mr. Crump continued his argument that plaintiffs could not be the authors of the work in question, but that Reynolds, the artist, who executed the negative in question, was the real author, and that no assignment had been made.

Mr. Justice Field said—The question was if an assignment was necessary, or if Reynolds, as assistant, would entitle plaintiffs to be the authors.

Mr. Petheram, for plaintiff, contended that Reynolds was a servant only if the company paid his wages; that his work was the copyright of his employers; and that they were the authors.

Mr. Justice Field considered it a very important case, and would give his judgment on Wednesday, the 4th instant.

Mr. Justice Field, in giving judgment on Wednesday last, said the first objection was as to the place of abode not being properly registered. He considered that the place of business was to all intents and purposes the place of abode, and that the registration in this respect was sufficient. The second objection was as to authorship. Nottage and Kennard trade as the London Stereoscopic Company. The copyright act says the author is entitled to the copyright during his lifetime, and is continued to his trustees, &c., seven years after his death. There is nothing to prevent the London Stereoscopic Company forming a company, or it may be one; then where is the authorship? There is no evidence that they take any interest in the business, or that they have a photographic mind. They have an establishment in Regent-street and Cheapside, which causes a great obstruction; they have managers who call and solicit parties to sit for their photographs, and who direct the

* Stolze recommends 100 c.c of water, ten c.c. of alcohol, ten grammes of pyrogallic, and one gramme of salicylic acid.—*Photo. Wochenblatt*, 1883, p. 130.

† After fixation has taken place the alum bath does not to the same extent produce an agreeable grey-black—that is to say, with an emulsion which has been prepared with ammonia.

‡ This misprint of two hundred for twenty is copied in The British Journal of Photography, June 8th, page 331, line 28 from top of column.

tist to take the negative. What is the meaning of the word "author?" y the Act of Parliament photographs are the same as paintings. I go to ı artist to sit. He decides how I shall sit; he puts colour here or there as equired; he is the author. Quoting the cases of J. L. Hatton and Chas. eene, Shepherd and Conquest, as to joint authorship, he (Mr. Justice ield) says:—I come to the conclusion that the plaintiffs are not the uthors, and I give judgment for the defendant with costs.

Mr. Shortt, for the plaintiffs, argued as to the question of costs as to the leadings.

Mr. Justice Field remarked that he regretted his suggestion as to an rrangement had not been made; that costs must follow the event; and dded—"I do not think the defendant was a fraudulent infringer."

Contemporary Press.

MORE NEWS FROM THE ECLIPSE PARTY.

[The Times.]

During the last few days additional information has been received both rom the French and American expeditions sent out to observe the eclipse of the sun on the 6th of last May. The more we learn about the results of the expedition the more we see that most excellent work has been done, and, as we surmised in our previous article, new questions have been brought to the front as well as old ones probably settled. Let us deal with some of these *seriatim*. One matter, outside the domain of solar physics, but yet of extreme interest to the astronomical world, is concerned with the possible existence of a planet or planets nearer to the sun than Mercury. Such a planet has been "discovered" two or three times, only to be lost again. Its existence has been predicted from general considerations, but yet, strange to say, it has not revealed itself when it has had every opportunity of doing so; for instance, in the photographic record of the sun, which is now being slowly introduced at a sufficient number of places on the earth's surface to make the story almost a continuous one. This question was seriously taken in hand at the late eclipse by Dr. Janssen, the head of the French party, by MM. Palisa and Trouvelôt, who accompanied him, and by Professor Holden, who was in charge of the American party in consequence of the enforced absence of Professor Young, to whom the charge had been in the first instance offered.

The result of this combined attack is to show that there was no body near the sun brighter than a star of five and a-half magnitude. Professor Holden's conclusion depends upon eye observations. Dr. Janssen's depends upon photographs of the whole region near the sun to a distance of fifteen degrees all round it. Such self-confirmatory evidence as this is of the highest value, and must be held, we think, to suggest that the body seen by Watson in 1878 was in all probability a comet, as was, indeed, suggested by the appearance of the comet seen in Egypt last year. Had the comet then observed been less bright than it was, so that the nucleus alone had been visible, the discovery or the confirmation of the existence of an intra-Mercurial planet would in all probability have been announced to the world.

Next in point of view of general interest to this work with regard to the intra-Mercurial planet, we may refer to some observations made by Professor Hastings, which are of very great value taken in conjunction with prior work. In order, however, that the full importance of Professor Hastings's observation may be clearly grasped, it is necessary to go briefly over the history of eclipse work since the year 1869. It was only really in the eclipse of that year that we began to know anything about the corona, and it was only in the eclipse of 1870 that we began to appreciate what a very difficult problem was presented to us by that phenomenon. The then Astronomer Royal and Professor Maedler, to cite some among the eminent authorities writing after the eclipse of 1860, had come to the conclusion that the corona was mainly a non-solar phenomenon. That *part* of it, however, was undoubtedly solar was admitted by all, for the reason that it was seen before and after totality. In the eclipse of 1870 the idea that part of it was really non-solar was enormously strengthened by a comparison of observations made by different astronomers. Its shape seemed to change as the moon swept over it, and this obviously, if it were true, implied some action of the moon's edge and reflection by something between the observer and the moon. In 1871, when the Government of India and the British Association took steps to have the corona photographed at the same time that it was carefully observed by the naked eye, the strange fact was first clearly indicated that the corona seen by the eye was a perfectly different thing to that recorded on the photographic plates. The explanation given at the time was that the coronal light was much more actinic than ordinary solar light of the same visible intensity, so that in the eye and on the photographic plate two different images were built up by different qualities of light proceeding from different sources. Hence the view was distinctly enunciated that the corona seen during eclipses was a dual phenomenon, partly solar, partly non-solar in its origin, the true solar corona being filamentous with variously-curved streamers, the visible corona being non-filamentous and consisting mainly of radial lines and rifts extending to different distances from the edge of the moon. Such observations as these show how extremely difficult it was to determine the real limits of the corona by means of any simple analysis of the light from any part of the regions surrounding the sun. When spectroscopic eclipse work began it was imagined that if a part of the circumsolar region—say one degree from the sun—was brought on to the slit of the spectroscope, and a bright line spectrum obtained, here was evidence that the corona extended to one degree from the sun. It was only some time after such observations as this were commenced that it was found that the earth's atmosphere was so flooded with coronal light that even the dark moon itself gave such a record. This fact was most strongly brought home to us in the eclipse of last year, when the coronal spectrum was photographed extending right across the dark moon, and the result obtained in 1871—namely, that the corona was chiefly built up of blue light—was clearly confirmed by the fact that the photographs revealed that the strange, weird, lurid light, so special to eclipses, was really nothing but the reflected blue coronal light in our air.

These things being premised, we can now come to Professor Hastings's observation. He was among the first many years ago to recognise the importance of observing the spectrum of different parts of the sun side by side in the spectroscope, and for this purpose he, as well as others, prepared a special piece of apparatus allowing him to study the chromosphere on two opposite parts of the sun's limb at the same time. This was the instrument he used at Caroline Island this year. What he set himself to do was to carefully watch during the eclipse the apparent height of the corona, as determined by the lengths of the chief line in its spectrum at the two opposite points of the moon's diameter at which totality commenced and finished. Of course, if each line were really due to an actual definite corona of the sun, the position of its extreme summit and its length would not greatly vary; but if the spectroscope revealed a flash of light, now on one side of the moon and now on the other, produced by some such action as that to which we have referred, then it is obvious that the position of the summit of each line would greatly vary, its length varying in equal proportion. The question put to the sun, it will be seen, was of a most definite character, and Professor Hastings found that there was immense variation in the lengths of the lines. At the beginning of totality the 1474 line had a length of 12′ on the east side, while on the west it was seen short and faint. During the progress of the eclipse this difference in length disappeared, but was reversed at the end of totality, the change being greater than that which would result from the moon's motion alone. On the strength of this variation, Professor Hastings gives out the view that this paying out of light, first on one side of the dark moon and then on the other, is an effect of diffraction at the moon's edge. He, however, goes further than this, and, as we gather from his telegram to Professor Young, proposes to abolish the external corona altogether from our text-books. Here astronomers, while acknowledging the ingenuity which suggested the above observation, will not follow him, because he has not sufficiently taken into account the vast difference between the visible corona, with which he has been dealing, and the photographic corona, which, as we have already stated, is a thing quite by itself and possessing characteristics of its own; but in any case it is very curious and interesting that not only the boundaries, but even the existence of the solar corona is again in question, and it may happen that our view of the chemical nature of the outer corona will have to be revised.

There is another matter, and one in which the American and French observers are entirely at disaccord. This, however is of little importance, as the question raised was really settled by the photographs obtained in Egypt last year. The Americans say that in the coronal spectrum the only dark line observed was D, whereas Janssen, in his telegram to the Paris Academy, announces the discovery of the Fraunhofer spectrum and the dark lines of the solar spectrum in the corona, adding that this indicates the existence of cosmical matter round the sun. The French observation, judging from the photographic results obtained in Egypt, is much nearer the truth than the American one, but at the same time it must be acknowledged that the eye observation is one of extreme difficulty. It cannot, however, be said that the French observation is entirely accurate; for, although, no doubt, there are dark spaces in the coronal spectrum, it is not probable that all of them will correspond with the Fraunhofer lines. From the careful quantitative polariscopic observations made in 1878 in America we know that up to a certain point the amount of reflected light increases with the height of the corona, which may be taken to mean simply that the temperature in its higher regions is so reduced that its constituents have given up their simple gaseous nature and combined to form concrete particles, which are capable of reflecting light more strongly than gases are. On the theory referred to in our previous article this is at once readily and simply explained by the supposition that a reduction of temperature enables the association of the finer molecules of matter to take place, so enabling them not only to give out light of their own, according to their special nature, but to reflect the light from the regions around them to the eye of the observer on the earth.

These are the chief points on which the information we have at present enables us to speak with certainty concerning the work of the American and French parties. There is evidently much more behind, because we now learn that a great deal of other work was done by the Americans, the telegram informing us that observations with grating-spectroscope, prismatic-telescope, and integrating-spectroscope were made by Messrs. Rockwell, Upton, and Brown.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 10	Newcastle-on-Tyne	College of Science.
,, 12	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 28th ult., Mr. A. Cowan occupied the chair.

Mr. J. Traill Taylor showed a number of photographs recently taken in American studios. They included examples from the studios of D. Anderson (New York), F. Gutekunst (Philadelphia), A. E. Dumble (Rochester), C. J. Motes (Atlanta), in carbon, R. Walzl (of Baltimore), and several prints in artotype, by Bierstadt. Amongst the latter were specimens of portraiture and of views, one of Cleopatra's Needle being particularly noticeable. The perfection to which this development of

collotype or Albertype printing had been carried elicited great admiration. The portraits were from gelatine negatives, and Mr. Taylor said that dry plates were now manufactured in America quite equal to the best of English make.

Mr. F. W. Hart showed a photograph from a negative taken on board a ship in the Pacific. The plate contained as its principal subject an albatross on the wing, whilst one or two other sea birds were also included.

Mr. J. B. B. Wellington produced some instantaneous yacht pictures taken on a recent tour.

A question from the box was read—"What are the advantages of using a single lens over a symmetrical doublet?" But it was thought that it could not be properly discussed unless the purpose for which it was to be applied were stated.

Another question was an inquiry for information as to a process for printing upon ivory without silver, and without a film either of carbon or of transferred collodion or albumen.

Mr. Taylor said that many years ago a process had been published in which the ivory was soaked in nitrate of uranium, dried, and, after exposure, brushed over with a solution of chloride of gold.

Mr. E. J. Dale and Mr. J. H. Hare were elected members of the Association.

This being the annual meeting, the Hon. Secretary read the

FIRST ANNUAL REPORT.

In presenting the first annual report of the London and Provincial Photographic Association the members must be congratulated upon the success of the undertaking.

The Association was formed to supply a long-felt want, namely, a society whose meetings should be of a more social character than those of the then existing societies, whose proceedings should be open to publication, and the subscription to which should be sufficiently low to enable all members of the profession to participate in its benefits. This latter requirement has been met by the annual subscription being fixed at the small sum of 5s.

So far the efforts of the promoters have been successful, there being now nearly 100 names on the books.

By the Treasurer's report it will be seen that, after paying all liabilities, there is still a small balance in hand.

The item of rent will not be so large in our next balance sheet, as, by the change made to our present quarters, this charge falls less heavily upon our funds.

During the year many papers have been read, demonstrations given, and discussions have taken place, and, by means of the reports published weekly in the photographic journals, much information of value to all concerned in photography has been disseminated.

It is with deep regret we have to chronicle the death of two valued members, viz., Messrs. C. G. Collins and T. J. Pearsall, both of whose names are well known in the photographic world, and whose loss the Association can but deeply deplore.

A gelatine plate competition has been organised, and this, with other kindred matter, will, it is to be hoped, tend to make the Association even more popular.

The election of officers was then proceeded with, and all other nominations being withdrawn, was declared without ballot to result in the appointment of Messrs. W. K. Burton and W. E. Debenham as Trustees, Mr. A. Haddon as Curator, Mr. W. H. Prestwich as Treasurer, and Mr. C. B. Cutchey as Secretary.

The business of the meeting being concluded, the members and visitors present sat down, at the invitation of Mr. A. L. Henderson, to a supper in an adjoining *salon*, and in right festive style wound up the first annual meeting of the London and Provincial Photographic Association.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The usual monthly meeting of this Association was held at the Free Library, on Thursday, the 28th ultimo,—Mr. B. Boothroyd, President, in the chair.

After the usual formal preliminaries, Messrs. J. T. Smith, T. J. Smith, J. M. Jones, and T. Haworth were elected members of the Association.

The Chairman, in commenting upon the large accessions of new members to the Association of late years, desired to remind those who had not presented copies of their portraits to the album that they should do so without delay.

Mr. W. H. Kirkby thought it would facilitate the making known of new members to the older associates of the Society if the proposer or seconder of each neophyte were to introduce him to the President and Hon. Secretary and then, very necessarily, to the Treasurer.

The Hon. Secretary then read Mr. J. A. Forrest's report of the recent meeting at Conway, when some twenty of their *confrères* enjoyed the hospitality of Mr. Lewis Hughes, and upwards of one hundred negatives were taken in and about Conway. Mr. Forrest's notes are attached to the present report.

The Chairman proposed a resolution thanking Mr. Hughes, in the name of the Association, for his magnificent hospitality on the occasion referred to by Mr. Forrest. Nothing could have been more enjoyable than the excursion, and the sumptuous entertainment provided for the members by their host closed the proceedings of the day in a most agreeable manner.

Mr. J. H. Corkhill, in seconding the resolution, said that he would abstain from referring in detail to the many enjoyments of a most delightful excursion, out of consideration for the feelings of those members who had been unable to be present.

The resolution having been carried by acclamation,

The Hon. Secretary referred to the kindness of Mr. Pochin, of Glan Conway, who had thrown open his splendid grounds to the Association, and had afforded very great pleasure to those who had been able to visit them.

Mr. J. H. T. Ellerbeck seconded a formal vote of thanks to Mr. Pochin.

This vote also having been carried, the Hon. Secretary was authorised to communicate with both Mr. Hughes and Mr. Pochin, and convey to them the thanks of the Association.

Mr. E. Banks then read his paper *On Hydrokinone as a Developer* [see page 386], and at the close presented a number of packets of it for distribution among the members.

Mr. Kirkby asked Mr. Banks if he could give an approximate idea of the cost of hydrokinone.

Mr. Banks replied that Captain Abney had mentioned £1 1s. per ounce as the price of it, but he thought that when a demand for the new developer had arisen it would soon be cheaper than pyro.

The Chairman asked Mr. Banks for particulars as to the use of the packets which he had so generously presented to the members.

Mr. Banks said that each packet contained fifteen grains of hydrokinone, and that this was sufficient for from ten to fifteen ounces of developer. To each ounce of solution he recommended the addition of from one to three drops of a saturated solution of common washing soda.

Mr. Ellerbeck asked why soda was recommended in preference to ammonia; and also wished to know if the developer could be used again and again.

Mr. Banks said that a possible prejudice on his part in favour of soda had led him to recommend it in preference to ammonia; but he had found the latter destroy the image on a negative under certain circumstances, and this had never been his experience with soda. Hydrokinone might be used repeatedly for purposes of development, until the solution became discoloured.

The Chairman, on behalf of the meeting, expressed his warmest thanks to Mr. Banks for his excellent paper, and also for his considerate kindness and generosity in presenting to the Association so abundant a supply of the new developer. It would, doubtless, be an experiment of the greatest interest to the members to be able thus to test the value and capabilities of hydrokinone.

Mr. Kirkby exhibited some prints of negatives of instantaneous sea subjects taken from the deck of a yacht under full sail, with a strong wind, and in a rough sea. These views had all been taken with Mr. Kirkby's own shutter, and were extremely good specimens of instantaneous work.

Mr. R. Crowe also showed some fine prints of instantaneous pictures taken by him at the Conway excursion, with his own shutter and Edwards's plates.

The Chairman invited the members of the Association to spend the day with him on Saturday, the 21st July.

The Hon. Secretary said that the July meeting of the Association was usually held at the house of one of the members, and, therefore, he had much pleasure in proposing a cordial acceptance of Mr. Boothroyd's kind invitation, and that the July meeting be held at his house.

Mr. Beer seconded the resolution.

Mr. Kirkby objected to the holding of the regular monthly meetings of the Association anywhere but in the room usually employed for these meetings, and, therefore, proposed as an amendment that, while accepting the Chairman's kind invitation to Southport, the ordinary July meeting be held on the proper day and in the usual place.

Mr. Tyerman seconded the amendment, and on being put to the meeting it was carried by a majority of votes, and the Hon. Secretary's resolution was lost.

Prints of negatives taken during the Conway excursion were exhibited by Messrs. Tyrer, Boothroyd, Ellerbeck, Crowe, Corkhill, Birtles, and Twigge. Messrs. Palmer and Wharmby showed negatives taken on the occasion, and Mr. James some transparencies of Conway subjects.

Mr. Forrest exhibited some prints from negatives of the Lake District, and the Platinotype Co. showed specimens of their new tone.

The meeting was then adjourned.

Visit to Conway.

It will be a long time before we forget the sixty-eighth anniversary of the battle of Waterloo—made memorable by one of the happiest trips of the Liverpool Amateur Photographic Association. It was at the invitation of Mr. Lewis Hughes, of Conway, to visit the far-famed Conway Valley and enjoy his princely hospitality, to bring our cameras and sketch-books, and take the fairy locality by storm.

The day was unexceptionally fine, and nothing marred the proceedings but an anxiety to escape the generous hospitality of our host, Mr. Hughes, who detained the members till a late train, overlooking the anxieties of home and the dear ones awaiting the arrival of the "absentees." The train was caught by a few minutes, and the blessings of the whole party were showered upon the noble host and impressions carried off by the memory, by the camera, and in water colour that may produce an R.A. for aught we know. The latent photographic images have not yet been developed, but on Thursday next, at our monthly meeting, some specimens will, no doubt, be presented that will show our art-science well to the front. Let us cull a flower from the poet (slightly altered):—

"Is there a photo.-soul so dead
Who never to himself hath said—

(as the magic image started up in all its truthful lustre)—

This is my own, my native land!"—

holding the mirror up to nature as a reflex of world-wide associations, artistically displayed, of the fairyland of Wales. Two words, two little words will do—

'Twill mock oblivion's power,
'Tis the trip and Waterloo!

J. A. F.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A meeting of this Society was held on Thursday, the 28th ult., at the Town Hall, Stoke-on-Trent,—Mr. W. C. Potter, Vice-President for Stoke, occupying the chair.

Mr. Henk was elected a member of the Society, and Mr. W. Alex. Jones was proposed as a member for election at the next meeting.

It was resolved that the necessary arrangements for the Society's first excursion be left in the hands of the Committee.

Some of the members, advocates of the wet-collodion process for landscape work, challenged an equal number of gelatine-plate workers to accompany them—on the same day, under similar conditions of light, and on the same subjects—to take simultaneous negatives, and compare the results, the whole number of members to decide who had won the day. It was, after a heated discussion, decided that the foregoing plan should be adopted.

A MEMBER stated that when gelatine plates were introduced, a few years ago, he and another gentleman were engaged in taking *instantaneous* street views in London. He himself used wet collodion, and, whilst the negatives he obtained were in every way perfect, he could secure three to his dry friend's two.

Mr. BURGESS remarked that the most favourable conditions must have been necessary for the above.

The CHAIRMAN said that he was pleased to see such an interest shown in the wet process by the members present, and he hoped that at the next excursion they would demonstrate theory by practice. He himself should join the collodion party; but he thought it absurd to set up collodion against gelatine unless under the most favourable circumstances as regards propitious weather and the chemicals being in good order.

Mr. Gover then read his paper on *Light and Lenses*. [See page 388.]

The paper was listened to with great interest, and a cordial vote of thanks to Mr. Gover was passed.

After some discussion, and explanations by Mr. Gover of some points in his paper, the meeting separated.

Correspondence.

EARLY DAYS OF THE WOODBURY PROCESS.

To the EDITORS.

GENTLEMEN,—Having been actively engaged in the Woodbury process almost since its earliest days, I think I can place on record some of the history of the process which will prove interesting to the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, more particularly of that part of it to which the new patent taken out by Messrs. Brown, Barnes, and Bell refers. I must, at the outset, ask whether it is at all probable that so ingenious an inventor as Mr. Woodbury would have been likely to overlook the "far more simple expedient of pressure between a pair of metallic rollers?" Of course it was tried, and failed. Whether the new process of Messrs. Brown, Barnes, and Bell will prove more successful remains to be seen.

My experience does not date back to the time when the relief was electrotyped. That had already been abandoned for the more efficient system of a metal plate (lead hardened with antimony) into which the relief was forced, by hydraulic pressure, between two mathematically-true, hardened steel blocks. To ensure planimetry of the leaden plates they were carefully rolled to about one-eighth of an inch in thickness. It was found, however, that metal of only this thickness required a great deal more pressure than if it were thicker, and the practice adopted was to cement two such plates together before pressing the relief. Another reason for doubling the thickness of the metal was to avoid accidental bending of the impressed plate.

It must be borne in mind that a perfect plane is the first essential of the Woodbury process. The degrees of shadow and half-tone are entirely dependent upon the degrees of depth of the intaglio of the mould, and, therefore, the *slightest* inequality of the original or normal surface would produce a corresponding depth of colour in the print. Anything in the shape of bending would render the "mould" perfectly useless. This, then, was the first serious obstacle in the way of pressing the "relief" by means of rollers—a plan, by the way, which had long before been tried for "nature printing," when leaves, feathers, &c., were successfully pressed into metal plates. If the metal were pressed directly between the rollers it would curl up and all planimetry would be lost, while if pressed between plates other difficulties cropped up, as will be seen by and by. We therefore used the hydraulic press and the double hardened lead mould.

Two separate troubles arose here:—First, although the steel blocks (between which the relief and lead were placed for pressing) were of hardened steel some two inches thick and absolutely true, the leaden mould when it came out from the press was not. It was invariably thicker in the middle than at the edges, and would spin with a touch upon the steel block. Secondly, it was sensibly enlarged, squeezing out at the margins; indeed, great care was necessary to confine this squeezing out within a small amount, otherwise the "relief" would be stretched out also, and would be found broken into fragments.

Another serious drawback was the fact that it was absolutely impossible to properly press the mould at all. A small part of the centre might be properly pressed, but the remainder never. I well remember a subject ordered—a church with a railing against a white, or nearly white, ground. Do what we would it was impossible to get the railings sharp. They would, of course, be pressed to their full depth into the lead; but in the act of pressing they would carry down with them the lead on either side, so that the print was blurred, and looked as if it were out of focus—as our foreman printer put it, "the whites are the last pressed." Having, myself, the practical supervision of the work it set me athinking, and I concluded that dead pressure was not effective; that what we wanted was an elastic pressure, and all sorts of experiments were tried—india-rubber, which squeezed out into no shape at all long before the lead was pressed; gutta percha, which was but little better; felt—everything, indeed, that we could think of. We would have tried ivory if a piece large enough could have been obtained. It was all to no purpose; the lead, hardened as it was, would give way long before the mould was properly pressed.

At this time MM. Goupil et Cie, of Paris, were also working the process, and, of course, found the same difficulties. Taking a hint from the method of making squeezes of wood blocks for electrotyping, M. Rousselon, their manager, had a steel block made with knife-edges, strongly bolted round the plate, and projecting about a-sixth of an inch above the surface. The lead plate which overlapped these knife-edges on all sides was forced by the hydraulic pressure on to them, the edges being nearly cut through, and a piece the exact size of the plate cut out and held in its place by the edges. In this way far greater pressure could be applied without breaking the relief; but still not enough to press the mould thoroughly. If still greater pressure were applied the lead was squeezed out *over* the knife-edges, and the reliefs broken.

It was at this juncture that I took charge of the department at MM. Goupil et Cie.'s. The first step towards practical success was getting some plates of lead of the full thickness—a-quarter of an inch—of pure lead without antimony. This being softer, allowed of less pressure being used to produce the same effect, and, moreover, being more plastic yielded sharper impressions. However, the usual *contretemps* happened. Some busybody thought he would like to try the effect of squeezing a copper coin between the steel plates, with the marked success of flattening the coin, and at the same time strongly indenting the steel plates. They had to go back to the makers to be reground; and, meantime, we had to fall back upon the old plates without the borders. Following up my old experience, I had a compound lever made as an indicator to guide me as to the amount of pressure put on. As the lead squeezed out the lever moved, and I could judge pretty well how much I dared allow before stopping.

It happened, thus, one day that I was out of lead—at any rate of our usual quarter-inch thickness, but I had some thinner; when put in the press, however, it did not allow space enough for the feeler of my indicator. To make up this space I packed the lead with a piece of stout cardboard, and put the usual pressure on. To my surprise the lead did not give way at the usual pressure. Satisfying myself that the indicator was in order, I increased the pressure by degrees to fully double the amount such a sized plate had ever received before, and still the lead did not yield. On taking it out of the press I had the inexpressible pleasure of seeing the first mould that had ever been properly pressed—sharp and crisp to the very edges. The cardboard which I had placed by accident as a packing was of exactly the degree of elasticity required. From that day, of course, card or paper has always been used, with the further satisfactory result of only necessitating one steel plate instead of two.

The next step was in the early days of *photogravure*. The size of these plates put hydraulic pressure quite out of the question, as it would have to be measured by thousands of tons. MM. Goupil et Cie spared no expense. A most massive rolling-press was constructed with a true bed-plate of immense size and proportionate cost; but it was an utter failure. Mr. Woodbury was consulted, and gave it as his opinion that it could be done in a rolling-press direct between the rollers by using very thin lead. Many attempts were made unsuccessfully, inasmuch as the lead was *not pressed*; and I believe it would have been abandoned but that I asked permission to try, when, applying all the force I could to the screw of the rolling-press, I drove it through a backing of paper, thin lead (perhaps one-sixteenth thick), the relief, and a thin metal (I believe zinc) plate. The relief was split to ribbons; the mould a bit longer than it ought to be, *but perfect*.

The next step was, naturally, to develope the relief upon a polished metal plate; and that system, with the thin lead and direct paper backing, is, I believe, the one still followed. I have, therefore, no hesitation in saying that the new patent is, first of all, not new; and, next, that the chances of its failure, in a practical sense—that is to say, in its application to ordinary photographic printing—are enormous.—I am, yours, &c., GEORGE SMITH.

July 2, 1883.

COLLODION EMULSIONS.

To the EDITORS.

GENTLEMEN,—The only question that Mr. E. Banks has attempted to reply to is that of the difference between a film of unwashed and a washed emulsion. He says they are both alike, but I must differ with him. With a washed emulsion the finished film is far finer than an unwashed, for certain reasons I before stated.

He then passes over the matter of using caustic soda in the developer. I think I put the question plain enough, and by his silence on that matter I take it that he cannot verify his assertion. I do not under-

stand him when he says that he did not deny the value of washed emulsions. I read what he said very carefully, and by my way of interpreting it is that he had not a good word to say in favour of washed emulsions. "They were gritty, sandy, and blistered, and gave a coarse film." If that be his system of not denying the value of washed emulsions I am perfectly at a loss to understand what he does mean, so I must leave it.

In reference to the statement that an unwashed emulsion with nitrate of silver in excess will keep for eighteen months: such has not been my experience in the matter, to say the least of it. Does Mr. Banks aver that an unwashed emulsion does not ripen by age, and that it is not a system of change? If he do he goes against all theory and practice.—I am, yours, &c., WM. BROOKS.

Conway, North Wales, June 30, 1883.

ON FOCUSSING.

To the EDITORS.

GENTLEMEN,—I have read Mr. George Smith's letter in your impression of the 29th ult. I thought it would be self-evident to all your readers what my object was in adopting the plan I did for making a focussing-screen; but I find I must apologise to Mr. George Smith for not making myself clear to his comprehension.

I considered that in making a screen, with plain glass in it, it was especially necessary to take care that the image should appear *sharp* on the clear glass of the *varnished* side and not on the clear glass of the *plain* side; and I secured that object by *temporarily* using as delicate a test as I thought necessary.

I have found, from some considerable experience (as I said in my last), that I have attained my object; therefore I do not see the reason for the suggestion made by your correspondent. I take it also to be evidently necessary that each and every operator have his own focussing-glass, carefully adjusted by and for himself, to suit his own sight, and then there ought to be no difficulty in obtaining *absolutely* sharp pictures.

I may as well add that I find it convenient to have the horizontal arm of the cross extended half way on both sides between the centre and sides of the screen, and this will be found to be especially useful when using a pair of stereoscopic lenses.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, July 3, 1883.

EXCHANGE COLUMN.

What useful offers in exchange for about seventy numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY?—Address, "BUTT," photographer, Blandford.

I will exchange a gem camera, twelve lenses, new, £3; Victoria ditto, nine lenses, £4 10s.; solar camera, nine-inch condensers, £4. Wanted, a good *carte* camera.—Address, C. P. GEE, Weymouth.

Wanted, first-class photographic apparatus, outdoor, in exchange for a splendid old Italian violin, grand tone, valued at £50.—Address, BUTT, photographer, Blandford.

A dark carriage on four wheels for pony, cost £10, good as new, well fitted up for outdoor work, in exchange for 10 × 8 camera, bellows-body, with two double dark slides, or a tricycle in nice condition.—Address, J. YEOMAN, photographer, Bedale.

Wanted, in exchange for a quarter-plate lens and camera, by Fleming, of Oxford-street, London, a good second-hand landscape background or studio posing-chair. Send photograph, which will be returned.—Address, FRED. RUBRA, Stony Stratford, Bucks.

Wanted to exchange, large specimen case, heavy moulding (English gold), openings for twelve 10 × 8 photographs, in splendid condition; also very pretty quarter-plate camera, repeating back, wet and dry slides, bath, frames, &c. Wanted, good bellows-body whole-plate camera and lens.—Address, E. E. K., 33, Rothbury-street, Scarbro'.

I will exchange a portable 9 × 7 camera, with single and double dark slide, for a wide-angle view lens by a good maker, or half-plate camera with double backs, also whole-plate doublet, group, and view lens, for anything useful in photography.—Address, WILLIAM NORMAN, artist, the Lorne Hotel, High-street, Rhyl, North Wales.

I will exchange the framework of a photographic booth, 16 feet × 9 feet, perfectly new, never been used, requires only the canvas to complete it, every joint bolted and numbered, and can be put together in half-an-hour—for a good Victoria camera, with four lenses, in good condition, or what offers?—Address, W. WHITAKER, 44, Accrington-road, Burnley, Lancashire.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

ERRATUM.—In our report of the Technical Meeting of the Photographic Society of Great Britain in our last issue, page 378, last paragraph but one in the report, the words "were torn" were, by a printer's error, omitted from Mr. Warnerke's observations on the fluorescence of gelatine films; which should read—"if a gelatine film *were torn* it would be seen to emit light, and that in the daylight."

ALPHA (Hull).—Received too late to be answered this week.

MOUNTANT.—We have received a sample of a new mountant. We shall try it the first opportunity we have.

H. G. H.—We do not see how the permanency of the prints can be affected by water, in the manner you describe.

DELTA.—If this correspondent will conform to our rule by sending hi name and address we shall be happy to give him the information desired

W. C.—The only plan is to make the photograph copyright at Stationers Hall. If you send us a print, with full particulars, together with one an sixpence in stamps, we will effect the registration for you.

F. WHARTON.—We never publish the addresses of our correspondents i this column; but if you forward a letter here, addressed to the gentlema mentioned, we shall be glad to forward it to him.

S. E. RIVERS.—The views are very carefully selected; but unfortunatel the negatives are all more or less under-exposed—some of them ver much so. In most instances double the exposure would not have bee too much to have given.

J. A. F.—The formula you have been employing will answer quite well It is probable that you have been allowing the bichloride of mercury t act too long, and have not sufficiently washed the negative before apply ing the ammonia. Try again.

W. JOHNSON.—Possibly a pocket camera will answer your purpose. Writ to the Sciopticon Co. Second-hand apparatus, if by a good maker, wil answer if it be in good condition. Read Hughes's *Manual of Photograph* published by Mr. J. Werge, Berners-street, London, W.

GEM.—Yes; it is customary to treat the prints before burnishing. Th usual method is to make a solution of Castile soap in alcohol—one grai to the ounce; then, with a pledget of cotton wool, to apply a little of th solution. When it is dry the print is ready for burnishing.

ALPHA.—1. The quantity of salt mentioned cannot be dissolved in tha amount of water.—2. The solution being slightly discoloured will be o no consequence. If, however, it is very much so, it will be better t throw it away and make fresh, as it is very inexpensive.—3. Simply a bad case of over-exposure. There is no help for it now.

X. Y. Z. (2, York-street, Covent-garden, W.C.).—The exchange notic sent with simply this *nom de plume* attached is not inserted, owing t non-compliance with our rule which makes it imperative to forward with the notice, the correct name and address of the person desirous o effecting the exchange. These notices are also confined to four lines.

J. H. TUNMER (Paris).—We should be glad to take up your suggestion i it were really feasible; but at the present, at least, we can scarcely se our way to doing so. The questions might, no doubt, afford entertain ment to one section of our readers; but there are so many other demand on our space that we should hesitate to make the new experiment.

BEGINNER.—As you are a beginner in photography we should advise yo to have glass only on the north side of the studio and not on the south as that would give you considerably more trouble to work, howeve thick your blinds may be, particularly when the sun is shining. Six fee of glass in the top and sides is scarcely sufficient. We should advise yo to have seven or eight feet. If you can increase the length of the studi you will find it a convenience in working.

T. S. BRIGGS.—The spots on the two carbon transparencies sent by yo are evidently due to dust settling on them while they were drying. I you examine the pictures carefully, you will see that the specks are o the surface and not in the body of the film, as they would be if the were contained in the pigment paper. Try again, and be careful tha the final washing water is free from floating particles. Then set them t dry in a situation where they will be protected from dust settling upo them.

RECEIVED.—W. Harding Warner.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At th next meeting of this Club, to be held on Wednesday next, the 11th inst. the subject for discussion will be—*On the Best Lens for Instantaneou Landscapes, Especially with Regard to the Angle Desirable to b Included.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For two Weeks ending July 4, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

June	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
21	29·89	SE	59	55	108	66	53	Cloudy.
22	30·04	N	58	53	104	69	51	Cloudy.
23	30·04	W	60	55	113	74	54	Cloudy.
25	29·82	S	66	61	117	78	60	Overcast.
26	29·75	SW	60	55	108	65	63	Cloudy.
27	29·94	W	60	56	100	65	51	Cloudy.
28	29·90	SW	63	60	119	73	57	Overcast.
29	30·04	S	72	65	124	85	58	Bright.
30	29·99	S	74	66	110	85	64	Overcast.
July								
2	30·09	SE	70	62	123	85	59	Cloudy.
3	29·86	SE	71	66	119	79	64	Overcast.
4	29·82	SE	60	57	96	61	53	Raining.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1210. Vol. XXX.—JULY 13, 1883.

SILVER RESIDUES.

The subject of residues has been recently revived by Mr. J. Pike in a paper read before the Newcastle and Northern Counties Photographic Association, and again in our columns this week by Mr. H. Y. E. Cotesworth, the methods proposed by both these gentlemen involving the use of "hypo." for the purpose of extracting or separating the precious metal from other matters with which it may be mixed. In Mr. Pike's method likewise there is the necessity for resorting to a crucible operation in order to reduce the silver sulphide to the metallic state, and so render it available for conversion into nitrate. Mr. Cotesworth avoids the crucible, but by his plan it is extremely doubtful whether silver of a very high degree of purity is obtained even when all the precautions he suggests are observed. We propose to describe a method we have used with success for some time and which has proved a great convenience, dispensing, as it does, with the troublesome operation of fusing the metallic silver, and at the same time giving a product in the shape of nitrate that is pure enough for any photographic purpose.

But why, it will be asked by some, resort to the trouble of reducing one's own residues when it is so easy to send them to the refiner? Those who prefer to send to the refiner can, of course, continue to do so; but there are at least two classes of photographers who are either compelled or prefer to recover their own silver, and it is for these that we and others write. There are, in the first place, many, amateurs and others, whose residues are too small in quantity to send to the refiner, and to whom the operation of recovering the metal, if not surrounded by too many difficult manipulations, forms a pleasant amusement. There is another class whose quantities are large enough, but who are of opinion—rightly or wrongly we cannot say—that they secure a better return by doing the work themselves; and, lastly, there are those who prefer to do everything themselves for the mere sake of doing it. As the plan we are about to describe is equally applicable to large or small quantities it will, therefore, suit all.

The process is based on the fact that the haloid salts of silver are reduced with more or less facility by the combined action of heat and alkalies in the presence of various forms of organic matter, but especially the sugars and glucoses. Chloride of silver, as is well known, is reduced to the state of oxide by boiling with potassic hydrate; but if glucose be added to the list of ingredients the final result will be metallic silver instead of oxide. Though caustic alkalies naturally operate most energetically alkaline carbonates may be used instead; while, in place of glucose, sugar, honey, molasses, or, indeed, almost anything of a saccharine nature, may be employed. In using these substitutes for the sake of economy it is only necessary to bear in mind that the change does not proceed so rapidly, and that, therefore, it is wise to continue the action for a longer period.

It will be obvious in using this method that, provided due care be taken in washing the reduced silver, no great amount of impurity can remain; whereas it is well known that when zinc, copper, or other metals are employed to effect the reduction, it is practically impossible to free the silver from baser metals by mere washing, and it is a somewhat difficult operation even when fusion is resorted to. In fact, several methods based on this principle have been proposed by different chemists for the purpose of procuring perfectly pure silver. Where the highest degree of purity is required fusion is, of course, resorted to, and this suffices to remove entirely any organic or alkaline impurities which may escape even a prolonged and careful washing; whereas, if other metals are present, they are difficult of removal except by cupellation or re-precipitation of the silver in the form of chloride, when, of course, the same trouble occurs again.

Let us now proceed to the practical details of the process. We will divide the residues into two classes, those consisting of the silver haloids in a state of practical purity—that is, unmixed with organic matter, such as washings of prints—and residues of gelatine or collodion emulsion, spoilt films, &c. This is merely as a matter of convenience, the unmixed haloids being reduced more readily than gelatine emulsion; but if it be preferred the whole may be mixed together. Sulphide of silver and old hypo. solutions are not to be treated in this manner, but must be reduced in the ordinary mode.

We will suppose that a mass of chloride of silver is to be treated. Drain off as much of the water as possible and transfer it to a deep porcelain evaporating basin, or, better still, a tall glass beaker, and pour on sufficient water to cover it to the depth of at least an inch. It will expedite the reduction and save trouble at a later stage if the haloid be rubbed down with a spatula until it is in the form of a smooth paste free from lumps. Now throw in, according to the quantity to be treated, crystals of common washing soda. The exact proportions are not important so long as sufficient alkali is used, but about two parts of carbonate to one of silver chloride appears to be ample. Now place the basin or beaker upon a ring burner, or, preferably, a sand bath, and raise the temperature to boiling point, stirring occasionally. So long as the alkali and silver salt alone are present no change occurs; but immediately the saccharine or organic substance is added the mixture commences to change colour, turning first grey, then passing through various shades of brown until it becomes quite black. As regards the material to be used, common brown sugar or molasses are the cheapest, the first being, perhaps, the more convenient. Here, again, the quantity is not of great moment provided sufficient be employed.

At the end of a quarter of an hour's boiling, if the heat be removed and the mixture allowed to settle the chloride will be found to have been changed to a fine, black powder, the supernatant liquid being of a clear, deep brown colour, resembling, in appearance as well as smell, caramel. It is better at this stage to extract a small quantity of the silver deposit and test its solubility in nitric acid. If it do not dissolve completely the boiling is to be resumed for a further period, a little more alkali and sugar being added. If the residues treated have consisted solely of chloride or bromide of silver the result should be perfectly soluble; but if any sulphide be present it will not suffer reduction, and consequently remains as an insoluble black or brown powder when the rest of the mass is dissolved.

Should the silver to be recovered be in the form of waste emulsion or spoilt films, it is only necessary to pour over the mass

sufficient water to liquify it when heated, and to this to add the alkali. The products of the decomposition of the gelatine supply the necessary organic matter to complete the reduction, though the addition of a little sugar or glucose hastens it, as does also free ammonia.

In either case, when the reaction is found to be complete the dark-coloured liquid is poured closely off the sediment and replaced by water—this is changed repeatedly—stirring up the whole each time, until the washings are perfectly free from colour and from all alkaline reaction. The mass of sediment is then converted into nitrate by the cautious addition of dilute nitric acid. If this latter be added too rapidly the frothing up of the mixture is liable to cause loss of silver. The solution may be evaporated and crystallised in the ordinary way, or it may be titrated and used as a stock or standard solution by those who prefer to avoid the crystallisation. Evaporation to dryness on the sand bath should be resorted to where the purity or freedom from acid is desirable, otherwise it is not necessary. The product thus obtained is quite pure enough for any emulsion purposes, and the whole process is simple in the extreme.

LENSES FOR FIELD WORK.

The importance attached by practical photographers to the subject of the lenses best adapted for use in the photographing of landscapes, both slowly and rapidly, may be estimated from the fact of the last four meetings of the Photographic Club having been devoted to the discussion of this topic, a large attendance of members evincing the interest felt in it.

Certain reasons were given by the Chairman who presided at wo of the meetings (Mr. J. Traill Taylor) why the single achromatic lens was, *par excellence*, the objective best adapted for landscape work of the ordinary class, when the circumstances under which it was produced were not of a nature necessitating extreme rapidity of exposure; while, with regard to other lenses, he urged that they should be considered not so much as optical instruments as photographic tools, for the greatest excellence in the one did not thereby necessarily imply utility in the other.

For landscape work in which there is nothing of a specially obtrusive architectural character the single achromatic answers well—probably better than any other class of lens extant. This it does in virtue of the great vigour which it imparts to any delineation made through its agency. The reason of this superior vigour arises from the absence of the numerous reflections caused by the reaction of the one lens of a combination upon another, by which these reflections are distributed all over the plate, to the serious degradation of the shadows, and, consequently, the impairing of the brilliancy of the picture.

If a comparison be instituted between two lenses of short focus for extremely rapid exposures, one of these being a single achromatic and the other a "rapid" combination, there will be found a marked difference as regards the rapidity capable of being attained, this being decidedly in favour of the latter, on account of its working with a so much larger aperture. This difference is so well marked as not to leave for a moment in doubt the question as to which class of lens should be employed. This applies, however, in an especial manner to pictures of rather small dimensions produced by lenses of short focus; but when the lens is large and the focus long there is an element of disturbance introduced. This is the impossibility of getting into a uniformly-sharp focus the various portions which constitute the picture. A rapid lens of eight inches focus, when worked with full aperture—which may be one inch—will give a picture that is sharp and crisp throughout compared with a lens of similar intensity-power in which the aperture is four inches and the focus thirty-two inches. In this latter case, objects which were sharp with the smaller lens will now be so indistinct as to render it altogether impossible to get foreground, distance, and middle distance to be delineated on terms at all approaching equality; for if the distance sharp, the foreground objects are so exceedingly indistinct as ely even to suggest their character. It is only by an extreme stopping down of the lens that anything like uniformity of sharpness is obtained; and it is under these altered circumstances wher a comparison can be fittingly made between a *large* "rapid objective and a single landscape lens. In such comparison th advantage will not be greatly, if at all, to the disadvantage of th single achromatic.

It appears as if the whole matter may be summed up in th following:—For landscapes embracing a moderately-wide angle o included subject, there being no prominent architectural or vertica object towards the sides of the picture, a single achromatic landscap lens will be the most suitable. When the subject is composed in large measure of architectural subjects, then a non-distorting len should be employed, its nature—as to wide or narrow angle, slov or quick working—being determined by the circumstances of th case. For such subjects as garden groups or lawn parties a "rapid combination is necessary, unless when the subject is one occupying only a limited angle. In the latter case a portrait lens may be employed with advantage, worked, of course, with full aperture because if stopped down it then becomes inferior to a "rapid" lens

In the case of large pictures involving the extreme of rapidity i exposure—such as the photographing of a race-course—it will be wel not even to make the attempt, because of the necessity, as alread shown, for stopping down the lens to secure the necessary penetrativ power, as in such instances the diminution of the light necessitates longer exposure. For the slower class of the so-called "instantaneous objects—such as marine or seaside views, breaking waves, ships an steamers in motion, and soforth—almost any lens, single or combi nation, will answer that is capable of producing an impression i from the tenth to the twentieth of a second.

To conclude: a much more satisfactory result is usually obtained by taking a small (instantaneous) photograph and afterwards enlarging it than by taking it on a large scale direct.

PHOTOGRAPHIC PROPORTION AND PERSPECTIVE.

There is, perhaps, no character more frequently given to a photograph than that of untruthfulness as to proportion and exaggeratio as to perspective; yet as, with proper precautions taken, a photograph represents with mathematical correctness the appearance of the outlines of whatever object lies in front of the lens, it is evident that there is error somewhere. If, also, it be remembered that when an artist paints upon his canvas the objects before him he will, if he draw in strict accordance with the rules of perspective produce results identical with the camera picture, the question naturally arises—"Why then should there be this continual battle between mathematical truth and intelligent judgment?" At the risk of telling a twice-told tale we may at some length explain the matter.

When an artist represents upon paper or canvas the view befor him he produces outlines—with more or less accuracy according t his skill—similar to what might be obtained if, keeping his hea stationary, he drew upon a piece of prepared glass placed in fron of him truly vertically and in a plane at right angles to the axi of the eye the view before him. Thus, seating himself exactly in front of a window whose surface was prepared to take a pencil impression, and, without moving his head, marking the outlines before him upon such window, it is mathematically demonstrable that the picture so drawn would be an exactly true representation of the landscape or buildings as he saw them. Artists, whe treating of the subject scientifically, assume the picture to be draw upon such a theoretical piece of glass, which they term the "plane of delineation."

It must be premised that the view is assumed to be viewed with a single eye—an assumption that has no perceptible bearing, except upon very near objects. Then, taking the eye as a point, it follows that rays of light from all directions converge to it, all being cut by, or cutting, the sheet of glass or plane of delineation, and, being straight lines, forming a point only at the place of cutting or intersection. The central ray gives, at the point where it passes through the sheet, the "point of sight" or "centre of vision." When the spectator is looking straight forward that point would lie upon the line of the horizon—that is, the line where sea and sky appear to meet.

Now, as a matter of fact, it is found that all parallel lines in a lane parallel to the plane of delineation will appear to preserve ıeir parallelism when drawn upon the sheet of glass. Such lines arallel to the horizon, when in a plane at an angle to the plane of elineation, will always appear to converge—to the point of sight here they are at right angle to the picture plane—to points on ither side of that point of sight, and more or less distant from it hen they are more or less removed from a position of right angles. Vhen they are not parallel to the horizon and are at an angle to he plane of delineation they converge in all directions, but each et to its own particular point and under perfectly-understood laws.

All these facts are, as we say, pure matters of observation, and re beyond cavil. Their modes of application have been systemaised and a series of rules have been formulated from them; so that, ertain measured data being given, it is possible by their aid to raw a correct representation wholly by means of rule and compass f any object whatever—a representation so correct that if drawn n glass and held before the spectator exactly "square" to him it vould be found that all the lines so drawn would hide, or seem to over, the corresponding lines in nature.

The recognition of these facts may be, and in fact often is, lemurred to, but only by those insufficiently conversant with the ubject. Thus, it is often said that as the farther off an object is he smaller it is, therefore the top, for example, of a tower or tall himney (of the same width the whole of its height), being further way than the bottom, must, of necessity, look smaller.

Instead of contradicting such an assertion we would rather advise ts utterer to test it. Let him without favour seat himself behind a vindow, and keeping his head stationary the while, with a brush lipped in indian ink line out the outlines of the building on the vindow just as he sees them. He will find the proportion is in no vay altered, the explanation being that the rays from the distant arts when brought to a focus upon the retina of the eye have further o travel, and so can expand to neutralise their otherwise-reduced cale. Hence, no matter how long a series of parallel lines extend o the right or left of the spectator, they would not appear to conerge unless he turned himself from them so as to render the lines ıon-parallel to the plane of delineation, which by common practice s supposed to lie exactly in front of the spectator and parallel to he general plane of his body.

It will be thus seen that the same rule as to parallel or converging ines must hold good whether they are horizontal, as when bounding a row of houses, or perpendicular, as when indicating the outline of a himney, tower, or other tall edifice. This part of the subject has been excellently put by Mr. George Smith in an article on *Perspective in Photography* in our last issue.

There is just one other point that should be here named. We leave out of sight the fact that the eye as a theoretical optical instrument is not perfect. It is not achromatic, it is not aplanatic, and it possesses a considerable amount of spherical aberration. Practically we need not take into consideration any of these qualities, as the argument is scarcely touched.

We have gone thus fully into the question of perspective to show that the educated draughtsman acknowledges and acts upon rigid rules founded upon exact truth in his delineation of the objects he wishes to depict; and we have now to add to this that pictures taken by rectilinear lenses will be identical in every respect, as regards the lines, with pictures from the hands of the skilled draughtsman. If taken on the same scale, and superposed one upon the other, the lines of each would coincide exactly.

Again the question arises—"Where, then, is the untruthfulness of a photograph?" And now we can explain. Artists of the brush, as a rule, do not represent anything beyond sixty degrees of angular measure, which is never thirty degrees on each side of the horizon in an oblong picture, and is often very much less; and if they introduce a tempting "bit" of foreground they do not hesitate to reduce its true proportions, fully aware that the mental conception of a fact is often very different from its true character. Photographers cannot employ such a falsity, and, moreover, when using wide-angle lenses they get beyond the sixty degrees, and include subjects that would not be (at anyrate truthfully) represented at all by the painter, so obtaining effects with which the public are not familiar.

Yet, notwithstanding all this, such a photograph, if placed in the position of the picture plane or plane of delineation, would, line for line and measure for measure, down to the extreme edge, coincide with nature itself, but (and here lies the gist of the whole matter) only when the picture or the picture plane is at such a distance from the eye that it subtends exactly the same angle as that embraced by the lens; in other words, as far from the eye as the focus of the lens. If placed at any other distance it would not coincide with the original, and therefore it is that as the length of picture would in "wide-angle" views be much greater than the correct distance it should be viewed from, and as there would be no comfort in seeing it, it would be removed to a more comfortable distance; and so it follows that, though mathematically correct from one point of view, it is in another "exaggerated" in perspective and false in proportion.

THE RECENT DECISION ON COPYRIGHT IN PHOTOGRAPHS.

A case of very considerable importance to photographers at large—more particularly to those who publish their pictures—with regard to the copyright in their work was decided last week, by Mr. Justice Field, in the Court of Queen's Bench.

This decision, we think, is worthy of more than the passing notice of the proceedings we gave in our last issue, inasmuch as, so far as we are aware, the point relied upon by the defendant has never before been raised in a court of justice, and, unless the judgment be reversed by a superior court—and we are given to understand it is to be appealed against—it will materially affect the validity of the copyright supposed to exist in the larger proportion of the photographs now in the market. Evidently the question was a somewhat knotty one to the learned judge himself, inasmuch as the case has been before the court on several occasions since the 8th of May, and the judgment was only delivered last week.

Briefly stated, the facts are these:—Messrs. Nottage and Kennard, trading under the title of the London Stereoscopic Company, in Cheapside and Regent-street, sued Mr. J. H. Jackson, of Leeds, for penalties for selling alleged pirated copies of their pictures, namely, a group of the Australian Cricketers and a portrait of Lord Derby, and also for an injunction to restrain the defendant from further sale of the pictures. The sale of the pictures in question was not disputed, and the main points relied upon for the defence were—first, that the plaintiffs had not complied with the Act of Parliament, as they had only registered their place of business, where neither of them actually resided, instead of their place of abode; and, secondly, that the plaintiffs were not the authors of the work as contemplated by the Act, that being in reality done by an *employé*. On the former point the learned judge ruled that the place of business was, to all intents and purposes, the place of abode, and that the registration of that was quite sufficient. On the other point, judgment was given for the defendant, with costs, the judge remarking—"I do not think the defendant was a fraudulent infringer."

If this judgment stand there is little protection for photographers in the present Copyrights Act, unless the work has actually been executed by the person in whose name it is registered; for if it be done by his *employé* then any one, it seems, may pirate it without let or hindrance, as in the case just tried. Here, Mr. Reynolds, an operator in the employ of the London Stereoscopic Company, was deputed to attend at "The Oval" to take a photograph of the Australian Cricketers in a group. This he did, and the picture was duly registered at Stationers' Hall in the name of the Company (his employers); whereas, according to the ruling of Mr. Justice Field, the copyright was legally vested in Mr. Reynolds only, and in no one else.

According to this it follows that if a photographer employing operators shall register in his own name any work done by such paid operators the copyright will not be valid, inasmuch as by the recent ruling it is vested in the *employé* and not in the employer. Hence, it is manifest that many thousands of the landscapes, published by such

firms as Frith, Wilson, Poulton, and others may be pirated without legal remedy, because the negatives were, in most instances, taken by artists employed for the purpose and not by the principals themselves. This is a very serious matter. It is seldom, in the case of large firms who publish their pictures, that the negatives are actually taken by any of the principals; consequently it follows that a very large proportion of the portraits of celebrities which have been duly registered at Stationers' Hall are not legally copyright. However, we understand that the judgment of Mr. Justice Field is to be appealed against, when it is possible that it may be reversed. Be that as it may, one thing is certain, namely, that the present Copyright Act is very unsatisfactory, and requires considerable amendment to make it of much practical value to photographers.

In the proposed new bill that has been before Parliament for two or three years past—but which, like many more, has been "crowded out" by press of other business—this point is rendered clear and explicit by clause 11, and, as the proposed new bill will doubtless be brought forward on some future occasion, we here give the clause in full:—"If any person being a British subject, or domiciled as aforesaid, employs another as his assistant, servant, or workman to work for him for salary, wages, or hire, for the purpose of executing, making, or taking, or assisting in executing, making, or taking any work of fine art, or any photograph, the copyright in such work or photograph shall belong to the employer."

Clearly this is as it should be, for if a person pays for certain work to be done the result should be his property; and we imagine that few operators have for a moment considered that the copyright in any negatives they may have taken, either in the studio or out of doors, to their employers' order, is vested in themselves and not in their principals. However, such now appears to be the case.

It is quite possible, as the matter now stands, that the question may at some future time be still further complicated where one operator poses the sitters and another makes the negative—as is the custom in some large establishments—as to which of the two is the legal author and is entitled to the copyright; for it appears doubtful if the law will recognise joint authorship.

The immediate question now is—How can photographs which are taken by *employés* be protected from piracy? The only way we can see, according to the late decision, is to register the picture in the name of the operator who takes it, and then for him to assign the copyright to his employer, which must be done in writing and duly stamped. This is a roundabout method, and may possibly prove a source of inconvenience to many; but at present we can see no alternative for it, as this appears the only way by which the copyright can be secured.

However, as we have said before, the judgment of Mr. Justice Field will in all probability be appealed against, and the result will be anxiously awaited by every photographer throughout the kingdom. In the meantime, we learn that one or two more actions for piracy against the defendant in the case just tried are for the present allowed to remain in abeyance.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XI.—The Optical Centre.

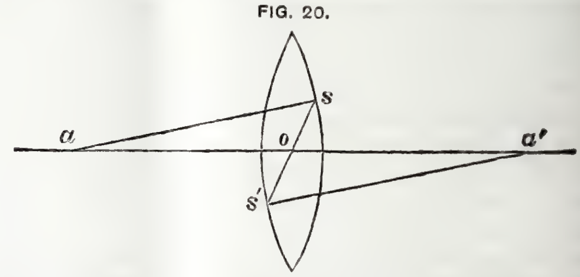
Previous to the consideration of either the solar, the equivalent, or conjugate foci of lenses it is necessary that we speak of the "optical centre," this being the point from which focal measurements must be made. Our remarks will, at first, have reference only to the optical centre of *a lens*, by which we mean just what is expressed by this name and not of an objective, or combination of lenses, which is quite another matter; for, if one choose to be too nice with definitions, it is not difficult to show that a combination has not an optical centre at all, or, to put it more intelligibly, that any given combination may have its optical centre at several places, according to the circumstances under which it is being employed.

The situation of the optical centre (or *focal* centre, as it has by some been designated) of a lens is determined by its form. In some forms it is within, and in others outside, of the lens. In a double-convex it is in the middle, or equi-distant from both surfaces; in a crossed lens it is situated at a point between the middle and the flatter of the two surfaces; a plano-convex has its optical centre on the curved surface; while in a meniscus it is outside altogether, its distance from the lens being determined by the degrees of curvature of the surfaces.

The method for finding the optical centre of a lens is this:—Draw two parallel radial lines, one from the centre of each curvature, and both being oblique to the axis; then connect the points at which they touch the curved surface by a line which, in the case of a meniscus, must be prolonged till it meet the axis. The point at which this junction line touches the axis is the optical centre. We shall now illustrate this law by applying it to the case of three of the four lenses just named.

In *fig.* 20 we have a double convex lens, the radius of curvatures of both surfaces being a and a', which in this and the two following

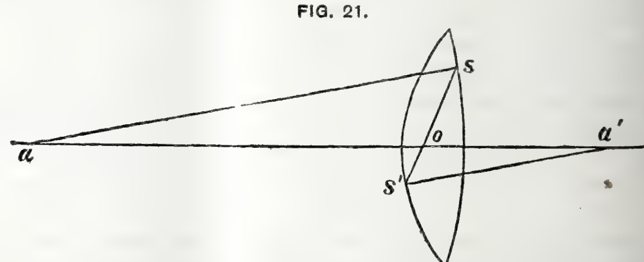
FIG. 20.



figures are parallel to each other. From their points of impact on their respective surfaces, as $s\ s'$, a connecting line is drawn, and at the point o, where this line touches the axis, is situated the optical centre.

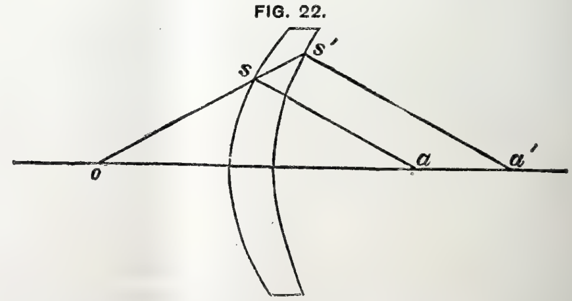
By the flattening of one of the curves of the lens it becomes, as in *fig.* 21, a crossed lens, having its optical centre at o, which in this case is not centrally situated.

FIG. 21.



It is in the case of the deep meniscus now so much in use for many purposes, both singly and combined, where the greatest discrepancy exists between one's ordinary or crude conjectures as to the situation of the optical centre and its true position. In *fig.* 22

FIG. 22.



it is demonstrated not only to be outside of the lens, but a long way outside. We have heard the question put to one who was reputed to be fairly conversant with optical matters—"Where must I measure the focus of my lens from?"—the lens spoken of being a wide-angle, deep meniscus, having a stop in front. The response was—"You will be sufficiently accurate by measuring from the centre of the curved surface of the lens." Now, this reply is not correct in the case of a lens of this form, although it would be so if one surface were plane instead of being concave.

One of the properties of the optical centre of a lens is this—that any ray refracted by the lens which passes through this centre emerges in a direction parallel to that of its incidence. In most of the class-books on optics the rule for finding the optical centre is expressed thus: "Multiply the thickness of the lens by the radius of one surface and divide the product by the sum of the radii, and the quotient is the distance of the centre from the vertex of that surface." The position of the centre is the same in every lens of the same dimensions, whatever may be the material of which it consists.

What has hitherto been said applies to single lenses, to which alone the term "optical centre" is strictly applicable; and, although we have confined the illustrations to those of the positive or convex class, the rules equally apply to concave lenses.

In a *combination* of lenses, whether symmetrical or non-symmetrical, there is no fixed point which can be termed the "optical centre." The mistake, however, is frequently made of assigning it a position where the stop is placed. But the best position for the stop has not necessarily any relation to that of the centre, which can only have its position determined upon knowing the precise circumstances under which the combination is to be used, for it has strict relation to the conjugate foci. If these were so definitely fixed as to be invariable, then the position of the centre could be definitely allocated, but not otherwise; for every alteration of focus would be attended with a displacement of the central point. What is commonly termed the "optical centre" in a combination is in reality the centre of conjugate foci, and this is determined by the conjugates, which, as already said, are changed with nearly every change of picture aken.

The place of the centre in a combination of any nature or form may be easily found, and for any special purpose it may be marked upon the brasswork of the mounting. The method now to be described is one which involves no special apparatus. Suppose the lens to be a large portrait combination, and it is desired to know its centre when employed in portraiture. Let us assume the anterior conjugate (the sitter) to be at an average distance of (say) eighteen feet from the camera, then let the lens be brought into a darkened room and placed upon a board on the table. On this board must be laid a small square block of wood about two inches in height, and the upper surface of which is brought to a wedge shape. Now rest the lens across the face of the wedge and let it be directed to a lighted candle placed in front at a distance equal to that at which the sitter is expected to be placed, and having erected, a few inches behind the lens, a white sheet of cardboard on which to receive the image of the candle, hold the lens (the weight of which rests upon the wedge-shaped block) level by the forefinger of the left hand, and with the right hand rotate the lens gently on the extemporised rotary axis formed by the wedge below and the finger above. Now observe if the image of the candle flame stand perfectly motionless, or whether, as will most likely be the case, it moves across the card with every rotation of the lens. In this latter case, move the lens a little farther backwards or forwards on the supporting block and try again. Do this until that position is found at which the image of the candle remains motionless while the lens is being rotated from side to side, and then put a small mark on the tube, which ever afterwards will indicate, with the degree of accuracy practically required, the optical centre of the combination, whenever employed under circumstances in which the position of the conjugates assimilates to those under which the trial was made.

But to prove that the centre in question is really only that of these conjugates: after having made the mark on the tube, let the candle be brought to within six feet of the lens, and by another course of experiments let its centre be again found, and it will be seen that it now differs materially in position from that of the previous trial. The new centre is quite right for, and under, the altered conditions, but wrong as regards all others.

We are aware of some gentlemen who are so dexterous in examining a combination for its optical centre (we are now using the term under a kind of protest) that they will take it up and, poising it between finger and thumb, examine the stability of the image on the wall opposite a window while rotating the lens, and in this way will in less than half-a-minute have acquired more knowledge concerning it than another would in some days.

We take it that anyone who freely gives his ideas to the public must feel complimented if those ideas are taken up and worked commercially, especially where the credit due for originality is properly given to him. Such must have been the case with Mr. A. Johnson when, within a few hours of the arrival of our ALMANAC in America, the enterprise of the Scovill Company had caused to be placed in the market immense numbers of his useful little "plate-lifter," giving to him the credit of originality. This, we repeat, was nothing but most satisfactory. But what would Mr. Johnson's feelings be, on reading the advertisements in a German journal, to find his plate-lifter figured and described as "Braun's new plate-lifter?" Such, however, is the case; and only that we do not care to give gratuitously an undeserved advertisement we would append the name of the dealer who so coolly for his own purposes appropriates the ideas of others.

The last eclipse observations would appear to have been more fertile in results than had been anticipated. Last week we called attention to Dr. Hastings's observations, and now, if we are to rely upon a recent telegram, the French observers have still more startling surprises in store when detailed accounts come to hand, the following being the substance of a despatch telegraphed from San Francisco under date of July 10th:—"The French astronomers who were despatched to the Caroline Islands to study the eclipse of the sun on May 6th last have arrived here on board the 'City of Sydney,' and report having observed a red star, which they believe will prove to be a new discovery. Several new features were noticed on the corona, chiefly consisting of white prominences, supposed to be the vapour of white clouds."

Our readers may probably remember our giving a description of some experiments upon india-rubber with regard to the action of light and air upon it—a subject of some interest to photographers—a solution of that material having a reputation as a mountant that can easily be used without producing a stain or causing cockling. The experience of a number of years has shown that some prints so mounted are apt gradually to lose their adhesion to the support and to fall away. Mr. Herbert McLeod has now published the results of further experiments in continuation of those previously described. In January of this year he introduced two small lengths of narrow caoutchouc tubing, about a couple of inches long, into two test tubes containing oxygen over mercury and placed them side by side in a north window, covering one over with a black paper case and leaving the other open to the light. At the end of last month the tubes were examined, when it was found that the rubber protected from light was unaltered, while that which had been exposed had absorbed about three-quarters of the oxygen originally contained in the tube, and was visibly altered, pressure with the fingers causing superficial cracks in the material. The conclusion arrived at is "that caoutchouc alters under the combined influence of oxygen and light, but that neither alone produces any effect." From this it may be concluded that india-rubber solution should be safe to use for pasting pictures into books, as they would not be often exposed to light, while when used for pictures for hanging it would be liable to change.

There are many vexed questions in relation to the chemistry of albumen still awaiting settlement, and the subject, rather obscure as it is, has not received attention to the extent that has been bestowed upon some other apparently less important topics. The much-abused albumenised paper print is still the "sheet anchor" of the professional photographer, and every experiment which will throw light upon the theory of the causes of fading will be received with interest by the whole body photographic. We learn, therefore, with pleasure that there is some probability of the subject being better

known, as the Vienna Academy of Sciences offers, among others, one prize of a thousand florins for the best treatise on the chemical constitution of albumen matter.

The question of the cause of luminosity in gas flames has recently been studied by Dr. Werner Siemens with some interesting results. As our readers are aware, the actual cause of light has been by some authorities stated to be the luminosity of gaseous matter at high temperature, while others (the majority) have explained it by the incandescence of solid particles of carbon. Dr. Siemens, by means of the regenerative furnace at his brother's works, has satisfactorily proved that gas at a temperature above the melting-point of steel is entirely non-luminous; and that, therefore, the feeble luminosity of even a flame such as a Bunsen's burner must arise from some other cause than that hitherto assigned.

The elements most employed in our art-science have a mutual interdependence beyond that most familiar to the working photographer. Professor Wigglesworth Clarke, in a re-calculation of atomic weights, says the atomic weights of silver, potassium, sodium, chlorine, bromine, iodine, and sulphur, depend upon each other to so great an extent that they can hardly be considered independently. Indeed, chlorine, potassium, and silver have always been mutually determined. From the ratio between silver and chlorine, the ratio between silver and potassium chloride, and the composition of potassium chlorate, these three atomic weights were first accurately fixed.

In the course of his remarks Professor Clarke makes reference to one fact in connection with chlorate of potash which is not generally known, and which will account for some of the peculiarities observed with india-rubber bags that have been in use for oxygen storage :—"When potassium chlorate is ignited under ordinary circumstances a little solid material is mechanically carried away with the oxygen gas. Minute portions of the substance may be actually volatilised." Of course few experienced lantern operators pass the gas direct into the bag from the retort without the intervention of a wash bottle, though we have seen it done several times. Here, however, is an argument to show the unwisdom of such a course.

Gelatine plates have not, as was once freely stated they would do, banished the "spotter" from the list of photographic helpers; there is still plenty of work for them to do. Blacklead pencil and indigo, lakes, browns, and greys without end have, commixed in various proportions, been recommended for the purpose; but perhaps indian ink has had the greatest number of votaries. There is a right and a wrong way for using most things; and, with regard to indian ink, the wrong way is usually employed, so that not one-half its real value is obtained from this valuable and inimitable pigment. The usual method of procedure is to rub down a little of the ink on to a slab or palette, and, allowing it to dry, to moisten the brush with the lips and take up a small portion of ink as required. By this mode, however, the colour works in a clotty manner; indian ink once rubbed and dried never moistens again to its original smoothness, which is more like a stain than a pigment. Further: the moisture imparted by the tongue makes the colour run still more in clots. If very little of the ink at a time is rubbed up with pure water only, and used while wet with a rather dry brush, it will cover beautifully and "bite" as no other pigment does; and, finally, though its colour does not match the tone of an average photograph, it will be found when dry that the difference in tone is by no means conspicuous.

EMULSION MATTERS.

Notwithstanding all that has been written upon this subject, it is highly probable that more will steadily be forthcoming until the acme of perfection has been reached in the shape of a formula giving the very best results attainable. When, with this object before the mind, a retrospective look is cast on the various leading formulæ given, one cannot help noticing the wide margin existing between this and that man's formula—probably all *bonâ fide* enough, yet leaving much food for reflection, even after considerable practical experience in the matter. Indeed, which is the best—much silver as in Captain Abney's formula, or little silver as in the Paget prize formula? Which the most advisable—a large or a small excess of bromide? Is a small proportion of gelatine really preferable to greater proportions as a vehicle in which to emulsify? Should one use the maximum or the minimum of gelatine to incorporate the emulsified silver salts in? And, next, which is the preferable—emulsifying with an acid or an alkali?

It will be allowed that all these questions are pertinent enough, even though they might not be deemed very interesting by all. The casual and also the indifferent reader would probably prefer some new system of working simplifying the present mode of taking a negative, or a method of printing where washing, toning, and fixing went on simultaneously with exposure under the negative. Not having these desiderata at hand, however, I must rest content with the subject I started with, and to which I was led on reflecting over circumstances associated with the immediate subject in connection with a line of discussion and argument I had with some experimentalists.

After originally starting with the Paget prize formula—which, by the way, is very good, though, to my mind at least, lacking that directness and lucidity desirable in a practical formula—it occurred to me that the primitive elements which constitute the emulsion might logically be proportioned in a ratio at once tangible, practical, and efficient, whilst offering a directness and simplicity met with nowhere that I know of. My numbers simply were these—

Gelatine	One part.
Bromide	Two parts.
Silver	Three parts.

It must be conceded that this has at least the merit of simplicity, and in practice it will be found excellent. It might have been from three to four months after Mr. W. J. Wilson's formula was made public that I devised my formula, and anyone referring to The British Journal Photographic Almanac for the present year, page 56, will see that I adhered to those proportions of the essential ingredients, and I see no valid reason to change them to this day. The invaluable item, carbonate of ammonia, I owe to Mr. J. A. Forrest, who gave it in his excellent article *Every Man His Own Sensitive Plate-Maker*, in the Almanac for 1881.

Now the very name of Mr. Forrest brings back the first term of my proposition—the relative proportion of silver in emulsion; for, while he rests content with using seventy-five grains of silver to produce about ten ounces of finished emulsion, Captain Abney recommends nothing short of 216 grains of silver to produce about six and a-half ounces of emulsion (see *Photographic Handy-Books;* Supplement to No. II., by Captain W. de W. Abney, R.E., F.R.S.). Surely greater divergence of working and opinion could hardly be entertained, and I must say that I consider Captain Abney's greatly-excessive quantity of silver absolutely useless, while a somewhat higher figure than Mr. Forrest's may be desirable for the attainment of very rapid emulsion. I take it that ninety grains of silver is abundant to form five ounces of the most sensitive emulsion.

The next term of my proposition is the bromide. Now it is found that if in excess a thin picture invariably results, and one which no known intensification will turn into a satisfactory negative. Try the effect of sixty grains of bromide for five ounces of emulsion and test it over and over again, and you will find that that proportion gives a robust, healthy-looking negative, better than which is not to be met with. Dr. Eder has put it on record that he attained extreme sensitiveness while emulsifying with the entire bulk of the gelatine. Need one point out how much this is at variance with the theory of boiling only with five or ten grains? Faithful to my original formula, I use thirty grains to emulsify in for the production of five ounces of emulsion, and never had cause to regret adhering to such proportions, feeling convinced, however, that the more or the less will neither mar nor improve the final results.

The last term of my proposition reminds me of a verbal contest with a gentleman who makes a first-rate plate, is a good photographic chemist, and a man who weighs his words before giving them utterance; at the same time, being an army man and used to command, there is a decision, an energy, a terseness in his utterance, which at once would place a matter as *decided* by him beyond all contest. "How did you make your emulsion, and did you use an alkali or an acid?" he asked. "I used the former," I replied. "Then you do not attain the maximum of speed," he rejoined. "Why?" I

nquired. "Because it is not to be done," was the answer. "Not to be done?" I said. "No," was his final reply. I manifestly revolved the matter in my mind and clearly said I could not understaud why an alkali would hinder the production of the maximum of sensitiveness. He subsequently added—"Such is the opinion of the leading men on the subject, the Editors of THE BRITISH JOURNAL OF PHOTOGRAPHY included." I could not but bow; nevertheless, I promised myself to test the point, but have not to this day gone sufficiently far to decide. This much only I know, as in the acid method, speed is a matter of length in boiling—*cœteris paribus.* A third person present at the discussion of the question of "acid *versus* alkali" thought boiling could not be protracted in the presence of an alkali without the solution "coming to grief." A gentleman who works my formula with excellent results has boiled an hour and five minutes, producing a superior emulsion at the end. Further than this my knowledge on the point does not extend; but as the knotty point is by no means decided, in my estimation, it might be well for the good of the cause that the matter were fully investigated by competent experimentalists, and the final results made public in the columns of the Journal. The third term of my proposition, then, which is the best to emulsify with, an acid or an alkali? remains an open question.

But, meanwhile, I must return to that precious ingredient, "carbonate of ammonia," and cannot help saying that I look upon it as a most excellent auxiliary in emulsion working. With it the emulsion ripens far more rapidly than is the case with an acid. It seems to me that the plate containing it possesses a beautiful bloom. For all that, if it really hinder the attainment of maximum speed, when such is desirable, it need hardly be said that it were better discarded.

And, now, how long is one to boil in any way? The gentleman whose words I have previously quoted said, in answer to that question—"The length of time cannot be specified." I asked—"What is one to go by if not by time?" He replied—"Exclusively by colour." "What must it be?" I inquired. His answer was—"The emulsion when viewed—or, rather, the flame when viewed—through a little emulsion spread on a strip of glass must have attained a pure blue colour before it can be said to be sufficiently boiled for general purposes." For extremely sensitive plates the boiling is protracted beyond that considerably.

Now, the ingenuous might not unnaturally ask—"How long will the boiling have to proceed at that rate?" Well, I have known of four or five hours' boiling, and then the emulsion was not at all a speedy one. While the advocates of this system are slowly plodding on their way, I, with my alkaline method—or rather Mr. Forrest's—make a good, rapid plate in three-quarters of an hour's boiling, and one I can invariably rely upon. As a rule, I do not boil more than half-an-hour for ordinary plates giving me from 15 to 17 on the sensitometer, which those who understand plates will concede to be fair working plates. I hold that three to four grains of iodide to every five ounces of emulsion is a decided improvement.

The term "sensitometer," just used, brings another discussion to my mind. After successfully making and working my plates for a long time, I was suddenly questioned as to their sensitometric value, and, to my confusion, was as ignorant on the point as a new-born babe. "Then, how can you speak of your plates at all?" I was asked. I felt the force of the argument as irresistible. How could (say) a fruit dealer, no matter how experienced with his wares, decide the weight of a lot of cherries in the absence of his scales? He might make a pretty near guess, but would that satisfy your pressing and exacting inquirer? I fear not; and I felt that my not having resorted to the use of the sensitometer was a perfect slur on my character as a plate maker (not a public one, by the way); consequently I, like a sheep, followed the movement just being initiated, adopted this otherwise excellent instrument, and now test my plates.

As it happened I had a slow batch, tested it, and, according to Dr. Eder's valuation of the numbers of Warnerke's sensitometer, found it had only one and three-quarters wet-plate speed. Well, I exposed one of these on an open view, which, with the lens I used, would, I think, have necessitated an exposure of some ten seconds. I exposed only two seconds, and had a slightly over-exposed plate. So, despite the register on tablet—despite the valuation of the number on the same—my plate was really more than five times quicker than a wet plate. I think there is a moral to all this. One must put more trust in experience than in theory; not be too readily led away by fresh ideas, and eager to take them up in the teeth of our acquired experience; while, at the same time, it is wisdom to fall back on any scientific means of a nature to lead us to work with more accuracy than ever. Diverging a little from my point, the difficulty still is, and I fear must for a considerable time remain: What is to be the length of exposure? With the greatest attention, over- and under-exposures will still occur now and then.

To conclude: my formula for five ounces of finished emulsion stands thus:—

Hard water	3 ounces.
Nelson's No. 1 gelatine	30 grains.
Bromide of ammonium (or potassium)	60 „
Iodide of „ „	3 „

When the above is dissolved at (say) 140° Fahr., add—

Ordinary printing silver, in crystals	90 grains.

Shake well for a few minutes to dissolve, and then add ten grains of carbonate of ammonium dissolved in two drachms of water. Well shake and uncork twice to let out carbonic acid fumes. Now boil from half-an-hour to three-quarters of an hour, or even an hour for very speedy plates, then add—

Hard water	2 ounces,
Nelson's No. 1 gelatine	50 grains,
Heinrich's gelatine	50 „

this last being dissolved prior to adding. Now let it cool till next day, when treat as I described at page 473 of the Journal of last year, which see for all minor details.

I cannot end this article without wishing it to be distinctly understood that I lay no claim to any originality whatever beyond proportions of chemicals—that I do not for a moment pretend that the formula above given is perfection, or that it is better than anyone else's. I thought it right to draw attention to the wide divergencies in existing formulæ, and think I am not far wrong in my proportions as closely accurate for best working purposes. Silver in excess is, I think, a waste. Too attenuated, it is apt to display a lack of vigour, and bromide in excess certainly enfeebles the image; while the road between acidity and alkalinity I leave as I found it, "open to all comers." A. F. GENLAIN.

RECOVERING SILVER FROM RESIDUES.

HAVING recently a quantity of spoilt emulsion from which I wished to recover the silver and render it available for re-employment, I cast about for the best means of doing it with a minimum of trouble. I particularly wished to avoid the necessity of going through the operation of fusing the silver owing to my usual arrangements being somewhat upset, and the quantity was not sufficiently large to warrant my sending it to the refiner. I caught at first at Mr. John Pike's method with hypo., but I soon reflected that this did not do away with the crucible and furnace.

Revolving the matter in my mind it struck me that it might answer to use the hypo. for separating the silver from the gelatine, and the former might then be reduced to the metallic state instead of to the state of sulphide. Accordingly the emulsion in the solid state was treated with hyposulphite of soda as described, and when the bromide had disappeared the gelatine was allowed to soak in three changes of water, which were added to the hypo. solution. This was then placed in a tall jar and a sheet of ordinary roofing zinc, bent into a cylinder of the same height as, and about half the diameter of, the jar was immersed in it and left for several hours. At the end of this time a bulky, black, granular deposit of silver had formed, and the solution appeared to be exhausted of the precious metal. After many changes of water the deposit was found to be tolerably free from soluble matters; but upon treatment with nitric acid in excess it gave a coloured solution, and a portion remained undissolved. In order to get rid, if possible, of the brown coloration the washing was repeated, but produced no improvement, though weak sulphuric acid caused the silver to dissolve, with only a clear yellow tinge, still leaving, however, the insoluble residue of sulphide. As no better result appeared to be attainable, the bulk of the silver was dissolved in nitric acid, filtered to free it from sulphide, which was put on one side to go to the crucible on some future occasion, and evaporated to dryness on the sand bath. The result was a yellowish-brown, amorphous mass, which was treated with hot distilled water, filtered, and evaporated to crystallisation.

With the nitrate so obtained I have made emulsions, and I have also used it for printing. I cannot find that it is in any way inferior to the commercial article I usually employ. It is true that, theoretically, it is perhaps not pure—that it is contaminated with more than "traces" of nitrate of zinc; but this, I think, will be found to be the most dangerous contamination it contains, and as that is practically harmless in its action and can only interfere with

emulsion calculations by replacing a similar quantity of silver nitrate, it is easy to make the necessary test to fix its exact combining value.

Many, I know, will look with horror on a process like this, in which the silver is reduced by means of hypo. and subsequently converted into nitrate without refinement. The chances do certainly look strongly in favour of sulphur impurities being retained in the product; but, I take it, "the proof of the pudding is in the eating." My experience has been that the product is perfectly usable for various photographic purposes, and the process is totally devoid of all troublesome manipulations. As such I think it will be found useful by many. H. Y. E. COTESWORTH.

EXPERIENCES WITH DARK-ROOM WINDOWS.

THE editorial remarks which recently appeared upon this subject are by no means premature, for my own experience enables me to endorse what is said about fading dyes. Among my friends, professional and amateur, a very decided variety of practice exists as to the kind of light-filterer to select, though in a considerable number of instances I think one ruling principle governs that practice—experience rather than theory. It is somewhat surprising to what an extent circumstances govern the effectiveness or otherwise of the dark-room window—a fact of which on one occasion I had a mortifying experience.

Having (I speak of years ago) been in the habit of working in a dark room glazed with "orange" glass, the window occupying about ten per cent. of the wall space, I, when building a new dark room, employed a similar material to qualify the light. The new dark room was much larger than the old one, its ground plan embracing, perhaps, from a hundred to a hundred and twenty feet. Secure in my experience of orange glass, and feeling confident in its power to correct any rays injurious to my plates — wet, of course — I ordered from the manufacturer I had always dealt with a further supply of orange glass for the new dark room. Many of my readers will be familiar with the hurry that generally accompanies the erection of new buildings, and will not be surprised when I say that the squares cut to size at the manufacturer's were slipped into their places without any examination, and I, within a very short time afterwards, was working away in my new room.

My trustfulness was doomed to receive a severe check, for I discovered—but not till some time had elapsed—that my new windows did not keep out all light which could act upon the plates. In the first place, they were very large, and so let light in sufficient quantity to fog, when with smaller panes no evil would have resulted. In the next place, I found that the double-flashed glass which formed the orange screen was by no means evenly stained; one portion was so thin that it allowed a considerable amount of actinic light to pass. To discover the defect was to find a remedy. My readers may be sure it was quickly applied, and for a long term of years the window answered every purpose.

By-and-by, like everyone else, I had to give up my predilection for "wet," and by degrees fully adopt gelatine. The instructions as to the kind of glass or screen to use for the dark room were very emphatic when gelatine plates were in their infancy; and, fully appreciating the especial sensitiveness of the new medium, I determined when building a new studio—an experience which was about that time being forced upon me—to make sure of my glass. I specially ordered from my old manufacturer squares of the new "ruby glass" for my dark room large enough to fill windows over eight feet wide. When the glass arrived I found that, to the eye and the spectroscope, it was in nowise different from what I had received years previously, invoiced as "orange" glass. I wrote to the maker explaining that I wanted ruby glass, and was told such was the kind that had been sent. This statement was adhered to in the correspondence that ensued. Hence it is to be seen that the same glass is sold under the names of "orange" and "ruby." I need not say there is ruby *and* ruby—stained and flashed, and of great variety of colour; still I did not think it was a proper thing to sell the same glass as orange or ruby, as circumstances dictated.

One side of my dark room faces the south, and I have there a small window only; yet I found that at times, when the light was strong, sufficient passed through to fog a plate. This I remedied by putting an extra sheet of plain glass coated with aurine and roseine, and this acts as a most efficient light-stopper. I was guided in the selection of this varnish by the encomiums of Captain Abney, who has spoken so highly of it, and I have found, upon examining it with a spectroscope, that it will answer for all ordinary purposes.

Aurine, which I had employed alone in my printing department, was useless by itself; it faded almost away in a comparatively short time. In another unimportant part of my premises I used the pigment chrome orange ground with oil, but I do not care for it. I am inclined to think that the yellow effect is altogether deceptive; indeed, the window looks very different in colour according to the angle it is viewed at, which alone is quite enough to condemn it. My dark room I had at the outset supplied with a double framework, so that, according to the intensity of the light, I could use either one or two thicknesses. I have not been quite certain of my light with it under some conditions of illumination; and so, lately, have made it safer by using screens of the material sold under the name of "cherry fabric," which seems, with the "ruby" glass behind it, to answer admirably. The price is so reasonable that I find it far better to make use of it than to go to the trouble of staining and varnishing my own material—be it glass, paper, or cloth.

Finally: I would say that, as every dark room has its own conditions of light, I would recommend every one in doubt to ascertain the requirements of his own illumination, by placing a sensitive plate close to his window and giving it an increasing series of exposures. He would then know exactly to what extent it was to be trusted. G. WATMOUGH WEBSTER, F.C.S.

TRANSATLANTIC JOTTINGS.

THE Photographers' Association of America hold a convention at Milwaukee on the 7th of next month, and already the executive committee have issued a sort of brief outline programme of the proceedings, which, according to it, will continue for three days. Is there a better feeling of *camaraderie* among professors of the art in the United States, or what is it that enables large meetings of such associations to be brought to a successful issue in that country, while here a lamentable failure would be predicted if any attempt were made to start such a project?

Our contemporary, the New York *Photographic Times*, has an interesting account of a visit to Morrison's lens factory, from whence, as is well known, are turned out annually immense numbers of photographic lenses. An interesting account is given of the manufacture of a lens from the first piece of rough-looking raw glass to the time when, as a finished lens, it is placed in the lathe and "centered." Some idea of the great drag upon trades by the fiscal system of the United States may be seen in the prices of these and other American lenses. Taking, for example, the "new rapid lens" by the above maker, we find that the eight-inch focus costs forty-five dollars, or about nine pounds of our money, which is far above what would have to be paid in this country for a lens of a similar class; and as our English lenses are largely exported to America it is to be assumed that the native products are not considered superior to them.

Dry plates, however, compare fairly evenly in price with English charges for the same goods, and there is little chance of their being reduced, the various large makers having, as we described, formed a "ring" to keep prices at their present level.

We find a long account of an electric mode of working an exposing apparatus; but, beyond learning that the shutter is released by a "bit of wire controlled by the armature of an electro-magnet" actuated by a chloride of silver battery, and that the whole is cheap, no details of any sort regarding the make or maker of the apparatus are given.

The representative of the above journal has been abroad, and the "chiel amang us takin' notes" has been giving his readers the benefit of his tours through English establishments. A detailed account is given of his visit to the Kingston dry-plate works, from which many interesting particulars may be learnt. Thus, instead of machinery-coating being the useless process he imagined, he beheld a machine in active use capable of coating sixty dozen plates per hour; some four hundred ounces of silver being weekly used for plate-making; the working expenses reaching one hundred and fifty pounds per week. He narrates his experience with a developer which appears like the ordinary pyro. developer with citric acid and sulphite of soda, but which must possess some occult properties; for it is stated that it was still colourless after two plates had been developed in it. It seems very like the developer already described in our columns by Mr. S. Fry.

Speaking of developers: there is also given an account of Mr. Norden's developer, "specially devised" for the Norden plates; but as it is merely a four-grain-to-the-ounce pyro. developer, with am-

monia equal in quantity to the "pyro." used, with half its weight of bromide and the usual citric acid and sulphite accompaniments, we fail here to be able to discern any "special devising."

In some points the practice of photographers is universal, though the modes of displaying it may depend on the locality, after the wise advice—"In packing, liquids are not taken when solids can be substituted." Mr. H. Clay Price adds the rider that he believes "an exception is frequently made in this respect in favour of blackberry cordial."

Hydrokinone appears to find more advocates on the other side of the Atlantic than it has found here, several speakers having tried it and found it useful—in each case with carbonate of soda added to the developer. We must confess to a feeling of wonder that so little has been said here of a process that promised so much.

Perhaps the American photographer has a more omnivorous appetite than his brethren of the old country. As an example we note that at the Chicago Amateur Society, Professor Bellefield, who was giving a description of miscroscopic photographic processes, was asked to give a lecture on the habits, &c., of some of the parasites whose photographs on an enlarged scale were there to be seen. The Professor acquiesced, and gave an interesting lecture on internal worms.

We gather from the tenor of an editorial note that Mr. E. L. Wilson has been offending amateurs by speaking of them in a depreciating manner, and he has been smartly told what is quite true—that all great improvements have been the result of the initiative of amateurs. The editor explains that by "practical" photographer "professional" was meant, and that when the offending expression "*even* an amateur" might be learnt from was used, it meant really that the old professional is never slow to take a hint even from the youngest professional photographer.

THE PHOTOGRAPHING OF REICHENBACH'S MAGNETIC FLAMES.

Referring to the subject of the so-called magnetic flames of Reichenbach: their action upon a sensitive photographic plate appears very extraordinary, and I am fully aware is doubted by many. At one time I was one of these doubters, until I was convinced by practical facts based on my own experiments. Mr. W. H. Harrison appears to be somewhat in doubt, as shown by his communication in the last issue; and, knowing what I do of that gentleman, I believe he is quite open to conviction on the subject. As regards diseased, nervous, hysterical persons imagining they see these flames I can conceive that, as nervous persons, their imagination sometimes leads them a long way.

But I am not dealing with that class of persons, as imaginations are not facts that can be dealt with from a scientific point of view. I must, however, just mention one incident. A gentleman—a friend of mine, an eminent chemist and geologist who is well known in scientific circles—related to me some experiments that he had made with his wife in regard to these flames. She was neither nervous, hysterical, or diseased; but, to my mind, she was one of the most matter-of-fact sort of persons to be found, and he came to the conclusion that she could see these so-called flames in the dark. He placed an ordiuary horse-shoe magnet in a dark room unknown to her, and then sent her in for some article without a light. She said she could distinctly see these flames. He then placed the magnet in other parts of the room, placing the poles in various positions, and she could tell which was the north or south pole, as the case might be, as she said the flames were of different colours. My friend was quite sure there was not the slightest deception on his wife's part, and with the scores of experiments he made in this way she never once failed.

But to come to the photographing of these flames, or making them affect a sensitive plate, it proves to my mind beyond doubt that something is given off from the poles of the magnet. If Mr. Harrison will read my last article on the subject he will find that I say "I *specially* prepare a plate for the purpose." Upon this point I do not wish to be misunderstood, as an ordinary plate if used will *not* be successful no matter what the power of the magnet used.

I see that Mr. Harrison alludes to using plates prepared by Mr. Valentine Blanchard's glycerine process, which I suppose to be a wet bath plate that has had a solution of glycerine flowed over it to keep it moist. I do not wonder at his non-success, for unless the proper conditions be set up it is utterly impossible to be successful; for when the conditions are set up the matter is perfectly easy, and can be accomplished by any one.

I cannot understand Mr. Harrison when he says:—"Nor is the experimentalist prepared to offer to repeat his own experiments before the Photographic Society of London, and prove the actinic influence of the alleged actinic flames. There is always an unfortunate hitch." In this paragraph I suppose I am the individual to whom allusion is made. If so, I wish to ask how it comes to Mr. Harrison's knowledge that I am not prepared to demonstrate the fact that it can be done before a photographic society? And, again, what "unfortunate hitch?" Although I am personally acquainted with Mr. Harrison, to my remembrance I have never spoken to him on the subject.

But I must say that I do not consider a meeting of a photographic society at all the proper place to bring the matter forward, as I have had sufficient proof of that; for, unless the subject brought forward has something of a commercial interest about it, and that somebody can take it up and get something out of it, the demonstrator hears some very unpleasant remarks, which, I think, to say the least of it, shows very bad taste. I remember when I brought this matter forward one of the members jeeringly made the remark that "at the next meeting perhaps I would introduce Dr. Slade," which I naturally took as a pointed insult. Others asked me what was the use of it, and what could be made out of it; and therefore I consider that a sufficient reason why I do not intend bringing it before either of the photographic societies.

It is not only in connection with this subject that such indifference is shown. I remember once being present at a photographic meeting, and I think the subject was *Photography as a Record for Meteorological Observations.* On that occasion I saw one or two members reading, and many talking. But if the subject had been how to produce *carte-de-visite* portraits at so much per dozen that would have been another matter altogether. The same applies to many other societies not photographic; that is, if any subject is brought forward which is not understood, it either falls flat or some unpleasant remark is made which is not at all encouraging to the member who brings the subject forward and tries to do his best.

I shall be engaged for some few months to come upon other matters away from home, but I fully intend at some future time to bring this subject forward and demonstrate the fact publicly that the magnetic flames of Reichenbach (so-called) will and do affect a photographic plate *specially* prepared to receive them, and also that it is possible to get the effect through glass, in which part, I think, according to Reichenbach's own account, he failed; but I do not think for a moment that this demonstration will be at a meeting of a photographic society. Being known for so many years to the readers of these pages, I do not think anyone will tax me with making statements which I cannot substantiate if called upon to do so.

Wm. Brooks.

A NEW SCIENTIFIC SUBJECT.

Mr. Wm. Brooks, in a recent number of the Journal, has started an interesting subject in the apparently-unaccountable things he relates in his experiments under the head of *Effects of Contact or Pressure on the Sensitive Salts of Silver*, and I agree with him in thinking that magnetism has an important bearing on the subject; because it will be found upon investigation that all bodies—especially such as are magnets, crystals, man, and even the light of the sun and heavenly bodies—are polarised, and that the light given forth by various bodies is not the same throughout, but that in polarised bodies, such as I have mentioned, one of the poles would be orange or yellow, while the other would be of a greyish-blue.

In the case of an experiment tried in Germany many years ago, the hands of a person shone with different lights, the left hand appearing brighter, more distinct, and of a reddish-yellow, while the right hand was blue and less clearly defined, a certain polarity of colouring being thus manifested. Some persons are more sensitive to this influence than others, and those that are, on placing their hands over the poles of a magnet or crystal at a distance of from one to three inches, perceive very particular sensations, resembling sometimes those resulting from a tepid breath, and sometimes that of a cold breath, in distinguishing which they are not deceived, but obtain the same result at every fresh trial.

Scientific men have discovered that from all objects having life proceeds a force, to which they have given the name of "Od.," which may be explained thus, and which is an entire explanation of the instances mentioned by Mr. Brooks in his paper. This was studied by me some twelve years ago, and I now quote from my note-book:—From our earth radiates an atmosphere called by men of science a "photosphere," or luminous halo. From this photosphere is thrown off another, called a "chromosphere" from its shedding forth rays of colour. Now from everything animate or inanimate on this earth is also shed forth rays of colour after its kind which affect the sensitive plate, and more especially the gelatino-bromide plate, in a greater or

lesser degree, according to its intensity and its colour; and photography reveals to us the fact that in certain conditions of *body* each one of us have radiating from us a halo of light in greater or lesser proportion, varying in intensity according to our health and to the purity and impurity of our bodies. Women often having it stronger than men. Flowers also give forth light in the same manner, hyacinths especially, their perfume conveying the fact to us, such being invisible particles of matter floating in the air immediately surrounding the particular flower. All this is easy of proof, as must be apparent to any well-ordered mind. Even in the matter of our daily clothing and hygiene, those who keep the body scrupulously clean find that it conduces to health, goodness of sight and hearing. Strength of limb and cleanliness and purity also conduce to an abundance of "Od." Those who have this force specially love the colour blue, disliking the colour yellow, whilst others like yellow, red, and blue, yellow and red being in excess.

I have before spoken of the phenomena of sensation in similarity to the varying kinds of breath. In these is also manifested the same sort of dualism which has already been before noticed in the luminous emanations. *The right side of every person of either sex is cooler than the left side*, and from this we learn that man from the right to the left is polarised like crystals; and so also may be accounted for the seeming impossibility of Mr. Brooks's friend being unable to develope his plates without fogging. His odic rays in some way affected the sensitive surface of the plate he was working.

But, to bring these odic impressions more especially within the experimental range of ourselves, I would add that they are either disagreeably warm or agreeably cool. This may readily be tried by any two persons, the hand or the foot (without shoe but with stocking on) of the one party held up, while the other makes passes with his hands on both or either side of the limb; after a few moments an agreeable cold sensation (it was so in my own case) was felt which increased when continued for a long time. Moreover, on every occasion there may be observed an uneasiness at meeting with certain similar colours. I have noticed also the same with certain persons, namely, great and intense pleasure at meeting others, and an uneasiness at encountering dissimilar ones. For instance: a right hand shines with a blue light when approached to the blue pole of a magnet or crystal, while the right hand of another person feels an impression of repugnant warmth. The same is the case in respect to a left hand; whilst the left hand approached to blue light objects and the right approached to yellow objects gives, without exception, the impression of a delicious coolness. Hence it may be concluded that the poles of the same in magnets and crystals, as also the hands of men and women, are endowed with similar or reciprocally-opposite properties, and that these constitute a dualism of great importance which plunges deep into all nature. In the very early numbers of *Chambers's Edinburgh Journal* may be found much upon this interesting subject.

In conclusion: I would add that even the most sombre colours are accompanied by scattered rays of white light in quantity amply sufficient to affect the sensitive film, and so from ourselves and from the glorious landscape that surrounds us also are shed forth rays of colour, each tree, shrub, flower, and earth giving forth its own ray of light, a *ray specially its own*, all derived from that great source of light—God himself. With these thoughts I leave the matter; only adding that I have succeeded in photographing a plant in its natural colours, and that I am still pursuing my experiments. W. Harding Warner.

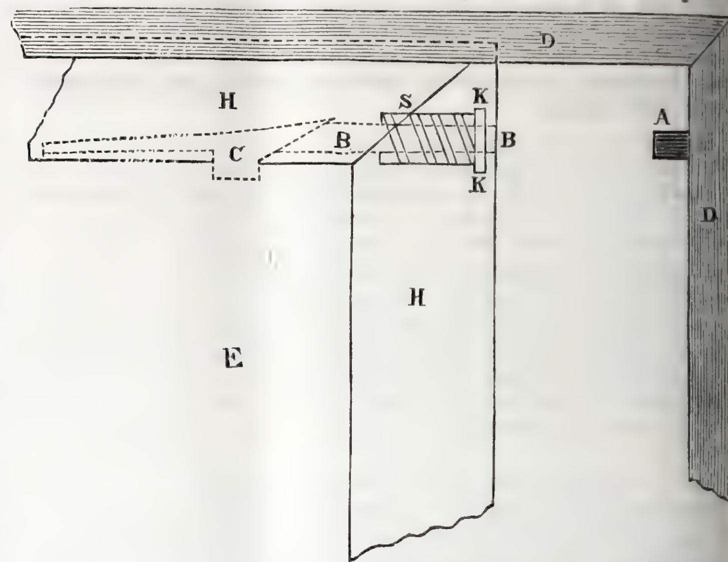
P.S.—In the specimen photograph enclosed, the colour in the geraniums, the tree ferns, the Indian-rubber plant with shining leaves, and other plants, are more clearly seen by some persons than others. Even the delicate pink of the fuschia has been seen by some.—W. H. W.

[The photograph enclosed is one of quite ordinary appearance, and neither we ourselves nor anyone to whom we have shown it has succeeded by any stretch of imagination in imparting the faintest idea of colour to it.—Eds.]

NOTES FROM ITALY.

I find that I am liable to lose a plate now and then, from what I may as well confess to be stupidity, but it is one which I know to affect others than myself; that is, occasionally forgetting in the case of double slides to expose the plates in the order of the numbers, and exposing one plate twice and the other not at all. I have sometimes, but much more rarely, forgotten to draw the slide shutter, thus opening my lens on the slide instead of the plate, and developed the plate as if it had been exposed. Another occasional cause of the loss of a plate is when, either from curiosity of impertinent inquirers when I had left my slides in the hotel or elsewhere, or from accidentally omitting to turn the catch that holds the slide shutter fast, and it happens by mischance to be partially drawn out, exposing the edge of the plate to light.

All these accidents may be prevented by an automatic fastener for the slide shutter, of which I send you a drawing. It consists of a short stud A in the camera D D, placed where it will press on a bolt B in the plate-holder, which, pushed home, raises a spring catch C from its hold on the edge of the shutter and allows it to be drawn out. H H shows the angle of the plate-holder and E the shutter closed, the plate-holder not being yet pushed home in the camera. When it is so, A impinges on the exposed end of B, which, pushed in, acts as a wedge by its inner extremity and lifts the catch C, which is placed at the bottom of the groove in which the shutter moves. K K is a flange on B B which takes the push of a spiral spring S, the action of which is to throw the bolt B B back again as soon as the plate-



holder is withdrawn and released from the pressure of A. C is a spring and catch in one, and on the wedge end of B B being thrown back drops into its notch in the edge of the shutter again. No accident can release the shutter except the most improbable one of a point being pressed exactly against B B, nor can the shutter be withdrawn till the plate-holder is well home.

By taking the precaution to put a gummed label over the head of the bolt B after putting in the plate, you may see which plates have been exposed by the puncturing of the label, which must take place when the slide is pushed home.

For professionals or amateurs who are constantly at work these precautions would probably be useless; but for those who, like myself, catch a day now and then and have many other things to think of, with tendencies to abstraction, there will be a sufficient advantage in the occasional saving of a plate or a valuable view to amply repay the cost of the little mechanism, which can be adapted to any camera or slide. W. J. Stillman.

Florence, July 6, 1883.

FOREIGN NOTES AND NEWS.

Extremely-Rapid Photographic Printing by Machinery.—Metallic Lead Pencils for Retouching. — Precipitation of Chloride of Silver. — Oil of Turpentine as a Reducing Medium for Silver Prints. — Alarm for Dark Room. — Professor Meyer's Educational Glass Photographs. — On the Identification of Criminals. — Dr. Vogel in America.— Two New Photographic Societies.—Two Photographers Decorated. — Dr. Stolze's Vignetting Masks. — On the Setting Power of Gelatine.

At a recent meeting of the American Photographic Society, says the *Archiv*, a sheet of paper was shown upon which 300 pictures had been printed, all from the same negative, at a rapidity of 12,000 per hour! The "printing machine" employed was constructed by Charles Fontayne, of Cincinnati, and is used as follows:—A negative is placed in a box and underneath it a sheet of bromide of silver paper, and the box is exposed, by means of a mirror apparatus, to reflected sunlight. After each separate exposure the paper moves forward in close contact with the negative. The motive power is supplied by the operator by merely turning a wheel. The machine furnishes 200 impressions per minute, which gives an exposure of about three-tenths of a second for each print. The sunlight is concentrated by a seven-inch condenser upon a circle about an inch and a-half in diameter, and so rendered about eleven times more powerful in its action.

In the *Deutsche Photographen Zeitung*, Herr Ernst Wolfram, of Bremen, writes to recommend the use of metallic lead pencils instead of graphite for retouching negatives. At his request Herr A. W. Faber sent him a metallic pencil with which to make a trial, and he found that it worked admirably and had two noteworthy advantages—First, one can retouch more rapidly with it because the point of the pencil neither breaks nor crumbles, marks easily, and yet the frequent dusting-off of particles of loose graphite is avoided. The second undoubted advantage consists in the great durability of the retouching, which does not suffer even when a great many copies are printed from

the negative. This does away with the question which has long vexed many—"How shall we fix lead pencil retouching?" The pencil will, however, "bite" neither upon "mattolein" nor upon a glossy varnish.

The *Chemiker-Zeitung* says chloride of silver is rapidly precipitated, even in dilute solutions, by the addition of a few drops of chloroform.

Herr J. Kopecky, of Winterberg, writes to recommend oil of turpentine as a reducing medium for over-printed pictures. Some *volatile* oil of turpentine is placed in a shallow vessel. The over-printed picture is taken just as it comes out of the printing-frame, and fixed with pins or drawing-tacks, picture side outermost, upon the inner side of the lid of a pasteboard box. This lid is then placed over the vessel containing the oil of turpentine, at a distance from it of about two centimeters, in such a position that the picture side of the photograph is exposed to the turpentine fumes. In this position it remains for a period which varies with circumstances according to the strength of the oil, whether it is fresh or not, and the degree of weakening desired. In winter from one to two hours may be required; in summer less, as the oil then evaporates more rapidly. The oil should not be warmed, or the picture will be injured. If a mask be fixed over the picture only the exposed parts will be bleached, either with a sharp outline if the mask be laid close to the picture, or with a softened edge if it be placed at some distance from it. If individual parts be covered with vermilion paint they will remain unaffected and only the exposed parts will be bleached. For example: if the face be covered with vermilion only the clothes will be lightened, but if the vermilion coat be thin the part under it will be slightly weakened. If all the persons in a group except one be covered over, that one may be bleached out altogether; and by the judicious use of masks and cinnabar unequal spots may be equalised. Should the desired result not be obtained at once the weakening may be repeated. Freshly-printed prints are more rapidly reduced than old ones. When weakened to the desired degree the prints undergo the subsequent treatment as usual. With regard to the above the *Archiv* says:—

"The alleged action of oil of turpentine as a bleaching medium for chloride of silver prints will have surprised many photographers, because the decomposition of pictures, consisting of silver sub-chloride or metallic gold and silver, has for long been known to be principally produced only by the most powerful chemical reagents, especially by those which form salts, or by the fumes of volatile mineral acids, not in direct contact."

The *Archiv* is of opinion that if the decomposing action of the fumes of oil of turpentine upon the silver picture actually take place that it will be found to be due to the formation of ozone, which to a slight extent occurs, under certain circumstances, when oil of turpentine is left long exposed to the action of the atmosphere.

Herr Silas has constructed an electric alarm clock for the dark room, the intention of which is to call the operator's attention to the conclusion of some operation, such as an exposure, and so leave him at liberty to occupy the interval between its commencement and end with other work without running the risk of neglecting it at the critical moment. To the minute hand of an ordinary hanging clock a small metal plate is attached, which, at the desired time, comes in contact with a metallic peg which is inserted at the outer edge of the dial. If the minute hand be connected with one pole of a battery, and the rim of the dial in which the peg is inserted with the other pole, at the moment of contact the current will be completed, and an alarm bell connected therewith will be set aringing to call the attention of the operator to the conclusion of the operation. This alarm clock is likely to prove very useful where a variety of work, copying, &c., is carried on by a photographer single-handed.

Professor Meyer, of Karlsruhe, has just published a catalogue of four thousand photographs upon glass intended to be used in the diffusion of knowledge of art as applied to industry. Apparently these glass photographs are lantern slides, for a few introductory remarks upon the "art of projection" is prefaced to the catalogue. The slides are divided into three principal divisions—those relating to antiquities, to the middle ages, and to the Renaissance period. These, again, are subdivided into departments—as architecture, statuary, painting, minor and decorative arts, costumes and customs, graphic art, &c. The lantern is no longer the toy it was when first introduced. Then it was considered to have amply justified its existence when it had amused a few children at a Sunday school treat, and when the most taking slides were of the comic description, such as Heliogabolus swallowing the rats, a donkey blacking a pair of boots, and so on, which were thrown in to give a flavour to the views of the Holy Land, which formed the staple of the exhibition. These latter, after the first flush of novelty was over, were regarded with distrust as a base attempt to impart instruction alone with amusement. Indeed, the young folks are now so *blasé* that they hardly tolerate the lantern—erst ycleped "magic"—at their entertainments at all; but the rejected plaything is fast becoming the valued aid of the teacher and the man of science, in whose hands as a teaching implement it may in time rival the microscope. It is now a good many years since it was urged in these pages that for teaching geography in higher schools, in addition to the usual maps and books, a good collection of photographs would be most valuable, and still more so in the shape of lantern slides; but geography is by no means the only subject to the teaching of which it may be applied—rather such subjects are innumerable. Professor Meyer uses it to convey instruction in art, and another German Professor is believed to apply it to the teaching of geology. He cuts extremely thin slices (so thin as to be transparent) of the rocks he wishes to examine, places them under the microscope, and photographs them; then he makes lantern slides from the microscopic enlargements, by which means the structure can be enormously magnified. Similarly, anatomists obtain magnified views of tissues, and, in short, as already said, the subjects the lantern slide can be employed to teach are endless.

Besides the portraits of all criminals which it has now become customary to take in most civilised countries, it has sometimes been suggested that their hands should be photographed, as being quite as characteristic and less easily disguised than the features (that was taking a leaf from the book of the American belle who had an album filled with photographs of the hands of her friends instead of their faces). The *Boletin Fotografico* has a further suggestion to make, namely, that special photographs should be made of the ears of criminals, on the ground that though the face changes with age the ears always retain the same form unless wilfully mutilated. In taking the ears it is recommended that the light fall on them at an angle of seventy degrees.

Professor H. W. Vogel, of Berlin, has accepted an invitation to attend the forthcoming Congress of the National Photographers' Association of North America, which is to be held at Milwaukee in August. Dr. Vogel intends to take the opportunity of being in the States to visit San Francisco and the Yellowstone district, and will contribute an account of his travels to the *Mittheilungen*.

The Photographic Assistants of Zurich formed themselves into a society on the 8th May, and issued a circular inviting all the photographic assistants in Switzerland to join them.

In April a society of Photographic Amateurs was formed at Havannah, of which Dr. John Zamora was chosen president.

General von Wanka has just been made a commander of the Greek order of Liberators, and Major Volkmer commander of the Italian order of the Crown and of the Greek order of Liberators These gentlemen are the directors of the Military Geographic Institute of Vienna, where much photographic and photo-mechanical work is done.

Dr. Stolze, of Berlin, the accomplished editor of the *Photographisches Wochenblatt*, has patented vignetting masks of fatty ink. An ordinary vignette mask is shaded off and printed in a printing-frame upon a dry plate or upon paper. In this way the negative of a vignetting mask is obtained. This, when printed upon a lichtdruck plate, furnishes a positive picture, which can be printed from in fatty ink as often as may be required. Such impressions, when pasted on the back of a negative, serve as a vignetting mask.

In some miscellaneous communications to the *Wochenblatt* Dr. O. Lohse speaks of the setting power of gelatine. Herr Heinrich sent a sample of gelatine for him to examine, and amongst other points he tested it for its setting power and found that in the proportion of one part of gelatine to 200 parts of water the mass still solidified. Three separate experiments were also made with the gelatine and washed bromide of silver, nitrate of ammonia, and bromide of ammonium respectively, without any essential difference in the setting power being observable, though it certainly seemed that the mass was rendered somewhat more fluid by the nitrate of ammonia, yet in all three cases it still thickened with 150 times its own quantity of water.

Our Editorial Table.

Photographs on Canvas for Painting.

Manchester: A. Brothers.

We have received from Mr. A. Brothers a specimen of the photographs on canvas for the use of artists, which he has advertised in our columns. The chief recommendation is that there is no film of gelatine or collodion to crack and peel off, while the surface appears to be admirably adapted to receive the colours. Permanency, even in photographic images which have to be covered with oil paint, is a matter not devoid of importance; but, as Mr. Brothers has made these pictures for a period of fifteen years, we presume they have been sufficiently tested in that respect.

PATENTS CONNECTED WITH PHOTOGRAPHIC ART.

NEW APPLICATION.

No. 3,362.—"Producing Plates by Photography to be Used for Printing Purposes." F. Wirth; communicated by Benecke and Fischer and J. Frank.—*Dated July* 6, 1883.

FOREIGN PATENTS GRANTED.

"A Photographic Camera." M. Flammang, Newark, N.J.

"Frame of Dark Cassettes for Photographic Drying Plaques." E. Martini, Berlin.

"Continuous Regeneration of Oxalate Developer." J. Kötteritzch, Pappendorf.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 19........	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society held on the 5th instant, Mr. H. J. Dale occupied the chair.

Mr. A. Cowan showed a transparency on a gelatino-bromide plate printed by the light of two flashes of lightning during a recent night storm.

Mr. A. L. Henderson showed a plate—one of a batch of seventeen dozen $6\frac{1}{2} \times 4\frac{1}{4}$—which had been coated with a quantity of emulsion made with only 200 grains of nitrate of silver. This economical result was obtained by using a very much greater proportion of gelatine to silver than was usually adopted. The plates were said to be sufficiently dense, although somewhat slow. He (Mr. Henderson) then read the following short paper commenting on the statements in an American journal concerning an English dry-plate manufactory:—

DUST IN THE EYES.—A SCREW LOOSE, OR WHAT?

A special correspondent of the *Photographic Times and American Photographer*, of the 15th June, gives an account of a dry-plate manufactory. Statements therein contained appear so startling that it is as well, before believing all we read, to take pencil and paper and see how the statements agree.

Sixty dozen plates per hour are coated by each machine and 400 ounces of silver nitrate used per week. Now we will presume, for argument's sake, that only half-plates are coated, and we find that to use this quantity of silver converted into bromide, allowing four grains for each plate, this would coat 43,750 plates. Now, to coat these plates at the rate of sixty dozen per hour, would require only one coater, working sixty hours, forty five minutes, fifty seconds. Further comment is superfluous.

Suffice it to say that this statement reminds me very much of the story of the young American who, being asked where liars went, replied that they went down west to write for the papers; but it seems that, having now done with the west, they are making their way eastward.

The Chairman showed a Swan incandescent lamp to which a ruby glass cover was adapted, for dark-room use. This cover could be removed so as to use the full illuminating power of the lamp at any time, and either lamp or ruby globe could be replaced when necessary. The cost of charging the battery was twopence for ten or twelve hours' constant work; but, as the lamp need only be switched on when actually required, the charge might serve for a week or a fortnight.

Mr. F. W. Hart requested the opinion of the meeting as to which was better—gelatine plates or collodion—for making reproduced negatives which were not to be of the same dimensions as the original.

Mr. Cowan would use gelatine plates.

Mr. Henderson considered that better results could be obtained with collodion, especially if any special treatment were required to bring out details insufficiently shown in the original negatives. For that purpose he would use a developer containing only two and a-half grains of sulphate of iron to the ounce, saturated with alum, and with sixty minims of acetic acid, of the strength known as Beaufoy's, added.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The ordinary meeting of this Society was held on Tuesday, the 3rd inst.,—Mr. T. H. Morton, M.D., President, in the chair.

The minutes of the previous meeting were read and adopted, and Mr. B. W. Wood was admitted a member.

The principal subject of conversation related to the work accomplished at the last excursion of the Society to Chatsworth, on the 11th ult. The weather being favourable the results proved highly satisfactory, although the number of plates exposed was below the average.

Mr. J. H. Rawson contributed a batch of nice stereoscopic pictures, and Mr. Dakin a number of good 10×8 negatives.

The Chairman showed several prints, one of which he said was from a plate which became rapidly so dense, even with little pyro., that it was apparently useless. The negative, however, was fixed, well washed, and steeped for a minute in a solution of ferri perchloride P.B., half-an-ounce to twelve ounces of water. The chloride then dissolved by the hyposulphite bath reduced the image to a good printing quality.

Mr. Rawson said one of his plates erred in the opposite direction, some of the detail being very imperfect. He applied a solution of ammonia with a camel's-hair brush over the insensitive part, which had the desired effect, and then he completed the development.

The Chairman exhibited a 12×10 portable camera made for him by Mr. J. Taylor. It weighed, with double slide, thirteen and a-half pounds, and looked a most serviceable apparatus.

The meeting was then adjourned.

Correspondence.

July Meeting of the Photograpahic Society of France:—Enlargements on Gelatino-Bromide of Silver Paper.—An Apparatus by M. Mackenstein to Give a Double Swinging Motion to all Cameras.—On Guillotine Shutters.—A Simple Washing Apparatus.—M. Fean's Shutter.—Lecture on the Transit of Venus, by M. Chapuis.—A Novel Means to Eliminate the Greater Quantity of Soluble Salts from Emulsions, by Professor E. Stebbing.

The usual monthly meeting of the Photographic Society of France took place on Friday last, the 6th inst.,—M. Davanne in the chair.

M. Hutinet presented some very fine enlargements on gelatino-bromide of silver paper. The enlargements were life size, and were obtained, M. Hutinet said, by an exposure of from four to six seconds by diffused light.

M. Hutinet is the only one in France who has pushed on positive printing upon paper prepared by a gelatino-bromide of silver emulsion. The paper is prepared at his manufactory, at Courbevoie, by machinery in the same manner as carbon tissue, and it can be had in lengths of ten metres by one in width.

Although much has been said and written about the instability of silver prints it is claimed for those produced by development that they are more permanent than prints obtained by direct contact with chloride of silver. Let time prove the truth of the assertion, and let us appreciate the great boon bestowed upon the photographer by this rapid means of reproduction. It permits him to work during the dull days of winter and produce hundreds of proofs in the same space of time in which formerly he could only print about a dozen.

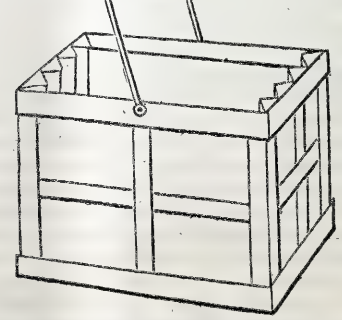
To return to M. Hutinet's paper. He calls it "*papier au bromure d'argent brillant.*" How he obtains the brilliancy upon the finished proof is his secret; but probably the emulsion is spread upon coagulated albumenised paper. As it is, the results were very pleasing and highly satisfactory.

M. Mackenstein presented a very pretty little half-plate camera adapted by its lightness for those who travel. The dark slides are so constructed that they can be used for dry plates or for films. One "dodge" may be referred to and is worthy of noticing; that is, M. Mackenstein has got over a difficulty in having a swinging back to his camera by making a simple apparatus which can be placed upon the tailboard of any camera, and give a double motion to the latter. The apparatus consists of two pieces of wood, each about half-an-inch thick, worked together by a cogged wheel and a toothed brass plate. This is to get the swinging motion from top to bottom. A brass plate is attached to the top by a pivot or centre axis. This is to obtain the motion from right to left, or *vice versâ*. This adaptable piece of apparatus will effect a great improvement in this wise—that it can be taken off and put on the camera with the greatest ease, so that a rigid back or a swinging one can be had at will.

M. Londe gave a long dissertation on the theory of sliding, instantaneous shutters. M. Martin and others entered into the discussion, from which it is to be learnt—1. That the best place for an instantaneous sliding shutter is in the centre of the lens.—2. That the width of the opening of the shutter or the drop must be larger than the diaphragm employed.—3. That a diaphragm is necessary behind the shutter, and that on no account must the drop serve as a diaphragm.—4. That the length of the opening in the drop ought to be at least double the width of the hole in the diaphragm, the larger the hole the better being the final results. This must be counteracted by a greater rapidity given to the fall of the drop, which can be aided by a spring or other mechanical contrivance.

M. Carette presented two lenses manufactured by Herr Steinheil. These lenses have been described in the journals. They attracted the attention of the members by the great thickness of the glass.

M. Audra presented, in the name of M. Jonte, a simple machine for washing gelatino-bromide negatives. It consisted of a skeleton frame



of zinc, with a few zinc grooves on each side intended to hold the plates upright. The frame containing the negatives can either be

.ced in its own reservoir or in a pail of water. Its simplicity is so ıat that an amateur can easily make one for himself on seeing the gram annexed.

M. Fean presented a new instantaneous shutter (guillotine) to be ;ed upon the lens or behind it upon the camera. Nothing new was be gleaned from this.

M. Chapuis, attached to the French expedition to observe the transit Venus, gave a very interesting description of the difficulties to be nquished and the state of the island upon which the observations ere taken, all being illustrated by projections which furnished not only tertainment but a practical lesson. It is to be desired that the ıotographic Society of France should, like the English societies, en- avour to stimulate its members to exhibit their slides and illustrate eir voyages, in order to impart interest to an otherwise sometimes onotonous meeting.

Much has been written about the best means to eliminate the nitrates om gelatino-bromide emulsions. To those who boil, stew, or ripen eir emulsions in warm water I should say—boil, stew, or ripen your nulsions in one of those porous porcelain cylinders which are used in ectric batteries. If the water be plentiful around it, or changed once twice, it will facilitate the washing by allowing most of the soluble ılts to dissolve out. Very little washing is required. I do not say ıat the operation of washing can be done away with, but that it can e greatly assisted, and that without cost or trouble, as the cylinder is ery cheap, and can be used over and over again if kept from the light.

E. Stebbing, *Prof.*

25, *Rue des Apennins, Paris, July* 10, 1883.

TONING.

To the Editors.

Gentlemen,—In his article on *Toning* Mr. Burton says that the olour he prefers is "the lightest brown we almost ever see." As I resume Mr. Burton has had some years' experience with prints of the one to which he refers it would be interesting if he would state his nowledge of their permanence. So far as my experience goes prints f a brown colour can scarcely be said to be toned with gold, and are ot so permanent as when fully toned to a purple-black colour.

I have prints toned in the old hypo. and gold bath which are as fresh s they were when done—at least twenty years ago. If Mr. Burton can how that the brown tones are permanent they are certainly, in some ases, to be preferred. I cannot, however, help thinking that much of he fading of prints is due rather to the absence of gold in the toning han to the bad quality of paper and other suggested causes.—I am, ours, &c., A. Brothers.

Manchester, July 6, 1883.

FRILLING.

To the Editors.

Gentlemen,—Those who are troubled thus during the hot weather will find a perfect remedy in the following:—Take a white paraffine candle, cut a notch in it like a corundum file, *and run it round the plate before development.* It prevents all action at the edge, where frilling usually commences. A line a-quarter of an inch in width is mply sufficient. "A word in season—how good is it!"—I am, yours, &c., W. Harding Warner.

Bristol, July 7, 1883.

HYDROKINONE.

To the Editors.

Gentlemen,—My attention has been drawn to a slight inaccuracy or, I should say, deficiency in the report of the last meeting of the Liverpool Amateur Photographic Association. In reply to a member as to the approximate price of hydrokinone I am made to say that Captain Abney stated it to be one guinea per ounce, leaving it to be inferred that such was still the price.

What I did say was that when Captain Abney first introduced it to the notice of photographers in this country he stated that it had cost him a guinea an ounce, but that I had procured mine at four shillings per ounce, at which price it can now be obtained.

Fearing the statement as it stood in the published report might be misleading to many, I have ventured to send you this explanation.

Another slight error occurs in my communication. Instead of "arbutive" *read* "arbutin," page 387, first column, tenth line from the bottom.—I am, yours, &c., Edwin Banks.

17, *Daulby-street, Liverpool, July* 11, 1883.

"ON LIGHT AND LENSES."

To the Editors.

Gentlemen,—In my paper on *Light and Lenses*, in last week's issue, there are three misstatements, owing either to our Secretary or the Journal, which were not in my original paper. In the third line from the top of the first column, page 389, for "as, owing to the spherical form given to this lens, it refracts light so powerfully that each object situated at different distances will have a different focus," *read* "owing to the spherical form given to lenses they refract light unequally at different parts of the surface, and objects situated at different distances will have a different focus."

Again: in line 6, for "other spherical aberrations," *read* "spherical aberration." And in line 7, for "which narrow opening draws out both pencils of light," *read* "which narrows or draws both pencils of light," &c.—I am, yours, &c., Herbert J. Gover.

Hanley, July 10, 1883.

[The "misstatements" referred to above occur in the copy furnished to this Journal. The MS. sent to us had evidently been copied by an amanuensis from the original paper.—Eds.]

A Photographer with a Good Job.—The trials of the photographer who takes babies are light in comparison with those of the sufferer who has the contract for photographing 364 wives of the Sultan of Morocco. A great many of these ladies wanted to have their picture taken. The mighty potentate who enjoys the situation of husband to them consented to have it done, provided the whole party would agree to be put on an equal footing, and all alike submit themselves to the gentle influences of the camera. Thus the older and uglier ones, as well as the young beauties, are to have their likenesses handed down to posterity. These 364 ladies are not to be taken in a group, like a general assembly or an agricultural convention, but each one on a plate by herself. It is understood that the French photographer is to take each beauty until she or the Sultan for her shall be satisfied with the likeness. It is easy to see that this gives the Frenchman a prodigious job, for there is no probability that the ladies will be satisfied with less than two or three dozen sittings apiece.

The Solar Eclipse.—The Philadelphia correspondent of *The Times*, writing under the date of July 9th, says:—Professor Holden, of Washburne Observatory, Wisconsin, who had charge of the American expedition to Caroline Island, South Pacific Ocean, for observing the solar eclipse of May 6th, has returned. He informs me the weather was favourable, and the entire programme of observation was carried out, proving that no intra-Mercurial planets as bright as $5\frac{1}{2}$ magnitude existed; all stars down to the sixth magnitude were seen, and only these. Dr. Hastings's spectroscopic apparatus was so devised that the coronal spectrum on the opposite sides of the sun could be simultaneously examined. At the beginning of totality the line was about twelve minutes' length on the eastern limb, extremely short and faint on the western limb. As the eclipse advanced this inequality vanished, and at mid eclipse the line was equal on both sides. At the end of totality the conditions at the beginning were reversed. This is regarded by Dr. Hastings as proof that the outer corona is largely a phenomenon of diffraction. It was the only dark line seen in the corona. The meteorological observations showed a rise in barometric pressure and a fall in temperature to that of the night rise in humidity. There was no change in the direction or velocity of the wind, while the radiation observations showed the receipt of heat by the earth almost wholly ceased. The azimuths of diffraction bands, both before and after totality, were determined by Professor Holden. The chromosphere was very quiescent, and the corona bright, with five streamers. Good drawings were obtained, all the contacts were observed, and the latitude and longitude were determined.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely offered for sale, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* nom de plume *be thought desirable), otherwise the notice will not appear.*

I will exchange a gem camera, twelve lenses, new, £3; Victoria ditto, nine lenses, £4 10s.; solar camera, nine-inch condensers, £4. Wanted, a good *carte* camera.—Address, C. P. Gee, Weymouth.

I will exchange a good lay figure, life size, for a whole-plate or 5 × 8 portable symmetrical or corresponding rectilinear, or good tourist apparatus.—Address, A. F. G., 32, Priory-street, Cheltenham.

I will exchange a stereo. camera, with dark slides and box complete, good as new, for a balustrade, scenic backgrounds, or any other studio accessories.—Address, L. W. Green, 37, Oxford-road, Altrincham.

I will exchange my four-wheel dark carriage, cost £16, value £7, good as new, for a 10 × 8 camera, and slides, for dry plates, or tricycle, or half-plate camera and lens.—Address, J. Yeoman, Market-place, Bedale.

I will exchange a half-plate bellows-body camera, Rouch's, and Dallmeyer's quarter-plate portrait lens, for a quarter-plate camera and landscape lens by a good maker.—Address, H. R., 18, Fransfield-grove, Sydenham, London.

I will exchange a mahogany bellows-body camera, double back, for plates 9 × 11 or 4¾ × 6½, for a pocket camera by a good maker, also a quarter-plate rolling-press, for anything useful in photography.—Address, K, 48, Church-street, Blackburn.

I will exchange Ross's No. 2 portable symmetrical lens, £2 9s., quarter-plate new tourist rack, bellows-body camera, 25s., Meagher's 18 × 18 camera, three-draw sliding-body, folding tailboard, 30s., for photographic goods.—Address, A. SCOTT, 88, Briggate, Leeds.

I will exchange Marion's grass matt, just new, cost 22s., pedestal on castors, cost £5, outdoor background, and five-pillar balcony. Wanted, Seavey's interior or exterior background, Seavey's pedestal and balcony. —Address, W. DAKIN, photographer, Nether Edge, Sheffield.

I will exchange a photographic booth, new, cost £2, whole-plate water-tight glass bath, in pine case, with ebonite dipper, and dark tent, on three wheels, almost new, for whole-plate camera and lens. Or what offers?—Address, P. H., photographer, Fore-street, Abingdon, Berks.

I will exchange a powerful screw embossing press, *carte*, by Marion, with silver-plated die, only been used a few times, for a Burr's quick-acting *carte* lens with Waterhouse's diaphragms, must be in perfect order, or any quick-acting lens by a good maker.—Address, PHOTOGRAPHER, 16, Vanvest-road, Guernsey.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Oliver Claude Smith, Wembdon-road Studio, Bridgewater.—*Photograph of Reredos in Berkeley Church, Gloucestershire, Photograph of Severn Bridge, and Photograph of Swing Bridge over Gloucester and Berkeley Canal.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

H. J. W.—We know of no better apparatus at the price.

IN TYPE.—Communications from George Smith, Edwin Banks, &c. Thanks. In our next.

ALPHA.—Any of the well-known clearing agents will remove the stain as well as the one you mention.

B. A. BASTIEN.—You will find several formulæ in our ALMANACS for the current year and four or five years past.

W. H. SMALLBRIDGE.—We can only refer you to our advertising columns. We cannot undertake to recommend any particular maker or advertiser.

J. H. TUNMER.—Your suggestion cannot be acted upon without careful consideration; we shall, however, endeavour if possible to do something in the direction you indicate.

NEMO.—Try the effect of immersing the prints in a dilute solution of common salt; that will make the colour redder and will possibly aid you in more easily detecting the change in colour during the toning operation.

J. S. DIXON.—Starch paste is as good a mountant as you can employ for the purpose. Thin glue is very good, but unless you have had some practice in its use we should not advise you to employ it on so large a size.

"RAPID."—Double the quantity of ammonia. The proportion you are now using appears to be far too small for short exposures. It is quite possible that you have set your shutter to work more rapidly than is absolutely necessary.

A. Z. A.—We strongly suspect your informant is labouring under a misapprehension. Get fuller particulars and let us know the result. The thing has been talked about for many years past, but nothing has ever come of it practically.

CAROLUS.—You do not say what kind of spots you are troubled with, or even what process you are working; how, then, is it possible for us to give you any useful information? Send us fuller particulars, and we will endeavour to assist you.

S. B. J. B.—You are clearly misinformed. Photographic glass may be obtained as good in quality as it ever could. Go to a respectable house, pay a fair price, and you will get an article as excellent in quality as you ever employed "in the old collodion days."

J. H.—Read the articles on *Portraiture for Amateurs* which have lately appeared in our columns. We cannot take up space in repeating information so recently given. It is quite possible to take successful pictures with a "fly shutter" in a good light.

A. S. BURROUGH.—It was supposed when the Wothlytype process was first introduced that it would yield permanent prints; but, unfortunately, experience proved that they were as fugitive as the ordinary silver prints. The process is not now worked commercially in this country.

A. G. B. writes:—"Are the citrates of ammonia or soda in any way applicable to the ferrous oxalate developer, as in the case of the pyro. developer? If so, what are the conditions?"——We have had ourselves no experience in this direction; perhaps some correspondent will kindly afford the desired information.

J. STONE.—The markings on the plates appear to arise from some impurity in the water, and from your account of your mode of working we should judge that to be the cause. The ordinary water may vary greatly at times and so account for your not always obtaining the same result. Have you tried distilled water?

O. P. Q.—The most likely thing to answer your purpose is ebonite tube It is an article of commerce, and will have no injurious action on the silver solution. Glass would undoubtedly be the best if you could make it available. Any chemical glass blower would, no doubt, make the apparatus if you supplied him with drawings.

W. HUDSON says:—"Mr. W. K. Burton, in an article about a month since, under the heading of *The Best Means of Drying Gelatine Plates* mentions that chloride of calcium could be purchased for three or four shillings per cwt., but does not say where it can be obtained."——Perhaps Mr. Burton will kindly supply the information desired by our correspondent.

A CARBON PRINTER.—If the temperature of the water as it comes from the main "is near upon 70°," as you say, it is very little use expecting to get first-class work if you employ it for mounting the tissue on to the flexible support. The only plan of avoiding your troubles during the present hot weather is to make the water cooler before you commence by placing a few lumps of ice in it. If you cannot procure ice in your neighbourhood try and get some spring water. This, when freshly drawn, is generally cool enough for the purpose.

E. W. DAVIES.—1. Without knowing the focal length and the form of the lens it is impossible for us to say if it will cover the half plate. Why not try it yourself?—2. The simplest way of finding the equivalent focus is as follows:—Focus an object—say a visiting card—with the camera at such a distance from it that the image on the ground glass is the same size as the card. When the size and focus are accurately adjusted, unscrew the lens and measure the distance from the ground glass to the card, and one-fourth this distance is practically the equivalent focus.—3. Twenty grains of gum dammar to each ounce of benzole.

RECEIVED.—*The Amateur's First Handbook.* By J. H. T. Ellerbeck. In our next.

H.R.H. THE DUCHESS OF ALBANY.—Mr. N. King had the honour of photographing, by command, at Claremont, on Saturday last, H.R.H. the Duchess of Albany and the infant Princess.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, the 18th inst., the subject for discussion will be—*Iron* versus *Pyro. Development. Which System will Give the Best Results (Detail and Vigour) with a Given Exposure Upon Plates from One Emulsion?*

PHOTOGRAPHIC GATHERING.—On Saturday last, the 7th inst., the *employés* of Messrs. H. and E. J. Dale, electricians, opticians, and photographic apparatus makers, of 26, Ludgate-hill and 4, Little Britain, held their annual bean-feast at the Sydney Arms, Chiselhurst, when seventy-one sat down to a capital dinner and spent a very pleasant day. Reference was made in the speeches of the managers and foremen of departments, and in the remarks of Messrs. Henry and Edward Dale, to the rapid advance in the staff employed in the business and to the good feeling existing throughout the firm. Some first-class groups were afterwards taken by Mr. J. H. Hare, manager of the cabinet works.

EXHIBITION OF CHRISTMAS CARDS.—The organisers of the forthcoming Printers' Exhibition at the Agricultural Hall are arranging for a comprehensive display of designs for Christmas, New Year, birthday, and other congratulatory cards, and of paintings in oil and water colour, etchings, &c., of a nature suitable for cheap reproduction and sale by stationers. Exhibits, framed ready for hanging, will be admitted free of charge, and screens for their display will be provided in a conspicuous part of the Hall. No limit is assigned to the number of designs to be admitted; but the manager reserves to himself the right to exclude contributions which do not satisfy a fair standard of merit. Every facility will be provided for direct communication between the exhibiting artists and the purchasing public. Exhibits must not reach the Hall later than Wednesday, the 25th instant.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending July 11, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max. Shade Temp.	Min. Tem.	Remarks.
5	29·89	SW	62	57	117	73	53	Cloudy.
6	29·85	S	66	58	118	75	54	Fine.
7	29·85	W	63	59	110	73	59	Cloudy.
9	29·80	SW	62	60	116	75	60	Overcast.
10	29·90	W	64	58	111	73	55	Fine.
11	29·70	SW	63	58	84	64	57	Cloudy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1211. Vol. XXX.—JULY 20, 1883.

PYROXYLINE FOR EMULSION COLLODION.

The recent contributions to these pages on the subject of collodion emulsion have elicited, from many correspondents, inquiries regarding the details of a process which for three or four years has sunk entirely out of recollection so far as the literature of photography is concerned. During that period a large number of new practitioners have joined the ranks of photography, and a still larger number of wet collodion workers have gone over to the dry-plate side; all these appear to be equally uncertain as to the requirements of the dry collodion emulsion processes, especially in the matter of pyroxyline, and in response to several queries on that particular subject we pen the following remarks.

The inquiry of "An Old Professional" in another column may be taken as a type of those in connection with this particular branch of the subject—Is "high-temperature" cotton a *sine quâ non* in emulsion work? To this we reply that much depends upon circumstances. If an "*unwashed*" emulsion be intended it will be advisable, but not absolutely necessary, to employ it; but for a "*washed*" emulsion it will be decidedly preferable to avoid the high-temperature preparation, for reasons which we shall explain.

In the early days of the collodio-bromide process and the then existing state of knowledge with regard to the conditions of working, the great difficulty was to produce an image of sufficient density. With a newly-made collodion the trouble was almost insurmountable, even when what was then called a "powdery" pyroxyline was used; and it was only by allowing the collodion to "age" or "ripen" that satisfactory results were obtained with any certainty. Subsequently it was discovered, by Mr. M. Carey Lea, that if the pyroxyline were made with acids at a temperature many degrees higher than usual the same result was gained with a newly-made collodion, as under other circumstances, by allowing it to ripen. Later still, by variations in other directions, other methods of controlling density were discovered, which, if not altogether independent of the pyroxyline, were at least so of *high-temperature* pyroxyline. In making pyroxyline at a high temperature, while the advantage is gained of a product which readily gives a dense image, several corresponding disadvantages accrue, as is not to be wondered at when we consider that the result is in a sense due to partial decomposition of the cotton. It is well known that, in making gun-cotton, the higher the temperature and the weaker the acids the greater is the solvent action upon the cotton itself; and in making the high temperature preparation these conditions are stretched to the utmost possible limit, the result being a pyroxyline of extremely unstable character as compared with that made at a lower temperature.

One effect of the high temperature is the production of a cotton which, owing to its absence of "body" or viscosity, requires to be dissolved in large proportion, in order to make a collodion capable of holding the silver salt in suspension and of giving a film of sufficient strength. This latter, though it may be of considerable thickness, is short and rotten in texture, and requires the greatest possible care in manipulating, as well as necessitating a substratum to make it hold to the glass. If such cotton of the high-temperature class be heated with boiling water, alcohol, or acetic acid a very much larger proportion will be found to be soluble than is the case with ordinary pyroxyline; in fact, some samples we have found to be converted into a soft gelatinous mass by boiling with either alcohol or water.

Now for the practical application of these properties to unwashed and washed emulsions respectively. In the former case the only requirement, from a physical point of view, is a collodion that will carry the sensitive silver salt in suspension and hold it firmly to the plate upon which it is spread. The more porous it is the better, for it permits the ready removal of the soluble nitrates by washing, and absorbs a larger quantity of the preservative or organifier which is subsequently applied. All these conditions are fulfilled by the high-temperature pyroxyline; but in the case of a washed emulsion the collodion requires to be able to stand a further test. It is washed in bulk under conditions which vary materially from those which prevail in washing a thin film of collodion; that is to say, in the presence most probably of a far larger proportion of the solvents, which it is extremely difficult to completely drive off from a thick mass of solidified emulsion.

The result is that, under the combined action of ether and alcohol, water, and most probably free acid, the pyroxyline under any circumstances is liable to slight decomposition or solution, and a loss of some of the emulsion ensues; but where the character of the pyroxyline is such as to favour such solution in every possible way—as when high-temperature cotton is used—the effect must clearly be much intensified. Such, indeed, really is the case, for it is found that many samples of such "high-temperature" cotton which work admirably for unwashed emulsion are entirely useless after washing. This result occurs in two different ways—first, a large proportion of the valuable organic constituents of the emulsion are soluble and are removed in washing, leaving a film incapable of giving density; and, second, the solution or washing away of a notable portion of the cotton itself leaves the emulsion upon re-solution deficient in viscosity, and consequently incapable of suspending the silver bromide, the final result being a sandy, granular film. This last defect may frequently be cured by dissolving a few grains of pyroxyline in the solvents before introducing the washed and dried pellicle.

High-temperature pyroxyline, then, may be useful for unwashed emulsion, but it is by no means necessary. The methods now used of mixing and ripening the emulsion, as well as improved modes of development, render the production of dense images with ordinary pyroxyline a matter of ease, and the unstable high-temperature preparation is to be avoided. For washed emulsion a somewhat "leathery" collodion is an absolute advantage in many ways, if not indeed absolutely essential. Such a product is obtained by treating the cotton with acids at a comparatively low temperature—145° to 150°—or, if pyroxyline be used, a very much lower temperature still. The proportion of sulphuric acid should be large—say $2\frac{1}{2}:1$, or even $3:1$—in order that its parchmentising action may be utilised to the full. A collodion made from such a cotton is not "horny" or "skinny" in the usually-accepted sense, but gives a tough, strong film which will bear gentle rubbing with the finger without injury, and which, when wet, feels "soapy" to

the touch. If these conditions prevail, the sample may be generally accepted as suitable for washed emulsion purposes.

We may possibly have to return to this subject shortly, as inquiries are received almost daily which it is impossible to answer singly with any degree of completeness.

THE COPYRIGHT QUESTION.

The judgment recently delivered by Mr. Justice Field in the Court of Queen's Bench, in the case of Nottage and Another *v.* Jackson, appears (as it well might be imagined it would) to have taken a very large proportion of photographers entirely by surprise—indeed almost as if "a mine had been sprung" upon them. On all sides we hear expressions of the greatest discontent—almost amounting to consternation—as to the late ruling on the law of copyright.

One source of surprise to most people is that the point contested, which successfully carried the day in favour of the pirates, has never before been raised. This is the more surprising seeing that the Act has been in existence for more than twenty years, and so many convictions have, at different periods, been obtained under it without this point ever before being questioned. Now, it is clear that unless the decision of the learned judge be appealed against, and the appeal prove successful, many who have been convicted of piracy and mulcted in penalties, though morally—of that there is no question—have not been *legally* guilty. As the matter now stands, on a moderate estimate, fully seventy-five per cent. of the published photographs, both portrait and landscape, which have been entered at Stationers' Hall cannot be considered as possessing a legal copyright.

The Act that confers copyright at all on photographs was passed, and came into force, during the year 1862, and up to that date there was no copyright whatever on pictures produced by the aid of photography. At the period when this Act was passed, it is more than probable it was never contemplated that our art-science would have ever developed into the important branch of industry it has now assumed. Then, most of the negatives—certainly the more important ones—were, as a rule, taken by the photographer himself, and rarely by an operator. Now, the case is entirely different, since by far the larger proportion of the published photographs are, perforce, produced by assistants who work for a salary.

It may be assumed that, in the eye of the law, the wording of the present Act is somewhat ambiguous as regards the person in whom the copyright is vested when the negative is taken by a paid servant; but in the projected new bill the subject, as we mentioned last week, is made clear and definite by Clause 11, which we gave in full, though in the eyes of a layman the present Act might be construed as being definite enough. As many of our readers may not have read the present Act we here print Clause 1 *in extenso*, as that contains the chief point raised in the recent action.

"The author, being a *British* subject or resident within the dominions of the crown, of every original painting, drawing, and photograph which shall be, or shall have been made either in the British dominions or elsewhere, and which shall not have been sold or disposed of before the commencement of this Act, and his assigns, shall have the sole and exclusive right of copying, engraving, reproducing, and multiplying such painting, drawing, and the design thereof, or such photograph, and the negative thereof, by any means and of any size, for the term of the natural life of such author and seven years after his death; provided that, when any painting or drawing, or the negative of any photograph, shall, for the first time after the passing of this Act, be sold or disposed of, or shall be made or executed for or on behalf of any other person for a good or a valuable consideration, the person so selling or disposing of or making or executing the same shall not retain the copyright thereof, unless it be expressly reserved to him by agreement in writing, signed, at or before the time of such sale or disposition, by the vendee or assignee of such painting or drawing, of such negative of a photograph, or by the person for or on whose behalf the same shall be so made or executed; but the copyright shall belong to the vendee or assignee of such painting or drawing, or of such negative of a photograph, or to the person for or on whose behalf the same shall have been made or executed; nor shall the vendee or assignee thereof be entitled to any such copyright, unless, at or before the time of such sale or disposition, an agreement in writing, signed by the person so selling or disposing of the same, or by his agent duly authorised, shall have been made to that effect."

From this clause it would appear, to many persons, that in any work executed for a valuable consideration, the copyright would be invested in the person for whom it was made, unless there was an express stipulation to the contrary. Some, after reading the clause will no doubt be inclined to ask what, in law, constitutes a valuable consideration. Many would imagine that the salary paid to an operator ought to be a valuable consideration, and therefore entitle his employer to the copyright in his work, as it is provided it shall be in the contemplated new Act, should it ever come into existence. Again: suppose a photographer were to contract with an operator who is not regularly engaged by him—as is often the case—to take a certain view or picture for a stipulated sum, would that in the eye of the law constitute a "valuable consideration," and thus entitle the employer, for whom the work is executed, to the copyright without further agreement? According to the recent ruling it would appear that the Act can be read in more senses than one. Be this as it may, few will deny that, as it now stands, the law requires considerable alteration, and photographers will do well to bestir themselves to secure its early amendment.

It may be asked—Who is to take the matter in hand? The question is not so easily answered, as, according to an old adage, "what is everybody's business is nobody's business." The subject certainly concerns, more or less, all photographers throughout the kingdom; for everyone, at times, wishes to make the copyright in his pictures secure. It is a purely business matter, and scarcely comes within the scope of any of the existing photographic societies; still all of them are largely composed of professional photographers, whose interests are at stake.

The Photographic Society of Great Britain and the Edinburgh Photographic Society are numerically the strongest in the United Kingdom, and possibly a section of these might be formed to, unofficially, take the subject in hand, enlist the co-operation of other societies, and then, by means of agitation amongst photographers generally, eventually bring about the necessary reform. There is plenty of time for this to be done before the next session of Parliament, as there is no hope whatever that anything can possibly be done before the adjournment. A short time since there was some talk of a Society being formed—if one be not already in existence—for the purpose of suppressing piracy; but we fear that it will now be practically powerless for the purpose intended, unless Mr. Justice Field's ruling be found, on appeal, to have been incorrect. In the majority of instances, photographs entered at Stationers' Hall are not the actual production of the persons in whose names they are registered, and, consequently, are not legally entitled to protection, unless, indeed, the registration has been effected in the name of the operator, which is scarcely likely to be the case. Such, at least, is the effect of the ruling in the case recently before the Court.

We consider photographers have hitherto been too lethargic over the law of copyright, but it now becomes imperative that they should bestir themselves and endeavour to obtain an Act which will effectually protect their works from piracy. Many of our readers may not be aware that a copy of the present Copyright Act may be obtained for a few pence from Messrs. Eyre and Spottiswoode, the Queen's printers; such, however, is the fact.

Since writing the foregoing, we find an appeal in the case of Nottage and Another *v.* Jackson was down for hearing on Wednesday last, but has been postponed till Tuesday next, the 24th instant.

DEVELOPING AND DEVELOPING FORMULÆ.

Without suggesting any necessarily dependent alteration in the formulæ employed by dry-plate manufacturers, we would observe that it must inevitably have been noticed by most users of commercial plates that the wide difference which at first characterised the proportions recommended in the makers' instructions for mixing the usual constituents of the developing solution has gradually been diminishing, till at the present time no very great harm wou

ɔe done to the quality of the negatives if the formulæ of any ɔne maker were applied to samples of each of the plates in the narket. The best effects, however, could not be so obtained, and to ıdopt such a plan—as, we believe, is the case with some workers—vould be entirely to relegate the very means that enable the houghtful photographer to produce the highest class of effects; 'et, if the earlier proportions recommended were employed, such reatment would have led either to hopeless fog or diminution of ıpparent sensitiveness.

The main differences to be seen lie in the proportions of the pyro-gallic acid to water, of ammonia to bromide, and of the mixture of he latter two to the pyro.; and they, as we have said, much more losely assimilate to each other than was formerly the case. The ormulæ as given in the printed instructions of plate manufacturers ıre complicated by the addition of sundry other agents—as citric ıcid, nitric acid, sulphite of soda, and soforth—all having a deter-ninate function; but the chief agents, as affecting the development, ıre the three above named.

We would here ask why it is that makers will persist in adopt ng, as they do, such an unscientific method of placing before ɔurchasers of their plates the mode of preparing the best developer o use. If there were only one maker and one type of plate the xisting mode would not be of much consequence; but, as it is, here are dozens of makers, and any comparison of formulæ is ɑost difficult and confusing.

When a number of photographers meet together to discuss ɑatters photographic we should scarcely hesitate to say that not ne in half-a-dozen could tell offhand how many grains of pyro. to he ounce of water, how much bromide to each minim of ammonia, r how much ammonia to each grain of pyro. he was in the habit of sing as a standard developer for a plate he was working daily; et there cannot be a doubt of this being the way the propor-ons should be stated if any questions of comparison are to be ɑised.

If one photographer says he compounds certain solutions A, B, nd C, which he mixes up to make D, E, and F, putting together so ɪuch of A and B, and so much of E and F to develope a plate, nd another equally skilful man says he makes a gallon of solu-ion of ammonia and bromide and puts a pinch of pyro. into such quantity of this solution, and so on, it would defy the power of ny rational listener to take away with him any clear mental con-eption of the difference between the method of the two workers, r, indeed, to know if there were a real difference at all!

If, however, one photographer said he employed, for example, yro. two grains to the ounce, and never exceeded three minims of mmonia to each grain of pyro., and, further, that he preferred sing for the plates he was working one-half as much bromide as mmonia, and other operators used the same method of description, basis of comparison would at once be evident; and we cannot but xpress a hope that such a method may eventually be adopted.

It might be thought that makers were afraid of allowing the re-uirements of their plates to be too closely scanned, but we can hardly elieve it to be so; for there are now many excellent plates in the ɪarket each of which may have a special requirement that might be ɔunterbalanced by a greater latitude in another direction. A fur-ɪer argument against this unscientific mode that we speak of is to e found in the fact that those who make plates for their own use e equally guilty.

Coming, now, to a consideration of the formulæ of various makers, nd describing them on the principles we recommend, we find ɪat practically the minute proportions of bromide to ammonia—ɪe characteristic, it will be remembered, of the Bennett process—ave been abandoned for all ordinary work, and the majority of akers recommend such quantities of ammonia and bromide as ɔproximate to a proportion of two to one respectively. Some akers recommend more and some less bromide to ammonia than ɪese proportions, and each maker's plates permit some latitude working as to the exact proportions required to produce first-ass results.

We would here note that to ensure the production of the very ghest class of negative—free from fog, brilliant, and full of contrast as well as half-tone—our experience with many plates leads us to the conclusion that most makers are in the constant habit of recom-mending a quantity of ammonia in proportion to pyro. entirely in excess of what should be used. It scarcely needs to be pointed out that a very large quantity of ammonia can be used to a grain of pyro., and will permit of very good negatives being obtained; but, with a large batch of plates to develope and no great amount of time permissible to spend over each plate, it may be taken for granted that the maker's proportion of ammonia to pyro. is beyond the maximum that will produce the highest class of results. So great is the competition and so close the race for sensitiveness that some makers will give a formula that, in ordinary routine and with a goodly number of plates to develope, will be far from giving the best class of work which can be obtained from the plate.

In a future number we will discuss with more minuteness the details of the formulæ recommended, and also such variations of development as should be familiar to all who wish to produce a first-class printing negative.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XII.—The Equivalent Focus.

Premising that the solar focus of a lens is that point at which objects situated at a great distance are brought to a sharp focus, we now consider the nature of the "equivalent" focus of a combina-tion—a term which arises from a comparison with a single lens that would produce the same-sized image, one being equivalent to the other.

The equivalent focus of a lens may be said to be the focus measured from the optical centre of the combination when such centre has been determined for a distant object. The term "back focus," in popular use, is altogether misleading, or rather it conveys no idea at all in cases in which accuracy is required. We give an instance, and in this case an extreme one:—An objective may be formed having a back focus of only one inch, yet the real or equiva-lent focus of which shall be eight inches; in other words, the size of the image produced by the combination shall equal that produced by the use of a single lens of eight inches focus.

Out of several portrait combinations to be met with every day, and by makers of high reputation, a large number may be selected almost identical as regards *back* focus, but not two alike as regards real or equivalent focus. We were present in the establishment of a dealer in lenses of home and foreign production when two portrait lenses were selected from a large stock and accurately paired, as was imagined, for the purpose of being employed in the taking of instantaneous stereoscopic views. Thorough care and honesty were bestowed upon the selection, the mounts were identical in every respect, and both were then brought under the influence of a single rack-and-pinion. So far all was right, and the images on the ground glass were sharp. Soon afterwards they were returned as not being a pair, in the sense of their producing images of different dimensions. This was an illustration of the misleading nature of back-focus measurement. It being of importance that the photographer should know the real focus of his lenses we shall now give some methods by which this can be ascertained.

We commence by giving one which is, at frequent intervals, being discovered by some whose reading of photographic literature is limited, and paraded, in non-photographic serials, with all the trumpet-blowing of a great discovery. It is, unfortunately, not an accurate method, being so only in an approximate degree. For "rough and ready" purposes, where exactness is not essential, it may prove useful. Focus upon any subject—such as a map or engraving—and let the arrangement be such that the image on the ground glass is precisely of the same dimensions as the original. Now, measure the distance between the ground glass and the subject and divide by four, which gives the figures required. The reason why this method is not accurate, in the case of a combination of lenses, is that it takes no account of the refraction of light by means of the lenses. Owing to this there is an amount of error introduced into the calculation; and the equivalent focus *thus*

found is greater than the true focus by about one-fourth of the distance at which the lenses are separated in the mount.

Fortunately there are other methods by which the equivalent focus may be ascertained with unfailing accuracy, and in describing a few of them we commence with that which we almost invariably employ in preference to all others, being that in which the late Mr. Thomas Grubb has made the camera itself to do duty as a theodolite. In front of a window place a table covered with a sheet of smooth paper, which must be fastened to the table top. Now make a pencil mark at each side of the ground glass of the camera, a slight distance from its margin. This mark may consist of a line about an inch or more in length. Next direct the camera to any well-defined object at a distance—say, the top of a chimney, a flag-staff, the corner of a building, or any other suitable object—and rotate the camera so as to bring this object directly upon one of the pencilled lines on the focussing-screen. This having been done, with a pencil draw a line on the paper cover of the table, making use of the right-hand side base of the camera as a straight-edge for this purpose. Now, without disturbing the table, move the camera round until the object of which we have already spoken is brought directly upon the pencil mark at the opposite margin of the focussing-screen, and again draw a pencil line on the sheet of paper, using the right-hand side of the camera for this purpose as before. (We may here state, *par parenthèse*, that the two lines thus drawn show the angle of view included within the space, hence this forms a simple method of determining the angular field given by any lens.) To resume: if necessary, extend the lines thus projected on the table and connect them by a line, as in the cross of the letter A, which is equal to the distance apart of the two pencil marks on the ground glass. The distance of the intersection of the two first lines and the third line is the equivalent focus of the lens.

A modification of the system described consists in determining the central point of the focussing-screen by drawing diagonals from the corners. Then select two distant objects so arranged as that their images shall be equidistant from the central point. Measure with a pair of compasses the distance between the two objects on the ground glass, and, rotating the camera so that one of them shall "cut" the centre mark, draw a line on the sheet of paper as before directed; then turn the camera until the second object shall in like manner correspond with the central mark, a second line being drawn on the table. Now connect these two angle lines by a third equal to the space between the compasses, and the distance between the junction point of the angle lines and the cross line is the focus.

Another method by which the equivalent focus of a combination may be ascertained is to observe very carefully the size of the image of any distant object given upon the ground glass, then remove the lenses from the mount and insert—most conveniently in the cell for the stops—a thin plate of metal in which is a very small hole, such as a pinhole. Now move the lens mount in or out until the image thus obtained coincides in dimensions with that given by the lens; then measure the distance between the pinhole and the ground glass. This will be practically equal to the equivalent focus of the lens. Owing to diffraction, or the tendency of rays of light to bend when passing an opaque edge, it will be impossible to secure a very sharp image by this pinhole system. On this we may observe that although in geometric objects light is assumed to travel in straight lines in physical optics this is not the case, for on passing by the edge of an opaque body it is bent round the corner to some small extent.

Instead of the pinhole system a better way is to obtain a cheap spectacle glass, which can be obtained in nearly any large town at a cost of sixpence to a shilling per dozen. This gives with a half-inch stop an image the same size as the combination. Measure the distance between the centre of the spectacle glass and the ground glass, although owing to the thinness of the glass the measurement may practically be made from the outer surface. Greater accuracy is of course secured by adding to the measurement thus obtained the semi-thickness of the spectacle lens.

But it is not at all necessary that a large number of spectacle glasses be obtained for determining the equivalent focus of a combination, seeing that it may be effected by the use of one alone of any known focus. Having taken the precise dimensions of any subject—and which we may designate the "test object"—on the ground glass with the photographic combination whose focus is as yet unknown, do the same with the spectacle glass of known focus, and compare the two results. The relation of the sizes of the two images to each other is the same as that of the foci of the lenses by which they were produced. It is a simple rule-of-three problem.

The troubles of the photographer with regard to the photographing of colours dates from the earliest days of the science, and numerous have been the plans adopted to overcome the difficulties of the subject. Mr. J. R. Sawyer's paper, read before the Photographic Society of Great Britain (which appears in the present number), puts in a clear light the difficulties inherent in the process—for example, of copying old paintings, which, of course, are not dissimilar to those attaching to the photographing of natural objects, landscapes, or figure studies. He gives an effective mode of dealing with the drawbacks of such a class of work, but it is, of course, mechanical in nature. If, however, we are to believe our contemporary, *La Nature*, a photographic millennium has arrived, and the problem of photographing objects of all colours, so that the depths of tints in the photograph shall fairly represent the colour value of the original, has been solved by a Parisian firm of dry-plate makers. Our Paris correspondent referred to the matter recently; but a whole article is devoted to it in *La Nature*, which says:—"First, Captain Waterhouse, then MM. Cros and Ducos du Hauron, have found a means of obtaining a reproduction of true value, either by causing the light to pass through coloured mediums or by staining the collodion with eosine. But the results have not appeared sufficiently satisfactory to those interested. And now the gelatino-bromide processes have quite dethroned collodion. Two Parisian photographers, MM. Attout-Tailfer and Clayton, have succeeded in giving to gelatino-bromide with eosine the properties which Captain Waterhouse had given to collodion. The plates which they prepare give a reproduction of the colour values as that done by the draughtsman with his pencil. Yellow comes out light; blue, dark; and orange gives an intermediate value," &c., &c. An engraving from a photograph presented to the Photographic Society of France accompanies the article, and, taken on its own merits, shows a most appreciative discrimination in the reproduction of the colours of the diagram prepared for the purpose, and containing bands alternately of a coloured fabric in blue, yellow, green, and violet, with an orange star. The photograph taken by ordinary means gives an almost uniform grey, with a light stripe for the violet. That taken by the new plates is in complete contrast to it, the violet and the blue being dark stripes, and the yellow a pale grey. We must say that this is a very striking effect; but, on the other hand, as nothing at all so striking was ever achieved by collodion and eosine, we must reserve our judgment as to the value of the process, as the photograph thus reproduced might be a mere *tour de force*. We are told that the plates (called by the makers "isochromatic") cost the same, have the same sensitiveness and are employed in exactly the same mode as ordinary gelatino-bromide dry plates—a fact that, at anyrate as regards equal sensitiveness, we take leave to doubt.

In the same journal a conspicuous place is given to a letter from a correspondent, announcing that he has succeeded in obtaining a photograph of a flash of lightning, and that he is now busy at work endeavouring to photograph by moonlight—a feat, so far, beyond his power; but the accomplishment of which he will announce as soon as possible after the event. As these feats have been performed in this country, we may say years ago, photography as seen in the pages of *La Nature* would seem to be behind the day.

It is remarkable how readily a scare is got up on the subject of poisonous processes of manufacture, and also how difficult it is to allay it when once started. An impression has been prevalent, and indeed is gaining ground, that many processes of aniline manufacture are dangerous to the health of the workers engaged, and the substances themselves injurious to health; but an important publication

on the matter has been issued, which should have a tendency to allay these groundless fears. Magenta is not a colour employed by photographers to any extent; hence, perhaps, we need not advise them as to the care needed in handling samples, which, if impure, may contain so much as eight per cent. of arsenic. Aniline itself, familiar to photographers through Willis's process, is decidedly poisonous; and eosine, which appears just now to attract fresh attention, is the cause of a special complaint called "*hyperhydrosis localis.*" As, however, this disease, though only appearing in the portion of the works where eosine is manufactured, is not conclusively shown to be caused by that chemical itself, but may be the effect of the use of strong solutions of chloride of lime formerly employed, we think photographers need have no anxiety on the matter. The effect is local, being thus somewhat like that of bichromate on subjects sensitive to its action.

All the eclipse accounts so far promise very well for a rich harvest of results. As might have been anticipated, disaster here and there in things photographic occurred; but it could not be expected that every detail should be carried out without a hitch, and every photograph developed without *contretemps*. It must have been very annoying to Mr. C. Ray Woods, for example, in developing a plate for the red end of the spectrum to find it all frill away, or, as the newspaper account puts it, tear away, leaving nothing but a margin of gelatine.

PHOTOGRAPHY APPLIED TO TERRA-COTTA AND OPAL GLASS.

In the natural course of things it must necessarily have occurred to practical men to utilise photography in the case of terra-cotta as it has already been employed in connection with so many other wares; but I have not to this day known of its successful application to terra-cotta. Now this is strange, if one considers how fashionable *plaque*- and plate-painting have become of late, and the good photographic results that are easily obtained on these as on sundry articles of this same "burnt earth." Portraits, animals, landscapes, seascapes, and reproductions are one and all easily transferred, whether for painting upon or to be left purely photographic. As a matter of business, too, one fails to see that it would not be remunerative, but rather the contrary. It was with something of this feeling that I was led to try and see what could be done to attain the end in view, and, as I knew of no *data* to go by, I had to use my own experience, or rather experiment on my own account.

Since emulsion was constantly at hand in my establishment, in the commercial production of my gelatine dry plates, it was but natural I should first have turned to this as a mode of obtaining the desired results; but, alas! all attempts in that direction signally failed—the ware most persistently refused to have anything to do with the emulsion. The bugbear was the fixing agent or hypo., which not only left indelible marks, but, despite any amount of washing, the image on a finished plate vanished to nothing at the end of an hour's exposure in the show window. There was nothing left but to seek other means for the attainment of my object. I would not have troubled the reader as to this unsuccessful line of experiment but that I wished to put him on his guard and save him useless researches in the same direction. To cut matters short, the method I found best and most direct was the now old, but still excellent, wet collodion transfer. I will now proceed to detail my system of working to facilitate the matter to the inexperienced in collodion transfer.

Terra-Cotta Photography in Practice.

The first and indispensable operation, in the preparation of the surface to receive the transfer, is the "sizing of the surface." It simply consists of a solution of gelatine chrome-alumed, as follows:—

Gelatine	10 grains.
Water	1 ounce.

A trace of chrome alum.

Coat with a soft camel's-hair brush and let dry. It is needless to say that numbers of *plaques*, plates, vases, &c., may be coated right off and will then be ready for use at any time.

Having settled on the subject and carefully dusted the negative, as well as placed it *in situ* for reproduction, the next thing required is a suitable collodion, and the following will be found all that can be desired:—

Transfer Collodion.

Cotton	3 drachms.
Iodide of cadmium	65 grains.
Ammonium iodide	25 „
Bromide of cadmium	19 „
Ammonium bromide	11 „
Alcohol	15 ounces.
Ether	15 „

The plate thoroughly cleaned and coated with the collodion is now transferred to a bath, as follows:—

Nitrate of silver (common)...... 25 grains to the ounce.
Made slightly acid with nitric acid.

After sensitising, the plate is exposed in the usual way and taken to the room where pictures are ordinarily developed, and *quantum suff.* of the following poured in the developing cup to bring out the image:—

Developing Solution.

A Winchester of water, *i.e.*	80 ounces.
Protosulphate of iron	240 grains.
Citric acid	240 „

Or the following may be used:—

Pyro.	3 grains	per ounce of water.
Citric acid	2 „	
Glacial acetic acid	30 drops	

After perfect development the picture is well washed and then fixed in a saturated solution of hypo.; after which it is thoroughly washed.

It will now be found that the picture is not altogether satisfactory; it lacks both vigour and colour. To improve matters recourse is now had to—

Toning.

Gold	1 grain.
Water	5 ounces.

With this a very fine depth is soon attained, and a nice picture the result. Leave out the toning and only a poor, sunken-looking picture will be the outcome; but directly the toning bath is employed richness at once comes to the fore. I have, however, known of instances where the picture needed no toning.

Opal Production in Practice.

This is still a secret with some in the profession. A limited number of workers have succeeded in bringing out good opals, and their *modus operandi* is kept from the many. Now this is a pity, when one considers the great charm attached to a good picture on opal, with pure whites and rich blacks, and in many localities the demand that might be created for them. Apart from their beauty, another charm attaches to opals—their absolute permanence; and this, it must be allowed, is no trifle. What, in fact, can be more painful to the worker who values his work, and sets store by it, than to feel it must ere long fade and pass into oblivion! A properly-executed opal will no more fade than the glass pictures so common at one time, and which, wherever taken care of, are as perfect now as they were when first taken.

Now, excellent pictures are to be made on opals by means of emulsion; but I propose first taking the transfer method (mainly applicable to ground opal and canvas) as given above for pottery, since in practice it is found very ready, easy of manipulation, and safe. The details are much the same as above, and necessitates double transfer.

After the picture has been obtained on the plate (ordinary glass plate), and after thoroughly fixing, washing, and toning, the picture (and this, remember, is the case likewise for terra-cotta) then has to be loosened from its support, and this is done with a solution of sulphuric acid—one drachm to fifteen ounces of water—which is made to flow between the image and the glass, after which perfectly wash and mount. When the image is loosened a piece of tracing-paper is put on the image, evened out, raised (assisted by some one else to hold the two opposite corners during the operation), and with the aid of the helper the picture is carefully centered, gently pressed out or down, and the transfer is so far effected. But what will happen, and does happen, in the case of vignettes is impurity of the whites, when the picture becomes positively objectionable. Now the way to remedy this lies simply in the application, to the dirty-looking parts, of a solution of iodine dissolved in iodide of potassium to sherry colour; after which, well wash and apply a weak solution of cyanide of potassium, and wash well again. This, by the way, is equally applicable to paper tranfers; and it is to be remembered that the toning comes last of all. It is a rather difficult matter to clean a ground opal which has been used two or three times, and acid must then be had recourse to (nitric acid is as good as any); but by transferring from the support on the ground surface all stains are at once avoided.

On the flushed glass, or on the pot metal (unground), after well cleaning the surface it should be covered with a substratum of egg. Then the picture is taken direct, not transferred; that is, the plate is exposed direct in the camera, regularly proceeded with, and, when dried, varnished with a pale negative varnish, or with dead varnish if intended for chalk or water-colour. This, when a good negative is used, gives a remarkably fine picture, not requiring a vestige of retouching, and having likewise the invaluable advantage of being perfectly durable if varnished with the negative varnish. Moreover, on that, effective pictures may be made in oil with simply tinting.

A gentleman, who has a right to be considered a good judge in all art matters, on looking at one of these pictures transferred on flushed glass, said it was one of the finest productions of photography. He urged that negatives *ad rem* should be taken most carefully, and that, like the picture I showed him, they should be full of half-tone and detail, and yet have plenty of vigour. They should, he said, be robust in the high lights, have perfectly clear glass in the few points of deep shadows, and thus have powerful relief. Moreover, the negatives should be retouched only by a competent hand, and care taken that the likeness shall be in no way altered, which is so frequently the case now.

If done as thus suggested there is no doubt that remarkably fine pictures are to be produced on opal, whether ground or not. Most artistic results are to be obtained, and, with proper care, absolute permanency. In this age of keen competition, all have to think of what may really be recommended to one's *clientèle*, and likely to meet with approbation from strangers and friends when the picture has once been delivered; and I candidly think that the opal, of all, is the picture most likely to meet with this general approbation.

I hope I have left it clearly to be understood that the class of opal picture to which I have chiefly alluded is one that remains untouched after the transfer—that is, absolutely unpainted upon. It is pure photography in every sense of the word, and the resultant picture one hardly to be surpassed in any way. I have rather laid a stress on this point, well knowing how pictures are at times irretrievably ruined by the barbarous hand of would-be artists, who by far exceed the true artists in number; and the hint on retouching should not be lost sight of, either, at a period when the tendency is to stereotype everyone in marble-like texture, or rather lack of texture, as if the face were devoid of all fleshiness and as hard and rigid as cast iron. It might be wise to weigh this point carefully, and act upon it, before the enlightened public have raised a cry against the pernicious practice and made photographers smart for their want of applying timely remedial measures to a decided evil.

On reading the above again, fearing lest any misconception should arise in the mind of the reader, I deem it expedient to clearly state that for terra-cotta recourse is had to double transfer; that is, the picture first taken is lifted from the support on tracing paper, put in the right position on terra-cotta, and pressed down while wet with blotting-paper, left to dry, and is then so far ready.

Respecting the production of pictures by means of emulsion, ground opal being the best, the system I employ is as follows:—After well cleaning the glass, coat it with emulsion (which had better not be too thick). When dry it is exposed and developed with the usual oxalate developer, to which a little bromide of potassium has been added. The remainder of the operations is as usual. Those varnished with dead varnish can be tinted and worked up with coloured crayons or black lead pencil and make very pleasing pictures. It is needless to add that they are also to be finished in water-colours if thought preferable. G. W. MARTYN.

THE THEORY OF THE SENSITIVENESS OF SILVER HALOIDS.

ONE of the earliest recorded experiments in the chemistry of photography, tending to show the nature of the change produced by the action of light upon sensitive silver compounds, is that of Scheele, the renowned Swedish chemist. He showed that if silver chloride be exposed to light whilst under water and in a sealed test tube, it is changed to a dark violet or nearly black colour, and that the water above it has become impregnated with an acid. Although this fact was made known at the time, nothing seemed to have been deduced from it. In the early history of applied photography many theories were propounded as to the nature of the change which takes place in the production of a picture, some maintaining that a physical change was produced by a process of re-arrangement of the molecules, and others that a chemical decomposition was produced by the action of light, a separation taking place between the silver and the halogen. The latter is the explanation which came to be generally accepted.

It was observed that iodide of silver, if prepared with excess of iodide, was insensitive to light, even when this excess was apparently washed away, but that an excess of silver nitrate made a very sensitive compound. It was also found that iodide of silver prepared with excess of nitrate of silver and then thoroughly freed from this excess by washing lost a great deal of its sensitiveness, but that this was again to a great extent restored by the application of substances of an organic nature, such as tannin, gum, or albumen. From this fact it was argued that, to produce sensitiveness in a film of iodide of silver, it was necessary that there should be some substance present capable of uniting with or of absorbing the liberated iodine, and that this also applied to all other silver compounds.

As this is a point having a direct bearing upon the cause which produces so much variety in the sensitiveness of silver compounds prepared by different methods, it will be useful to inquire whether this theory will cover all the facts. If it do, it will be a guide as to what would be the most suitable substance to employ to attain maximum sensitiveness; for it is evident that any substance possessing the greatest affinity for the haloid would produce the greatest rapidity. Starch, as is well known, has a powerful affinity for iodine—so much so that it is employed as a test for its presence. If we precipitate some silver iodide in a test tube, with a slight excess of iodide, and well wash the precipitate to free it from this excess, then expose to light under a solution of starch, sensitiveness ought to be very much increased, and if iodine were liberated the fact should be shown by the well-known blue coloration produced. No such effect is produced, however, nor is the iodide of silver rendered more sensitive, or at least only slightly so. This may be shown by exposing some for a few seconds and afterwards applying a developer of gallic acid and silver nitrate, when, if it have been prepared with excess of iodide, it will refuse to darken or develope for a long time.

If we vary the experiment, and expose some of the same silver iodide under a solution of gallic acid which is perfectly neutral to litmus paper, it will be found at the end of a few minutes that a change has taken place and the solution has become acid, which acidity increases with continuation of the exposure. The result is exactly analogous to the experiment of Scheele with silver chloride, and tends to show that it is not the absorption of the halogen which produces sensitiveness, but that a chemical decomposition takes place between the organic substance employed and the silver haloid, with the production of a halogen acid (H I).

If we examine the long list of organic sensitisers that have at various times come into use for dry-plate work we find one thing in common amongst them; that is, they all possess an affinity for oxygen and not for the halogen, and act, therefore, as sensitisers by virtue of their reducing power. It is also well known that the halogens themselves have a stronger affinity for hydrogen than they have for silver. If we immerse a film of silver iodide or bromide in a solution of sulphuric acid in water, and then place some zinc filings in the mixture, the silver is immediately reduced to the metallic state, the iodine and bromine going to the hydrogen liberated from the water by the zinc. Both these reactions come into force when an organic sensitiser is applied to a silver haloid. On the one hand we have the affinity of the haloid for hydrogen, and on the other the affinity of the organic substance for oxygen. Under the influence of light the action is completed: an atom of water is decomposed, the oxygen going to the sensitiser and the haloid uniting with the hydrogen, leaving the silver wholly or partially reduced.

In the case of an emulsion formed in gelatine, then, we have all the elements present necessary for the reduction of silver bromide to a lower or sub-bromide state, and that in a most intimate state of mixture, every molecule being surrounded by a reducing agent. This entails the necessity for forming such an emulsion with a soluble bromide in excess, so as to avoid the inevitable spontaneous reduction that would otherwise take place. Bromide of silver formed in water, in the presence of an excess of bromide, is, unlike the iodide, sensitive to light and capable of being reduced by a suitable developer after exposure; but it is not nearly as sensitive as one prepared with an excess of silver. If we form two precipitates of silver bromide—one with excess of silver and the other of bromide—wash slightly and spread on paper or a glass plate, it will be found, on exposure to light, that the one containing silver in excess darkens far more rapidly and attains a deeper colour than does the other. As is well known, the same occurs with the iodide and chloride.

In a gelatine emulsion, then, we have really a slow form of silver bromide, and the rapidity is due to the sensitising power of the

gelatine. In a collodion emulsion the case is different. Pyroxyline in itself possesses no sensitising power, but merely acts mechanically as a vehicle for the suspension of the bromide. If, therefore, an emulsion be formed in collodion with excess of bromide exactly in the same proportion as one in gelatine the two would by no means be similar in resulting rapidity; for the collodion would contain the slow form of silver bromide, without the sensitiser, and no amount of heat or "ripening" would make up for this deficiency. Hence the balance of equivalents should be turned the other way, and an excess of silver allowed to procure a rapid form of bromide, when further sensitiveness may be obtained by the application of organic reducers.

It is the physical characteristics of gelatine which render it so peculiarly suitable for use in the manner now so familiar to every one. It is insoluble in cold water, yet capable of absorbing large quantities of it. It possesses the power of absorbing or combining with oxygen, and so acts as a reducer or sensitiser. But there are many other organic substances which have also the latter property, and would doubtless form emulsions as sensitive as, or perhaps more so than, gelatine were it not that their solubility in cold water render them unsuitable for the after-process of development and washing. Such are gum arabic, dextrine, gum tragacanth, or albumen. Flour paste is an admirable medium in which to form a rapid emulsion for use upon paper where a matt surface is required. Here it is probably the glutin contained in the flour that acts as a sensitiser, since a similar emulsion formed in starch is considerably slower.

It is generally considered that the bromide is the most sensitive of the silver haloids when employed with an alkaline developer. It is very probable, however, that the chloride may turn out to be still more rapid if suitable means of development are employed. Mr. Herbert B. Berkeley, I believe, first pointed out, in 1874, that a vigorous image was capable of being developed upon a chloride film with alkaline development without universal reduction necessarily taking place, and since then several communications have appeared from him and others on the same subject. It is a matter well deserving of investigation. That the image is formed in the camera at any rate as rapidly upon the chloride as on the bromide there can be little doubt. It is in the development that the difficulty crops up; for there is such a strong tendency to reduction or fog under an alkaline developer that a powerful restrainer is necessary to hold it in check. This, of course, partially undoes the work done by the light, and so makes the chloride apparently slower.

From some few experiments I have tried with a chloride film in collodion without excess of silver or chloride, and an after-application of a weak solution of gelatine, using hydrokinone and an alkali as a developer, without any restrainer, I have found very great rapidity and perfect clearness in the shadows, the image being peculiarly rich and vigorous. Pressure of other matters has prevented my trying it with gelatine; but in all probability it would be even more rapid and vigorous, and for many special purposes would usefully supply a long-felt want. EDWIN BANKS.

THE TRANSLATION OF COLOUR INTO MONOCHROME BY PHOTOGRAPHIC MEANS.

[A communication to the Photographic Society of Great Britain.]

THE amount of interesting and instructive matter put down for your consideration this evening would seem to make it unadvisable that I should again occupy your time; but the communication that I wish to make to you springs so naturally out of the paper I read at your last meeting—is, in fact, so truly supplementary to it—and any value it may have would be so much impaired by the delay consequent upon the vacation, I decided to ask to be permitted to again trespass upon your patience.

On the last occasion I brought before you the results of photographing a screen of sixteen colours arranged in a curve, so as to give gradation of light and shade in each colour, and therefore giving the photographic value of each colour in every gradation from high light to deep shadow. This screen of colours I again bring before your notice, and by its side I have placed an enlargement of the best small negative I have been able to make of it.

The negative from which this enlargement has been made is upon a gelatine plate—bromide of silver, with a trace of iodide; and I believe that, with our present knowledge, no better photographic translation of colour is possible. But, however good this particular translation may be considered as the rendering of colour into monochrome, there is no disguising the fact that it is painfully inadequate to render colour into monochrome, so that its lights and shades shall impress the optic nerve of the eye in the same degree and in the same relation that the colours themselves do.

A comparison between the colour-screen and the enlarged photograph will show what a great gulf still exists between what is possible at present and what is necessary to be done, before photography can be considered able to translate colour into satisfactory monochrome. To take only a few instances: note the contrast between the energetic action of the yellow, No. 5, upon the optic nerve, with its extreme feebleness upon the sensitive plate. The blues, No. 3 and No. 10, both cool and retiring to the eye, are most energetic on the plate; the browns, 13, 14, and 15, although so very different in value to the eye, come out pretty nearly alike in the photograph. The orange, No. 6, a darker colour to the eye than the bright yellow next to it, is rendered as being a much lighter and brighter colour; in short, taking black and white as our standards, it is difficult to say which colour it is that photography does represent as being of the value that the visual organs attach to it.

Fortunately, it happens that neither nature nor art presents colour in the sharp and decided manner that it is given on this screen; nature blending and mixing her tints with wondrous skill, and the artist, being a faithful student, striving to put on canvas his transcript, exalted and emphasised by whatever of genius he may have in him. The result, then, of photographic transcripts from nature and art is not nearly so imperfect as might be imagined; but there is still a wide difference between the value of colour as seen by the eye and its value as presented in a photograph.

But, then, it may be said, What is to be the standard for translating colour into monochrome? Photographs are daily made that already render colour into very satisfactory monochrome, and it may be asked what more can be desired? What is wanted is the same translation that a skilful engraver would produce, and nothing less than this standard should be aimed at.

Let me now call your attention to a coloured picture, a very common chromolithograph, which I was fortunate enough to secure, probably because it was so glaring in colour, and so wanting in any artistic merit, that it failed to find a purchaser even for the very small sum that I gave for it; in my eyes, and for my purpose, it had great merit, and I eagerly became the possessor of a work that would so admirably illustrate what I wish to lay before you. This we may imagine to be an Italian fruitseller, a young girl attired in a white Garibaldi shirt, over which is a dark blue bodice and dress; she has an elaborate sash of green and red; her right hand supports a yellowish-brown earthen vase, whilst her left steadies a large basket of green and red grapes which she carries on her head; the grapes are set off by vine leaves, and a strip of some bright red material hangs over one edge of the basket; her face, of an orange tint, is illumined by the setting sun, one half of it being in shadow; she wears a necklace of red beads, also one of bright yellow; she has a background of greenish-blue lake, yellowish-green hill, and snow mountain, up which the blue shadow thrown by the departing sun is creeping; the sky has a faint primrose tint near the horizon, fading gradually into blue sky towards the top of the picture.

The special value, for my purpose, of this most inartistic work consists in its violent and crude colouring. I felt that I had here a range of colour sufficient to test to its utmost all the photographic resources known to me.

By its side I have placed an enlargement from the best dry-plate negative I have been able to make; and, before going further, I wish to call your careful attention to those points in which the photograph has failed in reproducing the value of the colour of the original.

Take the red and green grapes in the photograph: they both come out of the same value; but to the eye the red is, and should be, the prominent colour. The red patch of cloth hanging over the edge of the basket comes up as a dark patch; the necklaces, although the yellow one is much brighter to the eye than the red one, come out of about the same value; the girdle of red and green, picked out with yellow, comes out more or less of the same tint, but the patches of yellow, being light, have got something like their value; the earthen vase, being a yellowish-brown, is much too dark; the red end of the girdle or scarf, instead of telling out as a bright colour, is of a similar value to the dark-blue of the dress over which it hangs. I will not weary you by going minutely over the whole of the picture, but there are still two noticeable features that I must call your attention to. One is this—you will notice the light-blue shadow creeping up the distant snow mountain; this shadow is absolutely lost in the negative, there is no trace whatever of it. The other feature is, that in the coloured print the sky near the horizon is made lighter by the introduction of a pale yellow colour; but the photograph, as one would expect, has rendered this darker than the upper part of the sky, instead of lighter, thus absolutely reversing the effect the artist intended.

Still, with all these discrepancies, the photograph has a certain harmony in its way. There is gradation and light and shade, although the gradation and the light and shade are not those of the original; but, considering the violet colour and glaring effect of the lithograph, if we were compelled to make a choice between the two most probably we should all desire the photographic copy rather than the original. The problem to be solved appears to me to be this:—Supposing an artistic engraver had to reproduce this picture in monochrome, how would he do it, and what value would he attach to the various colours?

Taking this idea of reproduction as a standard, can there be any method devised by means of which an artist would have as much control over a photographic negative as an engraver has over his plate? My first step in the consideration of this problem was to produce a very thin negative, giving all the detail in the drawing that it was possible to get. A print from this negative is before you. You will observe that there are no high lights, no deep shadows; the whole thing is flat and in half-tone. This negative I took as a basis to work upon, and the result of this negative worked up is also before you. I do not pretend that the print from this negative is such a representation as a skilled engraver would give us, but it will serve to demonstrate to you the power of alteration consequent upon the method of working I have pursued.

The negative has been retouched by a clever artist, but one who has had no experience in this kind of work, and it is very possible that the effects produced are neither good nor true; for to produce fine artistic effects from pictures by this method will require both talent and practised skill. My object is to demonstrate to you what could be done. By having the negative in half-tone it has been possible to give vigour to the shadows by covering the negative with paper and cutting out those portions which were wanting in depth; to bring up the reds and yellows by working with chalk and pencil; to create the blue shadow creeping up the mountain by working upon the high light of the snow, and leaving the other portion of the mountain in its original half-tint to represent the shadow; to give luminosity to the sky near the horizon by stumping with chalk and powder colour, allowing the upper portion to remain as photographed.

Thus I trust to have demonstrated to you this evening that, given a thin, well-exposed negative, such as can so well be produced with a gelatino-bromide plate, it is possible to work largely upon such a negative, to put in lights and give depth and force to shadows, to lower the tone of colours that come out too prominently, and to raise to their proper importance colours to which the photographic sensitive surfaces refuse to render justice. J. R. Sawyer.

THE "NEW" SCIENTIFIC SUBJECT.

I read with some interest and considerable surprise an article which appeared, under the above heading, in The British Journal of Photography last week. I then read it again. After a short lapse of time, and a medical examination which reassured me as to the state of my intellect, I perused it for the third time; but I have felt that it would be a tempting of Providence to go deeper into the matter. Will Mr. Harding Warner consent to throw a "photosphere or luminous halo" round this Delphic utterance of his? or are we to understand that it is a colossal practical joke which leaves in the shade Artemus Ward's description of the silver mine?

Mr. Warner cites as facts things which are incorrect, and that in a crisp and epigrammatic way which is delightful. From these so-called facts he draws inferences which, even if they were facts indeed, would be illogical, and upon these illogical inferences draws deductions which, once more, no amount of concession would render tenable. Let us for curiosity's sake brace ourselves for a mental effort, and wade along in Mr. Warner's trail, in the hope of picking up some little scrap of meaning.

Mr. Warner begins by the pretty broad assertion that "all bodies—especially such as are magnets, crystals, man [!], and even the light of the sun and heavenly bodies—are polarised." There may be some argument as to how far such bodies may be polarised—though I believe that in physics the term is only applicable to light—but the use of the present tense and the offhanded looseness of the remark makes the sentence sound more like an extract from a nightmare of Professor Tyndall's than a sober scientific statement. There follows an incoherent allusion to "the polarity of colour" (whatever that may mean) and an account of some sensitive subjects who on placing their hands over "the poles of a crystal" were sensible of a "tepid breath," by which, I presume, the gentleman means a warm current of air—a curious circumstance, if true, but without the smallest bearing upon the subject at issue, if there can be said to be any subject at issue.

Mr. Warner then runs off upon another tack, and we might quote the bard that "this is a more beautiful song than the other." He tells us that scientific men have discovered a force in all living things which they have named "Od." What scientific men? At the risk of being flippant I should submit that it is very odd that such a force should be mentioned in no text-book of science. Can it be that the all-comprehensive syllable of the Hindoos, "Om" (if I remember right), is running in the gentleman's mind? He is an authority upon the subject, and favours us with a few jottings which he made in his note-book some twelve years ago. After running over a few rudiments of science, everyday commonplaces, such as that there are two envelopes round the earth, one emitting light and named a "photosphere," and the other "shedding forth rays of colour" named a "chromosphere"—both facts guaranteed by "men of science"—he brings us to something a little more off the beaten track. By virtue of "Od," says the note-book, all things animate and inanimate emit rays of colour which affect the sensitive plate, and more especially the gelatino-bromide plate. Unfortunately for the credit of the note-book, gelatino-bromide plates did not exist twelve years ago. But, apart from this minor consideration, was ever such an extraordinary statement promulgated in a scientific journal? Colour, according to this, is entirely independent of and separate from light. It is colour and not light which makes an impression upon a plate. Might I humbly submit that if *all* things emit this force, and if this force affects *all* plates "to a greater or less degree," how is a gelatino-bromide plate ever to be manufactured or, above all, stored? It is a waste of energy, however, to argue seriously against such assertions.

Mr. Warner gives us some other interesting particulars about "Od." He is gallant, and gives the fairer sex credit for possessing a large share of the commodity. Flowers possess it also. They give out light through it. Everything else affected give out colour in contradistinction to light. But it is just these little irregularities which give the charm to the whole dissertation. When Mr. Warner asserts, however, that it is clear that flowers emit light through "Od" from the presence of a smell (flippancy again suggests odour) he really transcends himself. The statement is so gloriously and symmetrically absurd that it appears absolutely brutal to suggest such botanical considerations as volatile oils, &c., especially in the face of the chirpy self-content with which Mr. Warner remarks in the next line that "these things are easy of proof, as must be apparent to any well-ordered mind." Alas! for my poor cerebrum!

Let us take another delicious specimen of this gentleman's method of reasoning. Here are two of the crisp statements in which he indulges:—(1) Cleanliness induces to an abundance of "Od." (2) People who have this force are especially fond of the colour blue. Now if we put the "Od" out of both questions, as being a common factor in the equation, we have it put seriously forward that clean people are especially fond of the colour blue—and this not as a mere playful hypothesis, but with the utmost confidence and dogmatism. I can only say that I have seen a procession of a certain well-known temperance organisation which would throw doubt upon the assertion.

I can hardly do justice to Mr. Warner's originality and daring in this hastily-written critique. Let me cull a few choice specimens of the flowers of science which lie scattered over the remainder of his communication. "The right side of every person is warmer than the left." *It isn't;* but no matter. "Odic impressions are either disagreeably warm or agreeably cool." There is something disagreeably cool in Mr. Warner's method of laying down the law. The gentleman gives us an experiment within the reach of all, which puts the existence of this galvanico-electro-hysterico-magnetic power beyond all cavil or argument. "If you hold up your leg," he says in his guileless way, "you find your foot grow cold. This is due to 'Od.'" If we had not been told we might have attributed it to the action of gravity upon the circulation of the blood. It is well to get at facts. Mr. Warner has another splendid illustration of the strange latent powers of "Od." It causes uneasiness and aversion at meeting some people, while others you may meet with indifference or pleasure. I have no doubt that if the gentleman observed a dialogue between the tax-gatherer and myself he would be surprised at the amount of "Od" which would be evolved. The last paragraph of Mr. Warner's letter I deprecate entirely as being out of place and in bad taste.

In conclusion: let me say that I know nothing of Mr. Warner, and that I should be most grieved to hurt his feelings in any way. Every man has a right to have his hobby, and to ride it, too, as long as he does not ride anyone down with it. When, however, a communication which abounds in scientific errors appears in an eminent scientific journal, it is not right that it should be allowed to pass uncorrected or unchallenged. Let Mr. Warner mature his views for another twelve years or so, and then give them light more logically and less dogmatically, while producing some show of reason for the faith that is in him. A. Conan Doyle, M.B.

THE EFFECT OF SHEARING STRESS ON SENSITIVE SALTS.*

[A communication to the Photographic Society of Great Britain.]

The subject which I have to bring before the Society tonight is one which has arisen from the observation that when plates are packed with masks, as by Mr. England's plan, it sometimes happens that marks are found at the corners of the plates where the gummed paper forming the corners of these masks comes in contact with them. The same phenomenon is also observable in plates packed by the ordinary zigzag plan. My attention was especially called to the fact, as I have observed, that plates from the top are not so liable to masks as plates at the bottom of (say) a packet of twenty-four. The question I asked myself was, then, what is the cause of these markings? In order to investigate the matter, I commenced by taking a piece of glass rod, rounded so as to be quite blunt at the end, and writing lightly on a gelatine plate. On applying the alkaline developer, the part written on showed as a black line: here there was a something on which to start an inquiry. Next it was found that ferrous oxalate development acted equally well. It struck me that this might be due to the action of the gelatine, which

* The author's original title was, *The Effect of Pressure on Sensitive Salts.* He has thought it better to modify the title to the above.

had been scraped, forming a nucleus on which development could take place. The question was how to settle that point. A plate was written on, and then half of it soaked in water till thoroughly swelled, and then developed: the action was the same as before. Next, half a similar one was immersed in bichromate solution, *and where the plate was immersed no action was seen on applying the developer.* Thus, then, the same oxidising solution which will destroy an image produced by light will also destroy one produced by shearing stress. The question then again arose, as to whether it might not be the material of the glass rod which caused this effect; so plates were written on by gold, silver, ivory, talc, and wood, and still the same effects were in every case obtainable. A black lead pencil seemed to be an exception, but this was only due to the repellent action of the black lead by the developer. When the graphite was sponged away by water, and development proceeded with, the pencil-marks showed all the signs of development. If a plate be moistened you do not get the effect, because the silver is not crushed. To my own mind, these experiments settled the question as to gelatine plates; but was the same obtainable on sensitive salts or other media, such as collodion? A collodion emulsion was taken, and treated the same way with the different media; and it was found that, where the film was not torn by the writing process, this same action took place, but more feebly, owing to the small shearing force that could be applied. To try further, a piece of gelatine paper was taken, and coated with collodion emulsion, and written upon, with the result that the writing in each case developed. A piece of bromo-iodised paper, prepared as I have described in the *Journal*, gave results, but very feeble, owing, in my belief, to the fact that the particles of sensitive salts could escape from beneath the writing-implement.

My next experiment was with a piece of mosquito netting placed on a gelatine film between two pieces of thick glass. These were squeezed together in a vice, and the film developed. Where the pressure had been brought to bear on the film, there the network developed as black lines. A collodion bath plate was treated with an albumen solution and dried, and the writing-implements applied to the film, and in this case the result was almost imperceptible, for a reason which will presently be apparent. A piece of cream-laid paper was placed over a gelatine plate, and writing executed on the film through the paper. With a gentle pressure the words did not develope, while when the pressure was strong they showed themselves perfectly, but the lines rather thicker than usual. In this case there was no abrasion of the film, as far as I could see. Let me lay the facts so far obtained before you.

1st. All rounded points applied direct to the film gave images on development, if the pressure was very slight, and the developing power was destroyed by bichromate.

2nd. The same points through a medium, such as thin paper, gave no results unless the pressure used was strong, when the lines seemed increased in breadth.

3rd. Pressure in a vice of a raised surface gave an image of that surface.

Now the foregoing are different results to those which have been previously obtained by Warnerke and myself. Pressure from the back of a film produces insensitiveness of the film. In old experiments where friction had to be resorted to, to bring green bromide to the state of orange bromide, in some cases the film fogged where friction had been applied, which is in accordance with what is now brought forward, whilst in others the sensitiveness to light was evidently diminished. The former was so much the rule, that I have in many cases resorted to unfogging the image by passing it through dilute hydrochloric before conducting experiments. I set this down, however, at the time to the effect of organic matter from the hand with which I usually rubbed. Can the effect be due to phosphorescence? I think not, for I could not perceive any light when rubbing, and, if it were present, it must be very feeble—in fact, too feeble to produce a strong image such as I obtained. Again it struck me that it might be due to the breaking down of the very sensitive form of bromide in the gelatine plates; orange bromide, however, gave the same result. Again, when I first tried the experiments, my thoughts naturally turned to Moser's experiments; but on testing the matter by using recently-ignited mica as a writing material this explanation was void. Other experiments, performed with the same view, corroborated this one experiment, and we must look for some other explanation. What that explanation is I dare not put forward with confidence, since there is much to be taken into account. The matter is one of importance in more ways than one. Theoretically, there can be no doubt of its significance, and practically it may prove to be of value in emulsion-making. At present I am inclined to the view that the shearing force, which often reaches half a ton to the inch, is so great that it breaks up a particle of silver salt much in the same way light does, and that mere pressure makes the particles more compact and therefore less sensitive. When more than this pressure is applied we have a further breaking down which causes the broken-down particle to be capable of development. I have not been able to pursue these experiments further, but I think they show that a variety of phenomena may be explained by the effect of pressure. I have not finished my investigations, and must reserve any definite opinion. As this is the last meeting of the session I thought it well not to withhold what I had already obtained. W. DE W. ABNEY, Capt. R.E., F.R.S.

IODIDE OF SILVER IN THE EMULSION.*

DR. F. STOLZE (in the *Wochenblatt*) says he has received the following letter from Captain W. de W. Abney:—

"DEAR SIR,—I have just read in THE BRITISH JOURNAL OF PHOTOGRAPHY the report of Herr Schumann's experiments with gelatino-bromo-iodide of silver, which appeared in the *Wochenblatt*, and also the remarks appended thereto by you, in which my name is conspicuously mentioned. I hope you will do me the justice of publishing this contradiction of the adverse conclusions you have drawn respecting my work. My experiments were made, in the first place, with every method of mixing gelatino-bromide of silver, and not, as you conclude, with a single one. Since the first publication of Herr Schumann's experiments I have repeated my own without in any way arriving at a change in the conclusion to which I formerly came. What the cause of the difference between the German and English results is I do not know, and I still undoubtedly hold fast by the same opinion as formerly, and the more so since certain of the results with pure bromide of silver, observed by Herr Schumann, are opposed to all the previous experiments of all the experimenters with which I am acquainted. In your remarks there are some unpleasant allusions, regarding which I shall not express my feelings. I shall only remark that I have no theory to support. It is to be regretted that I have no opportunity of seeing the *Wochenblatt*, otherwise I should have written long before and made this correction.—Yours, &c."†

I have believed that I best meet Captain Abney's wishes by printing his letter *in extenso*. I shall also be the better able to justify my own behaviour on this occasion, and to show that what I have said had sufficient cause. The article to which Captain Abney alludes in the above letter appeared on page 385 of the last volume of the *Wochenblatt*, and was reproduced in THE BRITISH JOURNAL OF PHOTOGRAPHY of April 27, 1883. Herr Schumann, who until then had always, in many hundreds of photographs of spectra (taken with pure bromide of silver emulsion and with iodo-bromide of silver emulsions prepared by all the different methods known to photographers, and in which the quantity of the iodide of silver was varied), obtained spectra in which the intensity of the action of the light always increased from one end to a certain maximum, and from thence always decreased more or less gradually; suddenly, when he mixed pure washed bromide of silver emulsion with pure washed iodide of silver emulsion systematically in various proportions, obtained a spectrum which showed a distinct minimum between *h* and G, and, besides, showed no trace of the great colour sensitiveness to the less refrangible rays, which, according to his earlier experiments, was so characteristic of bromo-iodide of silver emulsion. He had wished to adopt this method of mixing the already-completely-prepared emulsions in order to attain his object more easily and conveniently, and to be able to complete even larger series of experiments than previously. He then found that his end could not be attained in this way, because the spectral behaviour of emulsion so mixed was totally different from that prepared in the usual way.

To this communication from my friend I appended a number of remarks of my own, which, in so far as they refer to the above letter, I reproduce here.

[The remarks which Dr. Stolze reproduces in the *Wochenblatt* will be found in THE BRITISH JOURNAL OF PHOTOGRAPHY of April 27, 1883, page 242, and need not be repeated here at length.]

Now, to show that Captain Abney's report admitted for me of no simple explanation except what is given in the above words, I give here a literal translation of the passage in question from THE BRITISH JOURNAL OF PHOTOGRAPHY of May 19, 1882, page 293:—

"*Methods of Obtaining Mixtures of Silver Iodide and Bromide, Silver Iodide and Chloride, &c.*—To test mixtures of iodide and bromide, paper was prepared by immersing it in a solution of potassium iodide and potassium bromide, the proportion of each being so arranged that there should be definite proportions between each, supposing that each salt was entirely decomposed by the silver nitrate. Unfortunately this is never absolutely the case, and hence the results obtained with the paper must be received with some caution," &c.

There was not even a word here of mention of testing *emulsions* prepared in any other way, as the common formation of the double salts was only selected for *films* prepared in silver baths, and this method was expressly indicated as *not* employed for emulsions. How was I, therefore, when Herr Schumann on using Abney's method suddenly obtained exactly the same spectra as the latter, while with emulsions prepared by the usual methods he got such different results—how was I not to seek for the cause of the former difference and later agreement of the two investigators in the method of preparation given by Captain Abney himself? To be quite candid, I can even yet hardly judge otherwise.

I have beside me many hundreds of Schumann's spectral plates, the mode of the preparation of every single one of which is indicated with the highest degree of exactitude, as the readers of the articles published in the *Wochenblatt* know. At the same time Schumann's plates are prepared according to so comprehensive a plan and with such sequence, and his later work, as the tabulation of spectra given with the previous

* Continued from page 242.

† Captain Abney's letter appears in the *Wochenblatt* in German, from which the above is merely a translation. It does not appear whether the original was in English or German.—*Note by Translator.*

number renders evident to every reader, not only confirm his then provisional publications but also furnish a key to the difference, and show how one can convert the mechanically-mixed emulsion into the unified emulsion, so that, according to my conviction, they afford a degree of certainty which is seldom reached by experiment.

Nothing, however, is further from my intention than to doubt Captain Abney's assurance that he has tested the emulsions prepared by other methods also. The only explanation I can give is that some important error has crept in in the preparation of his materials. Perhaps the possibility of converting the mechanically-formed emulsion into the unified has played a part here, and I would advise Captain Abney to make himself well acquainted with Herr Schumann's latest labours, as they may lead him to the solution of the problem. It would be best if he were to be convinced, by the testimony of his own eyes, of the excellence of the work of his German co-investigator. I shall do my utmost to bring this about, and have already written to Herr V. Schumann asking his permission to send his plates to Captain Abney.

(To be continued.)

GUN-COTTON AND PYROXYLINE: THE QUESTION OF PERMANENCE.

[A communication to the Photographic Society of Great Britain.]

In overhauling my collection of chemical preparations lately, I came upon a small box containing a number of specimens of gun-cotton separately wrapped in paper and labelled both as to quality and date. As their history was known to me, and mode of preparation recorded, I naturally anticipated much interest in their examination after a lapse of twenty-one years; for although Sir Frederick Abel has treated of this subject almost exhaustively in his several communications to the Royal Society, it is seldom that a chemist gets the chance of experimenting for himself upon such ancient samples as those herein referred to; in fact, it is not usual to keep these articles in store for so long a period.

The specimens in question, six in number, were labelled as follows:—

1. Gun-cotton, highly explosive and insoluble. April 10th, 1862.
2. Gun-cotton treated with chlorate of potash. (Same date.)
3. Collodion cotton, perfectly soluble. 1862. Hadow's formula.
4. Gun-cotton and paper. (No date, but certainly very old.)
5. Dr. Liesegang's papyroxyline. April, 1869.
6. Mr. Daniel Spill's low-nitrated cotton pulp, as used for the manufacture of xylonite. 1870.

Besides these, I found another sample of highly explosive gun-cotton, without label or date, contained in a wide-mouthed bottle, which I remember as having been in my possession for a great many years. This bottle was closed with a cork of rather coarse texture, and therefore not hermetically sealed from contact with air. And, lastly, I have still by me some specimens of Abel's gun-cotton yarn and pulp, which Mr. E. O. Brown, of Woolwich Arsenal, gave me in April, 1869, after delivering his lecture (at the Conduit Street Gallery) *On the Manufacture, Properties, and Military Applications of Gun-cotton.* In regard to these last-named specimens, I may remark that they are not photographic qualities, but more highly nitrated compounds, suitable for blasting and military purposes, and, beyond becoming very faintly acid by keeping, have not sensibly changed; they are all still very highly explosive.

Speaking now of the contents of the box, I found, on opening it, that the wrapping-papers and string were very tender, and that the ultramarine in those papers, which had once been blue, was almost entirely discharged or bleached, as though by acid vapours, and, on testing with blue litmus, the wrappers and their contents were now in most cases distinctly acid. Dr. Liesegang's papyroxyline and Hadow's soluble cotton were, however, very well preserved, and the gun-cotton impregnated with chlorate of potash had not appreciably suffered, being still very highly explosive. Spill's preparations, perhaps from not having been so perfectly washed, had completely rotted the papers, so that they fell to pieces on the slightest touch. On firing portions of the two specimens, they burn now (as originally) with a carbonaceous residue —one, the finer sort, burning off much more quickly than the other. Both of these were found to contain free sulphuric acid, but no oxalic acid, as a product of their decomposition. The mode of manufacture was described in vol. xv., page 42, of the *Photographic Journal;* and these specimens were shown at the meeting of the Society in December, 1870.

With respect to No. 1 specimen—"gun-cotton highly explosive and insoluble"—which was contained in a blue-wove official envelope, the paper was bleached in parts, denoting some slight escape of acid fumes; but the material remains apparently as explosive as ever, is still quite insoluble in ether and alcohol, and in all respects seems practically unaffected at the end of a period of twenty-one years. This result I believe to be partly attributable to its position at the top of the box, where it found enough air to allow of the easy escape of acid vapours by diffusion. No oxalic acid could be detected on drenching this sample of gun-cotton with pure water, only a minute trace of soluble sulphate being found in the aqueous solution.

Specimen No. 2—"gun-cotton treated with chlorate of potash"—was not acid, and, as already stated, was apparently as explosive as ever. It likewise had withstood the action of time for twenty-one years.

Soluble cotton, No. 3, made by Hadow's formula, is still perfectly soluble in a mixture of ether and alcohol, giving a good tough film, and making excellent photographic collodion. Neither in this nor in Dr. Liesegang's papyroxyline can I find the slightest evidence of change, although prepared as long ago as twenty-one and fourteen years respectively.

From these observations I think it may be fairly inferred that well-washed gun-cotton or pyroxyline can be preserved indefinitely, if screened from sunshine, and left open to moderate access of air; but, on the other hand, we know from Professor Abel's experiments, that if heated beyond the normal temperature of the air, or enclosed in perfectly air-tight vessels with ever so small a trace of free acid, there is danger of a destructive decomposition being set up, with the chance, in extreme cases, of a spontaneous explosion. No one doubts the permanence of collodion films (apart from the question of cracked varnish), when once properly fixed and washed as in photographic negatives.

John Spiller, F.C.S.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

INVERNESS AND THE HIGHLANDS.

To the photographer who wishes to spend his holidays in a picturesque spot, and at the same time to be able to take home with him some good negatives of beautiful scenery, Inverness and its vicinity will appear a sort of "happy hunting ground." Inverness is the Highland capital and lies at the eastern extremity of the great glen of Scotland, known as Glean-mor-na-Albyn, which, however, is only Gaelic for what I have before called it in English. It is in the centre of a vast amphitheatre of hills and lochs and plains and sea.

Should the photographic visitor be inclined for architectural or sculptural subjects I am afraid he will not find many on which to vent his ardour and expose his plates. On the castle (which is really the county buildings and not a castle at all) it is well worth using a plate or two, as it stands on a considerable elevation, at the foot of which runs the River Ness. I have often intended having a "shot" at it myself by moonlight, and I believe a splendid effect might be obtained.

Next comes the Cathedral of St. Andrew, and two or three, or even half-a-dozen, plates might easily be exposed on different parts of this. The centre doorway is surmounted by some splendid carving in stone, and in the interior the pulpit and the font are well worth spending some little trouble over, both being of carved stone.

The Ness Islands lie midway in the river, and are, as the local guide book states, "girded about by the glittering stream as with a thread of silver." They are connected with the river banks, and with each other, by means of suspension bridges. Being thickly wooded, with winding paths, they offer temptations for many negatives.

Five miles from the town is the scene of the last battle fought on British soil, Culloden Moor, with the Cumberland stone—a large, flat boulder on which the English commander and his staff took up their position, and a collection of stones with which it was at one time intended to build up a monument to those who fell on the ever-memorable field.

The clava stone circles, about a mile from the battle-field, are supposed to have been erected by the Druids. They are described as follows:—They are each within the middle circle and of the most perfect form—that is, having three concentred circles of what are commonly called "Druidical temples." The stones in this circle are close together, while the large ones in the exterior circle are at intervals of some yards. On the innermost circle the walls have been raised of a round chamber twelve feet in diameter—in one eight feet, in the other only five feet eight inches high, there being about two feet more in depth of cairn stones; while of those in the middle cairn there are only three to four feet left, and it is doubtful whether the walls of the central chamber, which is seven yards wide, have risen higher. The outer circles are 110 paces in circumference. There is a large upright boulder stone, a compressed cube, six feet high and twelve inches girth, 230 paces east, and at 600 paces to the west there is an erect slab stone eight and a-half feet high. Immediately west of the second stone there is a small square enclosure, within which are the foundations of a small church or oratory—probably one of the earliest Christian encroachments on northern Paganism. Still 200 paces further to the west there is another upright slab, the largest of all, being eleven feet high, nine feet wide, and twenty inches thick. This has evidently been a great cemetery, probably of prehistoric Celtic or Pictish kings.

In another direction the Priory at Beauly is well worth visiting, as well as the Falls of Kilmorack, which can be taken the same day. These falls are not so remarkable for their height as for their general picturesque appearance. The beautiful accompaniments of lofty rocks, green banks, and hanging woods which encircle them greatly add to the charm of the scene. As the water approaches the precipice, twenty

feet in height, it hovers for a moment over the gulf, and, as if forced reluctantly from the river behind, is poured down in one unbroken mass into a deep cavern, which cannot be viewed without feelings of apprehension. This refers to the upper fall; for a short distance below this is the second or lower fall, which is as different as possible in aspect, the volume of water being broken by the rough rocks into innumerable small frothing cataracts. The falls should be taken from several points, the view from the wooden bridge below being particularly fine.

Close to this, too, is Strathglass and some of the finest scenery in the whole of the Highlands. A run up the canal should decidedly be taken, steamers leaving Inverness every morning. After leaving Inverness by this route one soon comes to the ruined remains of Castle Urquhart, which was erected by David I. A negative of this should be secured. By landing at Temple Pier and taking the 'bus Mr. Photographer will soon be in sight and hearing of what the late Professor Wilson called "the most magnificent cataract out of all sight and hearing in Britain, which it is worth while walking a thousand miles to see." This is the Fall or, rather, Falls of Foyers. The upper fall is forty and the lower ninety feet. The best view is to be obtained from a winding pathway along the face of the hill, and from here the whole extent of the fall is seen with the terrific gulf beneath and the lofty and precipitous rocks around, fringed with tangled masses of plants and shrubs and overhung by vapour. After a heavy fall of rain is the best time to photograph these falls, and the volume of water and height will be better shown by introducing some standard into the picture. A large plate will be much more satisfactory than a small one.

Photographs of the Loch can also be taken from close at hand, as also the monster hill which frowns upon you, and which is known by the name of Mealfourvonie. This hill towers 3,060 feet above the loch. A negative might also be exposed on the loch with Ben Nevis in the background, besides some dozen or so on other subjects which lie temptingly to hand all around.

I have only mentioned a few out of the multifarious subjects for pictures which are to be found in the immediate neighbourhood of Inverness. It is true that Messrs. Wilson and Valentine have obtained and published many splendid views and landscapes, but it is beyond the power of any half-dozen photographers to produce photographs of more than a tithe of the subjects worthy of being taken. Messrs. Wilson and Valentine have, in reality, but little more than opened the way. Their photographs, being taken for sale, necessarily embrace only the subjects saleable to tourists; the other little "bits" are left for the tourist himself. C. Brangwin Barnes.

A NEW UNIT OF LIGHT IN CONNECTION WITH SENSITOMETRY.

[A communication to the Photographic Society of Great Britain.]

With the introduction of prepared sensitive films means for ascertaining their photographic value has become an absolute necessity, as it is of the highest importance for an operator, wishing to secure the series of tints focussed upon his screen, to know the capability of the films he intends to employ, both as regards the time necessary to register the same, and whether their relationship is likely to be increased or diminished by the process. With the object of finding out means of obtaining this much-desired result I commenced a series of experiments, the outcome of which I intend, with your indulgence, to place before you this evening. Now, the first thing I had to decide was the best source of illumination to employ. A standard candle appeared, at first sight, to be all that could be desired, until experience showed it required great care and time to adjust itself, and, after all, did not give satisfactory results. M. Giroud, of Paris, in an investigation for the purpose of finding a standard of fixed intensity, gives the following experiments upon two standard candles, marked A and B, and one paraffine ditto:—

	Standard candles.		Paraffine candle.
	A	B	
Maximum	1·113	1·027	1·288
Minimum	0·716	0·765	0·795
Rise of value per cent. above minimum	55	34	62
Mean of sixty minutes' observation	0·875	0·887	1·041
Number of times the mean was observed	4	2	6

You observe they show a variation above their minimum value of fifty-five, thirty-four, and sixty-two per cent. respectively, which is quite in accordance with my experience. The result of his investigations led him to adopt as a standard the flame produced by gas issuing from a vertical hole 1 mm. in diameter, and regulated to a constant length of 67·5 mm.; for he found that small differences in the diameter of the hole did not appreciably influence length of flame, the intensity being affected after the rate of 0·015 of this intensity per 0·05 variation in the size of the hole, whilst the quality of the gas may vary as much as thirty per cent. The illuminating power of this standard is $\frac{1}{10}$ of a mean Carcel lamp, which latter equals 9·5 standard candles; consequently M. Giroud's equals 0·95. These results appeared so very satisfactory that it induced me to experiment with his standard with a view of adopting it for my purpose. The next thing was to determine its suitability; for this purpose I selected two batches of gelatine plates that I knew to vary considerably in sensitiveness, and, having a rough screen giving different intensities, I exposed them so as to obtain an equal minimum tint upon each: the ratio of exposure I found to be as 1:48. I have here one from each exposed in the camera for one and forty-eight seconds respectively. A collodion plate treated at the same time did not agree in the same manner. This, I think, can be accounted for when we consider that the collodion is sensitive to rays of different refrangibility, and as the two sources varied in composition, the percentage of actinic rays being less for the collodion in the case of gas and greater for the gelatine, this naturally disturbed the ratio when compared with solar light; and this must be also taken into account when great accuracy is required—when comparing films of *different composition*, such as a bromide with a bromo-iodide or bromo-iodide chloride; also the condition of the atmosphere when employing solar light—as, for instance, one would find considerable variation in the absorption of the solar rays when comparing an Italian sky with a genuine London fog with its full charge of butterine, or Blackpool with its soot-charged atmosphere; and further, these remarks apply equally well to the phosphorescent unit, or any other source of light differing in composition from that you ultimately intend to use with the films. May I venture to suggest that the difficulty can be overcome by the use of a constant for each film of that particular composition in reference to the light employed when comparing, to that you intend to use with the films. On the other hand, with films of *uniform composition* my experience is that their ratio is not disturbed, however much the lights may differ in composition among themselves. The last experiment having looked somewhat hopeful, I proceeded to find the best method of using my temporary standard. My first idea was to try the effect of various exposures, each upon a different portion of the film; otherwise, intensity, constant, time varied. I tried the disc method of exposure: an improvement upon this I found was to have a rectangular plate, about ten times the length of the film to be experimented with, and a-quarter wider, arranged in guides so as to have a free fall in the direction of its length, similar to a drop-shutter, at a distance of one-eighth from the farthest end when the plate is adjusted to fall past the film, "the latter being held behind;" an aperture was cut, the vertical length of which varied from unity to anything, so as to correspond to any desired ratio. Many modifications of the aperture were tried, all of which were very disappointing. My next idea was to try the effect of varying intensity, time remaining constant, as this is much more in accordance with the condition of the tints upon the screen of the camera which we desired to register.

Whilst engaged, one evening, with my microscope, which is fitted with rotary diaphragms attached to the stage by means of a short piece of tube, it occurred to me that if a piece of opal glass were placed upon the diaphragm, so as to cover the hole, the light would be distributed evenly over the base of the tube. This happily proved to be correct; and, to save trouble in calculating the areas, I mounted upon a piece of opal glass a series of pieces of perforated cardboard, each containing a different number of holes in arithmetical progression, their centres coinciding with a series of chambers upon which the opal plate was secured. The spaces between the cardboard were covered with black varnish, so as to exclude all light, except that passing through each group of holes corresponding to its little room. I found this to answer admirably, the light being controlled in proportion to the area of its windows, although I soon found the instrument had very little range; and, further, the intensities would have to be in a geometrical ratio to one another. Calculation showed that it would be necessary to have the holes very small, so as to be able to get the required number upon the limited area at disposal. For instance, the instrument I am about to refer to more fully would require 39,392 holes, the smallest having 10, whilst the largest would contain 8,120, which you can easily understand would have to be very small to get them within the limited area of 200 square mm., this being the area of the thirtieth part of a quarter-plate; consequently I had to abandon the holes, and turn my attention to the construction of single openings for each chamber. It was suggested to me to cut the openings in tinfoil, which I find very convenient. I have here a series of tints produced by apertures in arithmetical and geometrical progression respectively, also the instruments, and a modification in which you observe two wedge-shaped openings are employed, producing two series of tints, both of which are in geometrical progression to one another. Comparing the tints of one series with any two belonging to the other, the variation would be one-ninth, as the one having the greatest range is as six to nine, the other seven to nine. The next difficulty that beset me was to obtain opal glass of uniform quality, which I ultimately found to be extremely difficult; consequently I dispensed with it, preferring a screen formed of a sheet of white paper, such as is used for photographic prints, as you will remember formed the subject of a paper by Mr. Mucklow and myself at one of your December meetings in 1881. Here is arranged the standard in its latest form, which, as you perceive, consists of four of M. Giroud's standards arranged in a line parallel to the plane of the screen at a distance of 25 cm., the length of the flames being regulated by means of the cross wires. Between the opening formed by the two jets near the centre the sensitometer is placed, the plane of the instrument coinciding with a line drawn through the flames. My thanks are due to my esteemed friend, Mr. Cromwell Varley, F.R.S., &c., who very kindly suggested to me the principles of constructing the ratio, &c., namely, making the ratio a root of 2, the largest aperture 1 cm. in area; the depth and size of the chambers also to have a simple relationship. The dimensions adopted are the $\sqrt[3]{2}$, or as 1:1·2599, the depth of the chambers 25 mm., $\frac{1}{10}$ the distance from the screen, and their bases 200 square mm. Thirty of these have a range sufficient for all present requirements. Here are some of the results obtained:—First, a simple exposure; second, ditto, but with a mat interposed, formed by stencilling figures and lines upon a piece of glass; and, thirdly, with a stencil mat, which, I think, for various reasons, will be found the best adapted for general working. Series A shows the variation when

using sixteen- and twenty-five-candle gas respectively, being a variation in the quality of fifty-five per cent. above the minimum value.

Mark.		Instrument.	Power of gas, in candles.	Time of exposure, in seconds.	Reading of instrument.		
					1	2	3
A	1	S	16	60	23	23	23
	2	W	16	60	22	22	23
	3	S	25	60	23	23	23
	4	W	25	60	23	23	23
	5	S	25	60	23	23	23
	6	W	25	30	21	20	21
	7	S	16	60	22	23	23
	8	W	16	30	20	20	21
	9	S	25	60	23	23	23
	10	W	25	60	24	23	23
	11	S	16	60	22	23	23
	12	W	16	60	24	23	23

Series B, C, D, and D[1] show the effects of different exposures upon different films:—

Mark.		Reading of instrument.		Exposure.	
		1	2	Practical.	Theoretical.
B	1	14	14	4	4
	2	24	25	64	68·8
	3	28	28	180	176
C	1	14	14	5	5
	2	23	25	120	127·5
	3	28	27	160	167·5
D	1	9	9	2	2
	2	12	12	4	4·5
	3	14	14	8	7·7
	4	17	18	16	20
	5	20	20	32	31
	6	22	23	64	77
	7	25	25	128	150
	8	27	27	265	258
D[1]	1	15	15	10	10
	2	19	19	30	29·4
	3	23	23	90	87

These, you observe, do not agree with the ratio of the holes, which is owing to the variation in the area of the screen capable of reflecting light directly upon the film; this goes on in a diminishing ratio towards the smallest hole. By dividing the effective area corresponding to the largest by smaller, and extracting the 29th root, which multiplied by 1·2599 gives 1·31, the basis for calculating the theoretical exposure, which I think may be taken as within the experimental error. In the case of the phosphorescent unit, or when a piece of opal glass is used, the ratio given to the apertures remains good for the exposures, as shown in series E. The advantage of this arrangement above all others is—firstly, there is no medium between the source of light and the film; secondly, there is no appreciable deterioration by use; and thirdly, they can be produced in any quantity, as every part is based entirely upon measurement, and consequently may be regarded as a mechanical standard equal with a Whitworth gauge. With regard to the accuracy with which the holes can be made it is only necessary to have gauges similar to these, which are made the size of every hole; these can easily be measured by means of a micrometer, or the holes by means of slightly conical rods. Series E shows the comparison between Mr. Warnerke's instrument and my own, with two phosphorescent tablets, one being his standard, the other one prepared by myself.

Mark.		Exposure, in seconds.	Tablet used.	Instrument.	Readings.	
					1	2
E	1	30	W	W	15	15
	2	30	W	S	12	12
	3	30	S	S	14	14
	4	30 (8 times)	S	S	23	23

Series F exhibits the relative action of the alkaline pyrogallic and ferrous-oxalate developers respectively:—

Mark.		Light used.	Instrument.	Exposure, in seconds.	Readings.	
					1	2
		Alkaline	Pyrogallic.			
F	1	W	W	30	14	14
	2	W	S	30	9	9
	3	S	S	30	12	13
	4	S Gas	S	64	23	22
		Ferrous	Oxalate.			
F	5	W	W	30	14	14
	6	W	S	30	9	9
	7	S	S	32	12	13
	8	S Gas	S	64	21	22

The former, you observe, behave in a similar manner to the latter as regards sensitiveness, and contains per fluid ounce three minims of ammonium hydrate, sp. gr. 0·880, two grains of ammonium bromide, and one grain of pyrogallic acid, and is adopted by Mr. Swan for developing his plates. Having arrived at a method of determining the sensitiveness or time necessary to register the minimum tint upon a film, we will next apply the instrument to the study of the difference in the relationship that is found to exist between the tints themselves and the intensities that were used to produce them, partly arising from the character of the films and the developer employed. Series G are produced by modifications of the pyro. developer, all of the plates belonging to the same dozen.

Mark.		Exposure.	Developer employed.	Time acting in minutes.	Reading.	
					1	2
G	1	11	Normal	3½	19	18
	2	20		3½	21	20
	3	40		3½	23	22
	4	60		3½	24	23
	5	60	N + Am Ho	4	25	25
	6	60	N + Am Br	4	20	19

Series H similar, except that they were done with another lot of plates.

Mark.		Exposure.	Developer employed.	Time acting in minutes.	Reading.	
					1	2
H	1	1	Normal	6	19	18
	2	8		6	27	26
	3	8	N + water	6	26	25
	4	8	N + $\left\{ \begin{array}{l} \frac{1}{2} \text{ vol. } OH_2 \\ \frac{1}{2} \text{ vol. pyro. sol.} \end{array} \right\}$	6	26	25
	5	8	N + = vol. pyro. sol.	6	27	26

Pyro. sol. = two grains per ounce.

I regret that time will only permit my taking more than a passing notice of them. You will observe the range of tint is in some of them increased, whilst in others the opposite effect has been produced. This subject I hope to discuss more fully, with your permission, at some future time, as I find the instrument to be well adapted for such investigations. The form of stencil mat already described now comes to our aid, for it is only necessary when you wish to compare one result with another to reverse one of the plates end for end, and to superpose one upon the other, film to film; it is then a matter of comparative ease to bring any one of the tinted triangles opposite to any other particular one, for the purpose of judging their respective intensity with the idea of determining the gradation and range of tint produced.

I have to thank you for your very kind attention, and trust that this contribution may assist somewhat to elucidate the best means of obtaining a standard of comparison for prepared sensitive films. James B. Spurge.

RECENT PATENTS.

APPLICATION FOR PATENT.

No. 3,476.—"Improvements in Means for, and Methods of, Producing Designs upon Paper or other Fibrous or Soft Material, or upon Metallic Surfaces." R. Brown, R. W. Barnes, and Joseph Bell, of Liverpool.—*Dated July* 14, 1883.

AMERICAN PATENT.

No. 279-878.—"A Method of, and Apparatus for, Photographing Changing or Moving Objects." E. J. Muybridge, of San Francisco.—*Application filed August* 31, 1881; *renewed April* 19, 1883; *granted June* 19, 1883.

Improvements in the Formation of Gelatino-Bromide Film Paper for Photographic Negatives.

The specification of Raphael Hunter Brandon, of No. 1, Rue Laffitte, Paris, in the Republic of France, Engineer and Patent Agent; a communication from Alphonse Charles Auguste Thiébaut, photographer, of No. 1, Rue Laffitte, Paris, France.

This invention consists in the preparation of a gelatinised bromide of silver film paper from which the pellicle or film, after the photographic negative has been produced by exposure and development in the usual manner, is detached or peeled off in a dry state by hand, without the assistance of any dissolving or other agent.

Since the discovery and use of rapid glasses prepared with gelatine and bromide of silver, constant efforts and trials have been made to replace the glass universally used by a light support, not brittle, as fine and as transparent as glass, and at the same time easily handled, for the purpose of obtaining photographic negatives.

The paper which I have invented for this purpose answers all the requirements of the art, and has the following advantages:—

First. The sensitive coating is regular, and its thickness is uniform throughout the entire surface of each sheet.

Second. It can be exposed for a luminous impression in any kind of slide as usually constructed.

Third. It can be developed and fixed as easily as a negative on glass.

Fourth. The negative obtained dries quite flat on blotting-paper.

Fifth. The film which constitutes the negative can be detached or peeled from its support or backing easily and readily by the hand, without the assistance of any dissolving or other agent. Thus this invention does away with all sensitive preparations on glass, which latter is both a brittle and relatively heavy material, thus diminishing the bulk and weight of amateur and scientific photographers' luggage when travelling; it produces photographic negatives as fine and as transparent as those on glass, insomuch that the film does not contain any grain; and, lastly, it admits of printing from either face of the film, as regards the production of positives on paper or other material as well as plates for phototypy and photo-engraving, which latter processes require a negative to be reversed.

For the manufacture of my sensitised film paper:—

Firstly. A gelatinised sheet of paper is properly damped with cold water, and when evenly saturated it is placed on a glass, to which it is attached by means of bands of paper pasted partially on the glass and partially on the edges of the said sheet; in this state it is allowed to dry, whereby it is stretched quite flat.

Secondly. I coat the dry sheet with a solution of ordinary collodion, containing from one to two per cent. cubic measure of azotic cotton (one and a-half per cent. gives very good results), and from one and a-half to two and a-half per cent. of castor oil (two per cent. gives very good results); this coating is allowed to dry.

Thirdly. The glass with the prepared paper upwards is levelled, and then it is coated in a room from which all rays but red rays of light are excluded, with a tepid emulsion of bromide of silver to the extent of about one millimeter thick, and after leaving it in this position until the gelatine has set, say about five minutes, with the film paper still attached, it is placed upright in a drying room, where it should remain about twelve hours exposed to a temperature of from 62° to 66° Fahrenheit; and

Fourthly. The film paper is detached from the glass ready for exposure, development, and fixing in the usual manner; for the purpose of developing, oxalate of iron or pyrogallic acid answer equally well. For the purpose of fixing I have found that a mixture by weight—water, 1,000; hyposulphite of soda, 150; and powdered alum, 60—produces excellent results after being allowed to dry.

Fifthly. The film is peeled off the paper by hand, and can be immediately used for producing negatives *recto* or *verso* as above mentioned.

I claim as my invention:

Firstly. The preparation or formation of gelatino-bromide film paper for photographic negatives in the manner and for the purposes above described; and

Secondly. The use for this purpose of castor oil or any other analogous oil, more especially with the view of peeling off the film from the paper backing as above described.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The Exhibition of this Society, for 1883, will be held at the Gallery of the Royal Society of Painters in Water Colours, 5a, Pall Mall East, London, S.W. It will be inaugurated by a *conversazione*, open to members and their friends, at 8 p.m., on Saturday evening, the 6th of October. The exhibition will remain open daily (Sundays excepted), from Monday, the 8th of October, until Thursday, 15th of November. Admission (from 10 a.m. till dusk), one shilling. It will also be open every Monday, Wednesday, and Saturday evening. Admission (from 7 to 10 p.m.), sixpence. Members have free admission at any time, and will also be supplied with tickets to admit their friends. Season tickets will be issued—single, three shillings; double, five shillings. All packing cases must be sent (carriage paid), addressed to the "Photographic Society of Great Britain, care of Mr. James Bourlet, 17, Nassau-street, Middlesex Hospital, London," so as to arrive *not later* than Friday, September 28th. No packing cases can be received at the Gallery. Pictures by hand will be received at the Gallery, 5a, Pall Mall East, on Friday, September 28th, until 9 p.m.

Photographic transparencies will be shown with the Society's optical lantern on Monday evenings during the Exhibition. Slides (which must not exceed 3¼ inches in height) are solicited to assist this special purpose; they may be sent in, either on or before Friday, September 28th (so as to come with other exhibits before the judges of awards), or at any time afterwards during the Exhibition. Each exhibitor must send a letter of advice containing a description of each picture, as also a statement of process and any further detail, to be inserted in the catalogue (and it is suggested that when the work shown is taken by a special process, prepared and made by the exhibitor, information as to particulars should be communicated), addressed to the "Hon. Secretary," Photographic Society of Great Britain, 5a, Pall Mall East, London, S.W.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence, and the judges are instructed to reserve three medals for portrait or figure subjects (if they find them worthy of awards).

The judges will consist of the following gentlemen:—The President of the Society—James Glaisher, F.R.S., &c.; three members of the Council—Captain Abney, R.E., F.R.S., Francis Bedford, Leon Warnerke; three members of the Society—Joseph Paget, Fred. Hollyer, Robert Slingsby.

Special Notice, by Order of the Council.—The rules and regulations respecting the Exhibition are to be strictly adhered to, therefore no picture will be received after nine o'clock p.m. on Friday, September 28th.

Any further information respecting the Exhibition and *lantern slides* can be obtained from the Assistant Secretary, Mr. Edwin Cocking, 57, Queen's-road, Peckham, S.E.

F. Maxwell Lyte, F.C.S.,
Hon. Secretary, Cotford, Oak Hill-road, Putney, S.W.

Our Editorial Table.

The Amateur's First Handbook—Photography.
By J. H. T. Ellerbeck.
Liverpool: D. H. Cussons & Co.

The above little work, written by an expert in amateur photography, appeals, as its title implies, more especially to the amateur class; and its contents are such as the experience of the author has taught him will prove of greatest use to the tyro in search of information. The language employed is as free from technicalities as possible, and the different processes are explained in a simple and intelligible manner. Every department that is likely to be invaded by the amateur is treated; and there are chapters on such subjects as *The Selection of Apparatus*, *The Dark Room and its Contents*, &c., which will prove specially useful to the beginner; and, as the first guide into photography, we can recommend Mr. Ellerbeck's work.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 25	Bristol	Studio, Portland-st., Kingsdown.
" 26	London and Provincial	Masons' Hall, Basinghall-street.
" 26	Liverpool Amateur	Free Library, William Brown-st.
" 26	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 12th inst., the chair was occupied by Mr. A. Haddon.

Mr. A. L. Henderson referred to a discussion that had taken place at a previous meeting upon a question as to whether collodion or gelatine bromide plates were better adapted for making duplicate or enlarged negatives. He produced the negative of which he had spoken on that occasion, and a collodion transparency that had been made therefrom, to show that the latter contained more details in the deep shadows—the underside of the archway of London bridge—than could be seen in the original negative itself.

Mr. W. Coles said that he had recently found that a gelatine plate left in the hyposulphite bath all night had lost its image by the morning.

Several members thought that the warm weather lately experienced was the probable cause of such an effect.

A negative, sent by a photographer in Birmingham, was produced to the meeting. The emulsion with which it had been prepared was made according to Mr. Henderson's formula slightly modified, and had been found considerably more sensitive than some commercial plates, issued as extra rapid, that had been tried in comparison with it. The photograph had been taken with a lens of twenty-two inches focus, and stop of seven-eighths of an inch. The exposure was given by taking the cap off and on as rapidly as possible, and was considered to be more than required.

Mr. Henderson remarked that he could uncap and recap a lens three times in a second.

Mr. F. W. Hart said that Mr. Warnerke had told him that the quickest hand exposure that could be given was one-third of a second.

MANCHESTER PHOTOGRAPHIC SOCIETY.

On Saturday, the 7th instant, the members of the Manchester Photographic Society and friends, to the number of about twenty, including ladies, enjoyed a most delightful excursion to that quiet corner of Camden's "Fair Cheshire" which includes Marton and Gawsworth.

The party, on arrival at Macclesfield by train at 2.17 p.m., was conveyed in a large waggonette along a charming succession of well-wooded country lanes leading through the villages of Broken Cross and Siddington, at which latter place a brief halt was made and a few plates exposed. The drive being resumed, Marton was reached about four o'clock. Here cameras were quickly unpacked, and the church, more famous for its antiquity (1343) than for its architectural beauty, became an object of interest, and many plates received its image, although pictorial effect was somewhat marred by the rank and uncut grass in the graveyard.

The "Marton oak," immortalised by Mr. Leo Grindon in his "Summer Rambles," was next visited. The entire circumference of the trunk of this famous oak is, at one yard above the ground, fifty feet. The inside of the trunk, however, is totally decayed, and the space utilised for the storage of farming implements; but the upper branches are loaded with a wealth of foliage. A large number of plates, from many points of view, were exposed on this interesting object, and, the light being favourable, no doubt many good negatives would be the result. Other plates were "shied" at the picturesque wayside cottages, and gardens gay with roses. The fine old hall, an Elizabethan structure in the half-timbered style, was sighted at a distance to the right; but the day being somewhat advanced, and the prospective manipulation of "ham and egg" plates having by this time begun to engage attention, it was deemed advisable to push on.

After a further run of two miles the party alighted at Gawsworth—charming Gawsworth! For who that, for the first time in his life, has seen

the place in all its summer beauty could fail to be struck with admiration and delight? Near to the church, and in a shady plantation by the roadside, may be seen the unusual spectacle of a tombstone, on which are set forth, in a spirited poem, the reasons why Samuel Johnson, otherwise "Lord Flame"—poet, wit, and play-actor—did, about one hundred years ago, elect to have his remains deposited in this secluded place. The spot is locally known as "maggotty Johnson's grave." About an hour was spent in photographing the fine old church, rectory, old hall, and several groups of fine trees.

The members then withdrew to the quiet hostelry, once a famous posting house on the London-road, but whose glory has long since departed with the good old coaching days. An excellent and substantial tea was served up, to which the party, with appetites sharpened with the breezy drive and several hours' fasting, did ample justice.

On the return journey to Macclesfield and Manchester both ladies and gentlemen were unanimous in their opinions that the trip had been the most successful and enjoyable of any previous ones that could be remembered. Manufacturers of dry plates will surely rejoice to hear that in the aggregate more than 100 plates were exposed.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

The above Society met on the 15th ult.,—the President, Dr. H. W. Vogel, in the chair. Two new menbers were admitted, one of whom was Baron von Stillfried, of Yokohama, whose name is not unknown to our readers.

A number of publications were laid on the table, as were a couple of photogravures sent by Colonel Waterhouse, of Calcutta, and a fresh set of beautiful microphotographs of thin slices of stones selected by Professor Cohen. These enlargements are painted in the natural colours of the stones they represent, and are particularly instructive.

The Chairman mentioned that the Australian expedition to observe the eclipse of the sun had obtained some excellent results, regarding which further details would be given later.

It was resolved that there should be no further discussion of the dispute between Herr Obernetter and his licensees, because the matter in dispute is a secret process and only a minority of the members have an interest in it, and, besides, the discussion was apt to assume a disagreeably personal tone. [The Vienna and Cologne societies have also excluded the Obernetter process from the debates.] The subject is to be discussed in the columns of the Society's organ.

The Chairman invited the members to meet at the Technical High School on the evening of the 22nd ult., to witness an experiment with the electric light.

The rest of the business being concluded, the meeting was adjourned until the 21st September.

Correspondence.

"DUST IN THE EYES.—A SCREW LOOSE, OR WHAT?"

To the Editors.

Gentlemen,—In his censorship of my letter in the June issue of the *Photographic Times and American Photographer*, Mr. A. L. Henderson has studiously abstained from stating that the dry-plate factory, which forms the subject of his animadversions in your last number, is that which is presided over by Mr. Samuel Fry, of Kingston. This reticence is, doubtless, stimulated by a fear lest, were this fact known, the purity of his motives might, especially by London photographers, be misconstrued. To his friends it must prove a source of regret that, at the time of writing the article, Mr. Henderson had no judicious adviser beside him to point out the desirableness of paying greater attention to the truth of his premisses before he suffered his genius to hurry him to such a conclusion.

The account of the Kingston Dry Plate Factory was written for the American readers of the *Photographic Times*, who are presumed to have the sense to know that, although by one of certain machines plates were seen coated at the rate of twelve per minute, it does not follow that the powers of such machines are necessarily taxed to this extent from the beginning to the end of the week. The precise language made use of by me was as follows:—"I was led by my guide to the presence of the coating machines, and saw plates being coated with emulsion at a rate perfectly astonishing, each machine turning out at the rate of sixty dozen per hour." This deduction was made on the basis of my having timed the rate of production of one machine for about two minutes.

Mr. Henderson apparently mistrusts the coating capabilities of the machine (which is that of Eastman, of Rochester, N.Y.). I am not aware that his scepticism is of any consequence; yet, if it conduce to the allaying of his perturbation, it is possible that a properly-couched request to Mr. Fry might afford him the opportunity of seeing, as I saw, and as I timed by my watch, plates coated at the rate of one in every five seconds.

I cannot stoop to the level of the last paragraph of Mr. Henderson's article to notice its coarse personalities or *soi-distant* wit, nor is it necessary that I should do so for a reason that may be apparent before long; but I may say that there are others than Mr. Henderson and whose opinions on matters appertaining to American literature and veracity are likely to carry quite as great weight as his, who have not found it necessary to indulge in sneers such as this gentleman considers it good taste to put in requisition.—I am, yours, &c.,

The Special Correspondent
of the New York *Photographic Times.*

London, July 16, 1883.

[Mr. Henderson's "paper" came to us as a portion of the report of the meeting of the London and Provincial Photographic Association, at which it was read. We are at all times willing to give as much freedom as possible to the pens of our contributors so long as they observe the rules of literary etiquette and decency; but we should scarcely have published the communication in question had it not appeared under the *ægis* of Mr. Henderson's Association. As regards the subject-matter of Mr. Henderson's strictures: he appears to have achieved what is jocularly termed "finding a mare's nest." We have carefully read the article in the New York *Photographic Times*, and find that though, as he says, the machines are stated to coat plates at the rate of sixty dozen per hour, there is not the slightest suggestion that these machines are kept at work continually "from early morn till dewy eve," as he would seem to expect. There is not, in fact, anything in the article in question that would lead any ordinary mind to see the necessity for resorting "to pencil and paper" for the purpose of explaining a non-existent discrepancy between the figures quoted in connection with the rapidity of coating and the quantity of silver consumed.—Eds.]

To the Editors.

Gentlemen,—Some of my friends have called my attention to the remarks I made at the meeting of the London and Provincial Photographic Association on Thursday, the 5th inst., and which appeared in your last issue, in which I criticised as I thought in a good-humoured manner a report which appeared in the American *Photographic Times.* I did not for a moment question the veracity of the reporter.

I am sorry if it has given offence to any one, and now take the earliest opportunity of expressing regret that my meaning should have been misinterpreted in any way.—I am, yours, &c.,

49, *King William-street, London, E.C., July* 17, 1883. A. L. Henderson.

P.S.—Since penning the above I now learn that the "special correspondent" in question is a personal friend of my own—a gentleman I hold in high esteem; and I am sure he is quite incapable of giving other than a perfect account of whatever he writes about. The remarks made as to American writers were never for a moment intended for my friend.—A. L. H.

"LIGHT AND LENSES."

To the Editors.

Gentlemen,—In reply to Mr. Gover's letter of the 10th inst. I beg to state that I am very sorry that such "misstatements" should have occurred in my copy of Mr. Gover's speech; but I feel sure that you and your readers would readily pardon me for the errors I made if you read the original manuscript. For instance: referring to spherical aberration of spherical lenses, Mr. Gover states this—"*Owing to the spherical form given to lens it refracts light powerfully than any other portion of the lens and that objects situated at different distances each distance will have a different focus*" * * * "*this spherical aberration can be remedied by using a stop which is placed a little distance in front of the lens which narrow of draws out both pencils of light,*" &c.

Of course one can easily imagine, judging from the above extracts and other similar confused paragraphs, that Mr. Gover wrote his paper somewhat hurriedly; and I think you will believe me when I say that I did my best to make the paper intelligible, and fit to be published where it needed such correction.—I am, yours, &c.,

North Staffordshire Infirmary, Stoke-on-Trent, July 14, 1883. W. Alexander Jones.

COLLODION EMULSION.

To the Editors.

Gentlemen,—I am what I think I may venture to call "an old photographer," having had twenty-five years' experience—twenty-two of which were with wet collodion, the last three with gelatine dry plates, which have entirely replaced the bath process in my practice.

Now, though I use gelatine plates solely, I cannot help sometimes looking back to the wet plate as giving something in the way of quality that I cannot obtain (except perhaps by accident occasionally) with gelatine, yet I should be loath indeed to go back to the trouble of wet plates; but after reading what has been written lately by Mr. Banks and Mr. Brooks on collodion emulsion, it does not seem impossible that that form of dry plate may prove to be the connecting link between wet collodion and gelatine, and in that belief I should much like to go into the matter on my own account.

But here comes a difficulty, which involves a confession—I am totally ignorant of the working details of the dry collodion processes. Like so many of my fellows I have not kept back numbers of the Journal, which I know contain all I require; so I am obliged to ask the following questions, which I hope you may not consider as giving you needless trouble:—

First, as to pyroxyline. I remember some years ago acquiring a parrot-like familiarity with the term "high-temperature pyroxyline"—a preparation specially intended for emulsion work. Now, is this a *sine quâ non*, and, if so, where is it to be obtained? I have made inquiry at several establishments, and the dealers either know nothing about it or have ceased to keep it. If it is not to be purchased perhaps you would give a formula for its manufacture.—Second, as regards the ether and alcohol: what strength should be used, and is there any advantage gained by using pure instead of methylated?—Third, what bromides do you consider the best for use with collodion?—Fourth, what proportion of nitrate of silver should be used for each ounce? Knowing that quantity I can, of course, calculate my equivalents of bromide.

I may say that I understand, theoretically at least, the difference between a "washed" and an "unwashed" emulsion and how to proceed (generally) to produce either. I should prefer the former; is there any *great* difference in the modes of preparation?

Apologising for the trouble I am giving,—I am, yours, &c.,

July 16, 1883. AN OLD PROFESSIONAL.

[Several of these queries are practically the same as those of other correspondents who will please take this as a general reply:—First, the question of pyroxyline is treated in a leading article.—Second, methylated ether of s. g. ·720, and ordinary methylated spirit (not "finish") if not higher than s. g. ·825 will do. If the alcohol be lower so much the better. Pure solvents are not necessary.—Third, bromide of ammonium, cadmium, and zinc are generally used. The first is not sufficiently soluble to be used alone.—Fourth, from fifteen to twenty grains, according to the excess of silver, to be allowed.—Fifth, the only difference is that a "washed" emulsion is made in a more concentrated form to economise solvents.—EDS.]

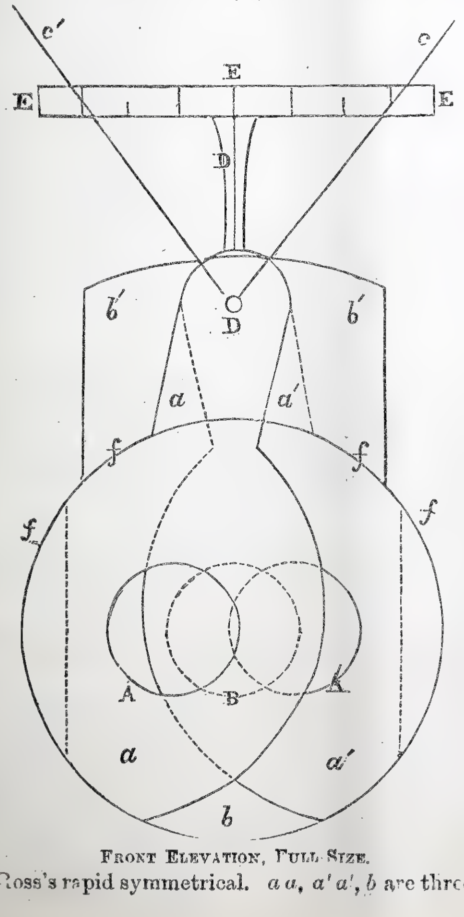
A NEW SHUTTER.

To the EDITORS.

GENTLEMEN,—Seeing some notices of shutters in your late issues, I venture to lay before you one which I had made under my directions this spring.

Thinking that a shutter working between the lenses and not needing the lens to be cut was best, I planned this, which I now venture to lay before you. The accompanying diagram (*fig.* 1) is drawn to full scale for a

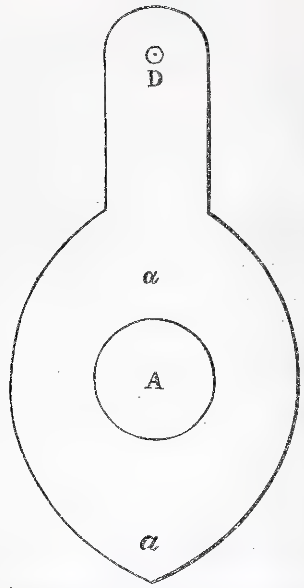
FIG. 1.



FRONT ELEVATION, FULL SIZE.

whole-plate Ross's rapid symmetrical. *a a*, *a' a'*, *b* are three diaphragms of thin sheet brass, about the thickness of a calling card; *b* is made just broad enough to enter the diaphragm slit and rest on the foot of the lens, and is made long enough to project about half-an-inch above it. On this an aperture B is cut exactly like a diaphragm; *a a a' a'* are two movable flaps, or diaphragms I may call them, cut in the shape shown in *fig.* 2. They are pivoted at *o*, so that the three apertures A A' B shall coincide, and the levers *c c'* are fixed *c* to *a a* and *c'* to *a' a'*. Two pieces of thicker brass (about one-tenth of an inch) *b' b'* are cut and one fixed to the diaphragm *b*. The diaphragms *a a*, *a' a'* are then pivoted between the two pieces of brass *b' b'*, and on the side next *b*. A cover or rest is then fixed *f f f f*, so as to fit round the lens and support the shutter. A guide E E E is then fixed by an upright D.

FIG. 2.



To use the shutter insert it in the diaphragm slit, open the levers as far as possible apart; the shutter will then be shut. To expose press the levers *c c'* together. The diaphragms will then pass each other and occupy exactly converse positions (that is, *a a* in the position of *a' a'*), and the exposure is given.

I add a formula for finding all the necessary sizes for apertures, &c., to suit all lenses:—

Let D = the internal diameter of lens.
d = diameter of apertures.
b = breadth of movable diaphragms.

$$d = \frac{5\,D}{16}$$

$$b = \frac{11\,D}{16}$$

—I am, yours, &c., H. J. GIFFORD.

Granton House, Edinburgh, July 9, 1883.

"A NEW SCIENTIFIC SUBJECT."

To the EDITORS.

GENTLEMEN,—The following statement appears in Mr. W. Harding Warner's communication in last week's Journal:—"From our earth radiates an atmosphere called by men of science a 'photosphere,' or luminous halo. From this photosphere is thrown off another called a 'chromosphere,'" &c.

I have always understood that "men of science" applied the terms "photosphere" and "chromosphere" to the *sun*. The fact that these terms have been applied to the earth is new to me and may be to your readers generally, and for that reason I think it would be desirable if Mr. Warner would give the authority on which the statement is made. —I am, yours, &c., A. BROTHERS.

Manchester, July 17, 1883.

HYDROQUINONE DEVELOPER.

To the EDITORS.

GENTLEMEN,—Your readers may like to know the result of a trial of the hydroquinone developer. Two plates were exposed and developed with hydroquinone, five grains; water, five ounces; ammonia, five minims. The result was very satisfactory. Exposure with Dallmeyer's landscape lens about seven p.m., "cap off and on."—I am, yours, &c.,

Greenhithe, Kent, July 16, 1883. W. T. F. M. INGALL.

EXCHANGE COLUMN.

Wanted, in exchange for *Le Meritoire* set, three double backs, quarter-plate, a rectilinear lens, half-plate, or offers.—Address, A. CHAMBERS, Gordon-road, West-hill, Hastings.

What offers in exchange for dark tent, on four wheels, springs, two lock-up boots, for any size plates, a boy can run it anywhere, value £5?—Address, PHOTOGRAPHER, 4, Hereford-street, Sheffield.

Wanted, Entrekin burnisher or Solomon's hot rolling-press, cabinet size, in exchange for lockstitch sewing-machine on stand, with treadle.—Address, GEO. BISHOP, 20, Stork's-road, Jamaica-road, S.E.

What exchange for Dallmeyer's 10 × 8 sliding-body mahogany camera, rising front, single back? Wanted, a whole-plate single landscape lens by a good maker.—Address, E. R. PRINGLE, 71, Front-street, Tynemouth.

I will exchange a 10 × 8 bellows-body camera, almost new, and a 10 × 8 body camera, never been used, with three backs, one to take two promenade and three cabinet photographs, for a 12 × 10 bellows-body camera, with the latest improvements for outdoor work. Must be in good condition.—Address, M. BATISTE, 29, London-road, Reading.

I will exchange a patent machine, cost £6 5s., for making picture frames (no previous knowledge required to use it), for photographic apparatus.—Address, J. BIDDLE, 97, Medlock-street, Hulme, Manchester.

I will exchange three photographic lenses—one whole-plate view lens, one half-plate portrait lens, and one quarter-plate lens—for an interior background and posing-chair. Send photograph.—Address, B. PEARCE, photographer, High-street, Towyn, N. Wales.

I will exchange nearly three years' numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY for anything useful; also a 10 × 8 lens, for view work, in good condition, and a silver gilt watch, for a gem or Victoria camera.—Address, A. J. B., 17, Hindon-street, Pimlico.

I will exchange a cabinet rolling-press, half-plate lens, whole-plate camera, with dark slide, sliding-body, or posing-chair, two backs and arms, by Cussons and Co., Southport, all in good condition. Wanted, a canvas booth, Victoria camera and lenses.—Address, J. COLLINGE, photographer, Rawtenstall.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

William Chadwick, Spring-bank, Higher Blackley, near Manchester.—*Photograph of St. Peter's Church, Blackley, near Manchester.*

IN TYPE.—Communications from W. H. Harrison; J. Brangwin Barnes; George Smith; "Free Lance," &c., &c. In our next.

A. BONNY.—Of no commercial value whatever.

A. Z.—The prints are produced by lithography and not by photography, as you have been informed.

H. HICKS.—That form of lens, so far as we are aware, is not now made in this country or, indeed, in any other.

J. FARNSWORTH.—If you find the colour sink into the paper after it has received one coat of size why not give a second, or even a third, before proceeding to paint the picture?

E. G. P.—Messrs. Marion and Co. will supply you with albums of almost any design. If they have not the kind you require in stock they will, doubtless, make them to your order.

A. J. SCOTT.—The scratches on the surface of the lens will not, practically, interfere with its working. They will only stop off a very slight amount of light and render the lens a *very* little slower.

W. A. CARVER.—Mr. J. Werge, Berners-street, Oxford-street, will, no doubt, supply the tent you require. We know he supplied this form some time back, and probably would do so now.

NEMO.—Discard your old fixing solution and make a new one each time you have prints to fix. If you use the same solution for "several weeks" there is little need for wonder that the lights of your prints are very yellow.

WM. ADCOCK.—Thanks for your kind expressions. We have the matter under consideration, but pressure on our space will preclude our going into the question for the present. However, we shall keep the subject in mind.

T. JOHNSON.—You will be able to purchase mastic varnish at the establishment of any artists' colourman. Its preparation is both troublesome and difficult when only a small quantity is required, and it demands special appliances to make it successfully.

"JOSKIN."—The markings appear to be due to the presence of a trace of hyposulphite of soda in one of the waters in which the prints were washed prior to toning. Some of the examples, it is clear, have been touched with fingers that had hypo. upon them, as the prints bear their impression.

A. A. CAMPBELL SWINTON.—You have named all the principal firms who are likely to be of service to you. Perhaps Messrs. Frith and Co. or Messrs. Poulton and Son might entertain your business proposition. Write to them. The address of the former firm is Reigate, Surrey, and of the latter is Lee, S.E.

E. G.—To produce enamelled prints successfully requires considerable practice and some amount of skill. We know of no practical work devoted to the subject. Many articles have at different periods appeared in back numbers of the Journal as well as in our ALMANAC, all of which are good when worked with judgment.

S. J. (Newcastle).—There is no reason whatever why you should not make the collodion you employ for enamelling the prints with methylated spirit. The only objection to its use is that what is found in commerce is frequently not strong enough to make a good collodion. If you can obtain it of s.g. ·820 or ·825 that will, doubtless, answer the purpose.

AMATEUR.—We cannot afford space to give details of processes in no way pertaining to photography. The preparation of artists' canvas for painting upon is of no interest to the majority of our readers. On a former occasion, if we mistake not, we gave you the advice that you could purchase it better and cheaper than you could prepare it for yourself in small quantities.

A. G. B. (Varna).—1. Iron and glass might possibly answer your purpose, or you might, perhaps, extemporise a small canvas tent on the roof. This could be removed when the weather was unfavourable.—2. On the top of the building you would, as a matter of course, secure much more light than you could in the yard; but it is quite possible the light thus secured would be more difficult for you to manage.

DEMARR.—1. Most probably the glass was not thoroughly cleaned before the waxing solution or French chalk was applied; hence the cause of the adhesion of the tissue.—2. Why do you collodionise the chromatised gelatine film? It is not at all necessary, seeing that you already have a coating of collodion on the tissue. It is only adding to your difficulty.—3. From your description we imagine that, from some cause or other, the tissue in drying has become insoluble on the surface; hence the cause of the veiling or fogging of the developed image. Possibly the tissue, while drying, was exposed to some injurious vapours.

PERPLEXED.—The cause of the markings on the plates is not in any way due to the formula of any of the numerous emulsions you have tried your hand upon. Neither are they due to the different samples of gelatine you have used; but simply to the manipulation in coating the plates. The trouble is mechanical, and not chemical. Without seeing you coat the plates we cannot say where you are in error. Alter the mode you are now employing, and note the effect. We should advise you to pour more emulsion on the plate in the first instance, and drain more off than you have been doing hitherto. Excess of alcohol in the emulsion has a tendency to produce markings somewhat similar to yours.

RECEIVED.—Great Eastern Railway Company's *Tourist Guide to the Continent.*

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, the 25th inst. the subject for discussion will be—*On Toning Silver Prints.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly technical meeting of this Society will be held on Tuesday next, the 24th inst., at eight o'clock, at the Gallery, 5A, Pall Mall East.

MR. A. HUMBOLDT SEXTON, Science Master at the Wedgwood Institute, Burslem, and President of the North Staffordshire Photographic Association, has been appointed Lecturer on Chemistry and Physics at the Manchester Technical School.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The first outdoor meeting of the season will be held at Hampstead, on Saturday, the 28th inst. Tea will be provided at the Bull and Bush Hotel, at six o'clock. Members and friends intending to be present should notify the same to the undersigned not later than Thursday next, the 26th instant:—F. A. Bridge, Hon. Secretary and Treasurer, 9, Norfolk-road, Dalston-lane, London, E.

A PHOTOGRAPHER'S RIGHTS OF LIGHT.—In the Court of Appeal of the Supreme Court of Judicature, before the Master of the Rolls and Lords Justices Cotton and Bowen, the case of "Parker *v.* The First Avenue Hotel Company" was heard on Saturday last, the 14th instant. This was an appeal by the plaintiff, who was a photographer, having a studio at No. 40, High Holborn, from a judgment of Mr. Justice North, who had granted an injunction restraining the defendants from raising their new buildings in High Holborn, constructed in front of the plaintiff's ancient windows, to a greater height than three feet above the sill of those windows; but the injunction was not to prevent the defendants from putting on a sloping roof of greater height so long as the angle of incidence of light over such sloping roof to the central part of the plaintiff's windows was not less than forty-five degrees from the perpendicular above the point of incidence.—The plaintiff appealed from the order, contending that it ought, in general terms, to have restrained obstruction of the plaintiff's lights.—Mr. Finlay, Q.C., and Mr. Colt appeared for the appellant; and Mr. H. Matthews, Q.C., and Mr. Beddall, for the company.—Their lordships held that the learned judge was wrong in making this order in this form, though the form of order was right in a previous case before the Master of the Rolls, when the circumstances were ripe for such an order. The order which ought to be made was that the defendants should not, by the buildings on the north and south sides, above, or in combination with their other buildings, obstruct the plaintiff's lights, and it being alleged that the fresh buildings were an infringement of the injunction as now varied, the injunction must restrain the defendants from continuing the buildings so as to infringe the order as varied. Whether there was an infringement could not be at present decided. It was not a matter of law or inference of fact that a building not transgressing the rule of 45 degrees was never an interference with ancient lights, and the sooner the idea was got rid of the better. It was only an element to be considered in each particular case.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending July 18, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
12	29·59	W	63	60	100	67	58	Cloudy.
13	29·66	W	62	57	117	72	54	Cloudy.
14	29·74	W	63	58	100	65	54	Cloudy.
16	30·12	W	57	52	96	64	45	Cloudy.
17	30·06	NW	60	55	89	65	55	Cloudy.
18	29·93	W	59	54	106	64	51	Overcast.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1212. Vol. XXX.—JULY 27, 1883.

ENLARGING FROM GRANULAR NEGATIVES.

Recently several experienced photographers have remarked to us that, as a rule, enlargements made commercially from small gelatine negatives are wanting in detail and delicate texture, and that they contrast very unfavourably with pictures of similar dimensions enlarged from collodion negatives. On inquiry into the matter—with a view to the discovery of the reason for this—we find that the enlargements complained of were, for the most part, made from small negatives taken on extra-rapid plates; in fact, from "instantaneous pictures."

During the discussion on the subject of enlargements *versus* direct pictures at the last meeting of the South London Photographic Society, the degree of fineness in the deposit forming the image of the original negative, as well as that composing the transparency, was specially alluded to by several of the members as being an important factor which should be taken into account when the best possible results obtainable by enlarging were under consideration. *En passant*, it may be mentioned that several artists have of late commented on the increasing tendency there is to coarseness in the particles of silver composing the image on commercial plates generally. This, if correct, happens unfortunately, inasmuch as at the present time there is much done in enlarging from small negatives, many of them being taken with very rapid exposures in order to secure instantaneous effects; and, to secure these, plates of the extra-rapid type must perforce be employed. These it is which, as a rule, have the coarsest grain of all, and are therefore likely to yield enlargements which are the least satisfactory.

In the discussion referred to some of the members went so far as to advocate that the original negative, as well as the transparency, should be taken on albumen, and others on wet collodion, if the best *possible* results were to be obtained by enlarging. There is no question that the finer the deposit forming the image and the more closely it resembles a stain, all things being equal, the better should be the resulting enlargement. The finest deposit it is possible to obtain in a negative is that given by the albumen process, as in this the image shows only as a stain, even when examined with a low power under the microscope—a somewhat high one being necessary in order to detect the reduced silver as actual particles. Under certain conditions it is quite possible, with wet collodion, to obtain an image partaking very much of the character of that obtained by the albumen process; but in practice neither of these processes is adapted to the requirements of the photographer of the present day, owing to their great want of rapidity as compared with gelatine.

Now, seeing that thousands of negatives composed of extremely coarse particles are in existence, and that tens of thousands more will be produced from which enlargements may be required, the question is—Which, practically, is the best means of obtaining the most satisfactory result from them? Assuming that an enlarged negative has to be produced, the first consideration is the transparency—how shall that be made? As we have just remarked, the albumen process yields the finest of all grains. Next comes the wet collodion with pyrogallic acid development. Then we have the latter process with iron development, which gives a coarser grain than with pyro.; and the carbon process, in which the image is composed of particles of colouring matter mechanically divided. Although the particles in the latter process are very fine indeed, they cannot, of course, be produced in such a fine state by mechanical division as they can by chemical reduction. Lastly: we have the gelatine process, in which the character of the deposit depends in a great measure on the preparation of the emulsion. With this process the particles composing the image may be obtained quite as fine as with wet collodion and iron development; or they may be so coarse that they can easily be detected with the unassisted eye.

The general impression with many appears to be that when an enlarged negative of the best quality has to be made it is imperative that the transparency should be composed of the finest possible particles. So it should be, provided the original negative was composed of an equally fine deposit. But it is clear that if the negative be composed of coarse particles of silver to begin with, then no advantage will accrue from using a transparency with the finest possible deposit, inasmuch as the coarseness in the original image will be reproduced in it, and consequently will be magnified in the enlargement. Hence no advantage will be gained by the transparency being excessively fine if the original negative be coarse.

In a leading article, in our issue for June 22nd, we gave a hint on enlarging from granular negatives, namely, to make the enlargement a trifle out of focus. Since then, in conversation with a gentleman who has made some very successful enlargements from small instantaneous negatives, in which the image was very granular indeed, we learnt his method of procedure; and, with his permission, we give it for the benefit of our readers, although at first sight it may appear somewhat heterodox.

Instead of aiming to secure the transparencies with a very fine deposit the reverse course was adopted, and gelatine plates were used, those being selected which gave an image as coarse, or nearly as coarse, as that in the small negative. Transparencies thus produced were then enlarged — the lens being put very slightly out of focus—and the result obtained, as we have just said, was most satisfactory, as the enlarged pictures appeared far sharper and crisper than when the transparency had been produced in the ordinary way—with carbon or with gelatine giving a fine grain—and the lens being in accurate focus. The granularity in the transparency appears as if it, to a great extent, neutralised that in the negative. Our friend was led to adopt this method of working from having received instructions in the Lambert method of working up negatives, and noticing that when one side of the negative only was covered with the thin tracing paper the texture of it was very apparent in the print; but when both sides were covered the texture of the paper was scarcely perceptible, the granularity of the two papers appearing to neutralise each other.

The principle of one grain neutralising another may very well be exemplified by a simple experiment:—If a transparency be backed with a piece of coarsely-ground glass—such, for instance, as that used for window glazing purposes—the coarseness of the grain will be very conspicuous indeed when the picture is looked through; but if another thickness of the same glass be added the granu-

larity will at once become less so, and a third thickness will render it still less apparent.

From the results we have seen—produced by enlarging from a transparency with a coarse grain, in preference to a fine one—we commend the idea to the attention of those of our readers who have small granular negatives from which they are desirous of making enlargements.

DEVELOPING AND DEVELOPING FORMULÆ.

Taking up our remarks at the point we left off last week—the formulæ of the dry-plate makers as given in their printed instructions—we are impelled to repeat our statement that the manufacturers (whether with or without the idea of claiming a sensitiveness not justly belonging to their plates we do not profess to judge) in many instances recommend proportions which, if adopted, would not permit a continuous series of negatives of the highest class to be taken. We speak not of a fair workable negative—with the range that exists in the use of developers such contention would be absurd—but of a negative of the highest class obtainable, and this, as the more experienced of our readers are aware, is by no means a common class.

The strength of pyro. given in these and other instructions usually varies from one to three grains to the ounce of water. Two to four minims is a common proportion of ammonia recommended for each grain of pyro.; while bromide in all proportions, from quantities equal in weight to the ammonia downwards, is recommended.

With the majority of plates a two-grain strength of pyro. will be found workable, and it will generally be safe to use less ammonia than is advised and more bromide. As an example in point, we may say that we recently had occasion to use the plates of a well-known maker, and, working with his own formula, we could not get a first-class negative, as green fog persistently made its appearance; but by using precisely half the quantity of ammonia recommended in the maker's instructions we got absolutely faultless negatives. With regard to the proportion of bromide: that, as we have observed, has gradually been increasing till now a common formula is that of one of bromide to two of ammonia.

Passing, now, to the development of the plate: we would note that we scarcely remember more than one instance where attention has been drawn to the great advantages of one special mode of development for combating green fog. At the outset we may remark that, notwithstanding the amount of discussion there has been upon the subject, the evil still exists, and, further, the conditions of its appearance are by no means well known. Workers who have in a single package of plates found that, under identical modes of development, some negatives would be almost covered with it while others would be entirely free, have been very much inclined to blame the plates for lack of uniformity when the subjects only were accountable. Whenever there is any tendency to this fog it will always be found to prevail most where there are large masses of shadow; and where the tendency is only slight the fog will not be seen at all in plates well covered with detail. Let, however, a plate of the same batch be exposed with one half of its surface covered from the action of light, and it will be found upon development that green fog will be strongly pronounced in the unexposed part, while it may be quite absent in that portion upon which an image has been impressed.

Reverting now to the mode of encountering the fog that we have referred to, let us remark that a plate which, with an ordinary developing formula, will have green fog strongly marked, will, with the same ultimate formula, work quite free from it if a portion only—say one-half—of the ammonia or ammonia-bromide be in the first instance added to the full quantity of pyro., and the development be well started with it. To those of our readers who may be incredulous as to the effect of this simple remedy we would merely say—"try it."

Hitherto we have been treating of a mode of development which, with a suitable exposure, will give a negative with due printing density in from two to four minutes. Many photographers, however, prefer to give a far longer time to the process, under the impression that the quality of the negative is improved.

We will not now discuss the point whether or not such is the case, though we may say that at the moment of writing we have before us a conspicuous example of the beautiful effects obtainable by such treatment. The gentleman—a well-known amateur—who took the negative from which it is printed tells us he usually gives an hour or two to the development of each plate; his plan being to place the exposed plate in a very weak developer, then, covering it over, to leave it, go into his grounds and smoke a pipe, and, lastly, return to see whether any image is visible upon the plate, when he adds further ingredients as required.

Such a plan may suit an amateur with plenty of time on his hands, but would never do for a professional, and would try the patience of most amateurs whose spare moments were limited in extent. As to its power of inducing the production of negatives of the highest class that is undoubted, as the print before us—and it is one of many from the same portfolio—abundantly testifies.

Among small matters which are yet worth notice we may allude to the method of using citric acid in the stock solution of pyro. When first the practice was adopted, quantities of acid so large were recommended that, through the citrate of ammonia formed, the development was perceptibly slowed, as we were the first to point out; though even now it is not well known that a very few grains—three or four—of citric acid to an ounce of pyro. will answer all practical purposes.

In descriptions of developers and development one point which constantly crops up is the power of a certain quantity of solution to develope a number of plates before becoming too discoloured to use; and it is a fact that with the use of sulphite several plates may pass through a solution before its colour becomes very deep. In practice, however, there are grave objections to the plan, as, after the passing of a plate or two through a certain quantity of developer, its tendency to produce bubbles and their tendency to adhere to the plate is so great that the risk of producing developing marks is by no means counterbalanced by the economy of materials gained by using a bath to the utmost, and we cannot avoid give our dictum in favour of using a developing solution for one or two plates only. It is far better to do so, and restrict the quantity employed, than to use an increased quantity many times over.

We will conclude by noting one point in which the tyro may be very apt to be led astray. He may often hear it stated that the correct exposure can be ascertained by the image showing at the back of the plate. Anyone who has the slightest experience in plate-making, or even of the use of commercial plates, will know this is a most fallacious test. Some plates, especially where there is a good proportion of iodide used, will scarcely show an image at all with a fully-exposed negative; while others, with a similarly correct exposure, will exhibit at the back almost every detail that the print can show. Such being the case, the use of the "image showing through at the back" must be decidedly limited, though when the conditions of the plates under employment are known it is not by any means useless.

We have now shown that, although to a certain extent authorities must be followed, there yet remains in the development of a plate, so as to obtain the highest results, much scope for knowledge and experience; and, in spite of the improvements in processes, there is room for exhibiting the individuality of the worker, be he amateur or professional.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

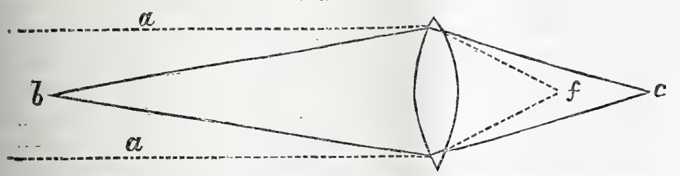
Chapter XIII.—Conjugate Foci.

If a lens which has been carefully focussed upon a distant object be then directed towards one comparatively near at hand, the nearer object will be found to be out of focus, necessitating the withdrawal of the ground glass from the lens before the image will assume its maximum sharpness. This establishes the fact that there exists a relation between the object that is focussed, as regards its distance from the camera, and the focus of the lens. This relation is termed "*conjugate foci.*" In what we have now to say we will speak of the distance between the lens and the object as the anterior

or forward conjugate, and that existing between the lens and the ground glass of the camera as the posterior conjugate focus.

Parallel rays *a a*—that is, rays from a great distance—falling upon a lens come to a focus at *f;* but those from *b*, which may serve to represent any object ten or twenty yards distant, have their focus at *c (fig 23)*. Then *f* is the solar focus, *b* and *c* being the conjugate

FIG. 23.



foci. The former of these is the anterior and the latter the posterior conjugate. To facilitate reference the lines indicating the conjugate foci are solid, while those relating to the solar focus are dotted. The points *b* and *c* are interchangeable; an object placed at either is sharp at the other.

The laws which govern the conjugate foci are to be found—not, perhaps, so clearly expressed as the practical photographer would require—in several old optical treatises. The following, which amount to nearly the same thing although expressed differently, will be quite sufficient for introduction in this chapter :—

If the principal or solar focus of a lens be regarded as the unit of measure, an object situated in front of the lens at a distance from a certain point, equivalent to a multiple of the said unit, will have its conjugate posterior focus at a distance from another certain point equal to a corresponding fraction of the same unit. This relation of the conjugates to each other, although probably first published in an old work (Dr. Smith's "Optics"), was first brought before the world in relation to photography by the late M. A. Claudet, within one year of a quarter of a century ago, at the Aberdeen meeting of the British Association (1859). The following popular illustration which was given at the time of the first publication of the proposition in The British Journal of Photography, by Mr. George Shadbolt, serves to make it more readily understood :—Suppose we have a lens of twelve inches solar focus—an object situated at a distance of *six feet* from a certain point in front of the lens, that is, at six times the unit of measure—the conjugate posterior focus will be at a distance of *one-sixth part* of the same unit; that is, at two inches distant from a corresponding point behind the lens.

The "point" here spoken of before or behind the lens is the solar focus measured from the optical centre of the combination, or, as we described it in the previous chapter, the centre of conjugate foci.

Previous to the publication of this, one of the methods usually adopted to calculate the conjugate foci was that of Sir David Brewster, which, however, was of little or no use when applied to other than a simple lens :—Multiply twice the product of the radii of the two surfaces of the lens by the distance of the radiant point from the centre of the lens for a dividend. Multiply the sum of the two radii by the same distance, and from this product subtract twice the product of the radii for a divisor. Divide the above dividend by the divisor, and the quotient will be the focal distance required.

From what was said in the previous chapter it will be understood that the range of posterior conjugate focus extends only from the solar focus, which is the nearest point to the lens at which a focus of any kind can be obtained, and that focus which results from having the object so near to the lens as to give an image of the same dimensions as the object, and which, as we have shown, is twice the solar focus.

Soon after the publication of M. Claudet's method, as just described, the late Mr. Thomas Grubb directed his attention to the proposition with a view to its still further simplification and perfecting for photographers' use. We here present two tables in juxtaposition—No. 1 containing four ratios constructed in accordance with M. Claudet's method; No. 2 being based upon the shortcoming of the other, in which there is nothing to indicate any ratio required except that of 1 to 1, and in which (viz., in No. 2) Mr. Grubb adopts in preference the more simple and natural ratios of the actual distances from the lens.

No. 1.			No. 2.
1 f and 1 f	...	...	2 f and 2 f
2 f and $\frac{1}{2} f$	...	...	3 f and $\frac{3}{2} f$
3 f and $\frac{1}{3} f$	...	...	4 f and $\frac{4}{3} f$
4 f and $\frac{1}{4}$	...	...	5 f and $\frac{5}{4} f$

In the above f denotes the principal focus of the lens, or feet when the focus is = one foot.

In table No. 2 the proportions required are at once apparent, while the numbers denote the actual distances required to be used for a focus of one foot, the ratio being still of so simple a progressive nature that a table of any required extent may be constructed almost as quickly as the figures can be written.

Having given Mr. Grubb's table, we here present in a condensed form the argument based upon it, and the simple arithmetical rule deducible therefrom, by which to determine the conjugates :—

Let it be borne in mind (observes Mr. Grubb, referring to the table No. 2), first, that f represents the focus of the lens, and that this focus is assumed to be = 1 foot, or unity; and, secondly, that we do not alter the *power* of a lens by using it, whether for bringing parallel rays to a focus or for forming conjugate foci. What we do in the latter case is simply to use a portion of its power on one side, leaving the balance of its power to be exerted on the other side—the simplest case of this being that where we use the lens for forming *equal* conjugate foci, and where, the lens being one foot in principal focus, a power equivalent to a focus of two feet is used at one side, leaving an equal power to be exerted at the other side. Now it requires very little mathematical knowledge to perceive that we can only perform the operations of adding and subtracting such powers by treating them as fractions—that is, by using their reciprocals; and thus, as we express the adding of two halfpennies, namely,

$$\tfrac{1}{2} + \tfrac{1}{2} = 1 = 1 \text{ penny},$$

we in like manner must, in adding the two before-mentioned of two feet each in focus, adapt the formula (p and p^1 being put for the respective powers) :—

$$\frac{1}{p} + \frac{1}{p^1} = \frac{1}{f} \text{ (and } p \text{ and } p^1 \text{ being each = 2 feet).}$$

$$\tfrac{1}{2} + \tfrac{1}{2} = \tfrac{1}{1} \text{ or focus = 1.}$$

From this simple equation (calling the whole power of the lens 1, or unity) we gather that the sum of the reciprocals of the powers, which are at the same time the required distances from the lens, must equal unity; that is, any two fractions whose sum is unity will, in their reciprocals, give relative distances of the object and image for a lens whose principal focus is 1—foot, yard, &c.

The rule deducible from the foregoing for finding the required distance for any proportional size of object and image, and for any given focus of lens, is :—Add the required proportions together for the denominator of two fractions whose numerators are the separate numbers. Invert these fractions, and multiply the focus of the lens by each of these for the respective distance.

One practical application of the principle of conjugate focus which, we believe, will come more into use than has hitherto been the case is in the taking of landscapes, without specially focussing for each subject. Every photographer is now aware that, if he focus a distant object very sharply, and then make a mark on the adjusting portion of his camera, no re-focussing will ever afterwards be required when taking a distant object, all that is necessary being to slide out the camera until the previously-made adjustment marks coincide. In like manner adjustment marks may be made for objects situated at a half, a quarter, an eighth, or a sixteenth of a mile as the anterior conjugate. The value of this will be specially appreciated under a twofold class of circumstances, namely, when by accident the focussing-glass gets broken; but more especially when the object to be photographed is in motion, precluding the possibility of staying in order to have it focussed. To focus ships in motion, especially from the deck of another ship also in motion, is altogether out of the question when the whole powers of the photographer are taxed in observing the fitting moment at which to touch the exposing trigger. In such a case the proper procedure is to estimate as nearly as possible the distance at which the ship is

from the lens (the acquisition of such guessing power being by no means difficult), and then adjust the sliding portion of the camera to the corresponding mark.

It is, however, in the production of enlargements and enlarging requirements, together with those employed in copying of every description, that the use of a knowledge of the laws of conjugate foci will be exceptionally useful. A photographer is supposed to be desirous of knowing what dimensions, as regards length, he should adopt in constructing a camera in which he will be able to copy a picture or object several times larger or smaller than the original, and to know how far from the lens must be the object on the one hand and the ground glass on the other. He is further supposed to have two or three lenses of different foci, but of the precise equivalent focus of each of which he has made himself well aware by one of the methods described in our last chapter.

Now let that focus, whatever it be—whether it be five, six, eight or nine inches—be represented by f. This is the only known element in the inquiry at the present stage. What is now required are the two positions in which to place the negative (represented by n) to be enlarged and the focussing-glass respectively, so that a sharp image shall be produced, no matter what may be the degree of enlarging. Expressing one focus of the lens by u and the other by v we have the following:—

1. $u = (n + 1) f$, and
2. $v = f + \frac{f}{n}$

which, when converted into simple language, means—

1. Add one to the times of enlargement (or reduction) desired, and multiply the sum by the equivalent focus of the lens. The product is the length sought for.

2. To find the other conjugate focus: divide the equivalent focal length of the lens by the times of enlargement (or reduction) required, and add it to the equivalent focal length. The sum is the length sought for.

The above embraces the whole subject of enlargement and reduction, even though the degree of enlarging be such as extends to the production of a life-size picture from a small miniature.

Quite recently we had brought before our notice a suggestion for a new mode of photography; but, as our interlocutor made no suggestion as to the mode of fixing the image, we proposed that he should hold the subject in reserve till he discovered such a method. The idea—which, we need scarcely say, was not gravely meant—originated in a very droll incident, which occurred in the presence of the gentleman in question. He was seated at an open window talking to an old lady whose head was adorned with a cap trimmed with bright pink ribbons. The sun was shining brightly into the room, and he states that the conversation did not last more than half-an-hour, though some old ladies' conversation is sufficiently sprightly and entertaining to make half-an-hour pass very quickly. Be that as it may, he avers that at its close the bright ribbons, pink half-an-hour before, were then, on the side nearest the window, bleached perfectly white, and a merry laugh greeted the discovery. If ribbons of such excessively-fugitive tints are worn there is no reason why, under some caprice of fashion, they should not be ornamented photographically by placing them under a negative before making up. We might then, instead of the "new colour," have the "new portrait" or the "new view." *Modistes*, make a note of this.

A useful, simple, and easily-applied test for gallic acid—which, as our readers may be aware, is stated to be a frequent accompaniment of pyrogallic and tannic acid—is described by Dr. Sydney Young, of University College, Bristol. It consists simply in the addition of an aqueous solution of cyanide of potassium to the suspected liquid. "A beautiful red coloration is produced, which, however, disappears after a short time if the liquid be not disturbed. The surface, however, remains coloured, and, on tapping the test tube in which the solution is contained, the superficial coloured portion is driven downwards into the colourless liquid below. If, now, the test tube is shaken energetically the colour reappears as at first; but, on standing, the liquid again becomes colourless." This would seem to be a plan most easily applicable, and, as no chemical is needed beyond what is probably to be found on any photographer's shelves, there would appear to be nothing to prevent the experiment being employed by any photographer who wishes to test for the foregoing substance.

It is always pleasant to see a familiar name in the list of the honourably distinguished. Every old photographer will be interested in learning that Mr. Robert Hunt, F.R.S.—an investigator whose name will be remembered when many famous photographers of the day will be forgotten—has been awarded a special pension by the Treasury in consideration of his long and laborious services as Keeper of the Mining Records. *Hunt's Researches on Light*, published three decades ago, is a standing monument of his industry and skill in photographic matters; and we are often surprised that even at the present day its facts are not oftener referred to.

We have from time to time commented upon the issues of plates to the subscribers of the Society for Photographing Relics of Old London, and now we have to announce the completion of another set, which brings up the whole number issued to eighty-four. The views hitherto published have been uniformly good, and the present issue compares favourably in every respect with its predecessors. The Hon. Secretary is Mr. A. Marks, 155, Adelaide-road, N.W.

The local secretaries of the British Association for the Advancement of Science have issued circulars pointing out to owners of scientific instruments, curiosities, and other objects of special or artistic interest that there will be an exhibition of such objects in connection with the forthcoming meeting of the Association to be held at Southport. It is to be hoped there is not going to be another scientific instrument exhibition *fiasco*; but apart from fears of that, we think that a very interesting collection of photographic instruments and apparatus, in chronological sequence, could be got together by some of our old friends and contributors in Liverpool.

The attempts to give an early origin to photography, to the stereoscope, and to other modern inventions is now being paralleled in telegraphy. A passage in Galileo's *Dialogues* is stated to describe an inventor having asked for patronage to enable him to show that, "by a certain sympathy of magnetised wires," he could speak to anyone two or three thousand miles off; but as the inventor would not try any lesser distance the arrangement fell through. If such a passage is to be found it is likely enough to prove an accidental coincidence; for the proposal is as though some one, now-a-days, should offer to communicate with the moon if anyone would lay a wire there, but would decline any shorter trial.

A UNIVERSAL SYSTEM OF DEVELOPMENT.

Every photographer, both amateur and professional, must have suffered at one time or another from the inconvenience attending the necessity for a special developing formula for every different make of dry plate. Comparing the present with the old wet-plate days, the professional, at least, must sigh for the changeless system of development that then prevailed. New baths might be made, old ones "sunned" and strengthened or "doctored," but the developer remained the same throughout, except, perhaps, when some new "fad" sprang up as a nine days' wonder, to be eventually discarded for the original "fifteen-grain solution of iron."

The difficulty now arises not so much from the employment of different materials in different formulæ, as from the very varied proportions in which the same three ingredients are mixed. This necessitates a separate set of developing solutions for each kind of plate that may be used, and an amount of confusion and bewilderment that old experience has taught me is anything but conducive to successful work. It must not be supposed that for ordinary work I am an upholder of the system of mixing up several makers' plates in daily work; on the contrary, I have myself suffered severely from attempting to do so, but cases frequently occur where it is practically necessary to do so. For instance, different plates possess different properties, and those which, perhaps, give the best results

or general work are not the most suitable for instantaneous expo-ures; or, again, one maker's plates are particularly suited for mall pictures, while some other make are better adapted to large vork. At anyrate, in the course of a day's work, whether in or ut of doors, it is frequently necessary to use at anyrate *two* different inds of plate, entailing in all probability two separate modes of levelopment, and therefore, according to the present system, two listinct sets of developing solutions.

It has been proposed to establish a system of standard solutions vith which plates of any make can be developed; but I must onfess that so far I have not seen any really practical suggestions n that direction. The difficulty does not, as I have said, lie so nuch in the use of new or unusual ingredients as in varying pro-ortions in which the ordinary pyro., ammonia, and bromide are ombined, and a glance at the developing formulæ of a few of the eading manufacturers of plates will surpise anyone who has not reviously given attention to this subject. It is not that one maker ecommends a generally and uniformly stronger development—that s to say, one in which the three ingredients are increased in the ame proportion; then matters would be comparatively easy. But omparing the formulæ of A and B (to take two of the leading nanufacturers) I find that fixing the quantity of pyro. in each ormula at 1 the following extraordinary variations in the pro-ortions are discovered, namely—A: pyro., 1; ammonia, 8; bromide, . B: pyro., 1; ammonia, 1; bromide, ⅛. As B's strength of pyro. s about twice that of A, calculating the other figures in proportion, ve find, in the actual developer that B uses, twice the quantity of yro., one-fourth the quantity of ammonia, and one-eighth the uantity of bromide; while a third formula, C's, as compared with 3's, gives three-fourths the pyro., one and a-half time the ammonia, nd *twelve* times the bromide.

We can have no reason to doubt the wisdom of these variations n each case, and it is only fair to the manufacturer to treat his lates in the manner he recommends as best for them; but it is wkward for those who have to use different kinds. Of course if, s some writers have asserted, all *good* plates are amenable to imilar development the difficulty disappears; but such is certainly ot my experience, and I think the best evidence that it is not the ase is found in the existence of so many and such varied formulæ ssued by those who of all others are, or ought to be, in the best osition to judge of the requirements of their plates, namely, the nakers. It is an easy matter for the upholder of the "similar-evelopment" theory to lay the blame on the plate when his theory reaks down in practice. He only expects it to answer for good lates, *ergo* the plates it does not suit must be *bad*—a somewhat rbitrary decision from the maker's point of view.

How is all this uncertainty to be removed, and something like rder made to take the place of the present system of chaos? I do ot pretend to be able to answer the question satisfactorily, but I vill make a suggestion or two that may help somewhat towards the nd in view. The following plan I have worked for some time, and ave found very convenient. It adds nothing to the difficulty of leveloping if you adhere to one class of plate only, and it enables ou equally well, in a few seconds, to make up the developer for ny plate that it may be needful to develope.

In the first place, I entirely discard the ammonia-bromide *mixture*, vhich palpably cannot suit all formulæ. I keep pyro., ammonia, nd bromide each in separate solution of such a strength that I now so many minims of each solution represents one grain of pyro. r bromide or one minim of strong ammonia. In the second place, very new formula that comes into my hands I translate for my own onvenience *into rational terms;* that is to say, I calculate the espective quantities of pyro., ammonia, and bromide actually pre-ent in each ounce of developer, keeping this list at hand for con-tant reference. The stock solutions I keep are as follow:—

A

Pyro.	48 grains.
Water	1 ounce.

Ten minims contain one grain.

r, if the sulphite of soda formula be followed, the pyro. and sul-hite are dissolved to make *nine* ounces of solution, which will have he same value.

B

Ammonia	1 ounce.
Water	3 ounces.

'our minims of solution represent one minim of strong ammonia.

C

Bromide of potassium	24 grains.
Water	1 ounce.

Twenty minims contain one grain of bromide.

To use these solutions with any ordinary developing formula it is only necessary to proceed as follows:—I turn to my list of formulæ and I find the following against the maker whose plate or plates I am about to develope:—

A	B	C
1½	3	3;

which indicates that each ounce of developing solution requires, according to the published instructions, one and a-half grain of pyro., three minims of strong ammonia, and three grains of bro-mide. Accordingly, for a quarter-plate (or one ounce of developer) I measure out—

A	15 minims,
B	12 „
C	60 „

making up to one ounce. If the directions state that the pyro. is to be allowed to soak into the plate first, B and C are not added until that has been done. If the ammonia and bromide are recommended to be used gradually that can also be managed, observing that with each further addition the same proportions are adhered to as exist between the total quantities of B and C—in the above case 1 and 5 respectively. In special formulæ—such as Edwards's or Nelson's—the glycerine or sugar must form separate items.

I am convinced that if some such system as the above were generally adopted, and if makers would publish the actual quantities of pyro., ammonia, and bromide required in each ounce of developer, as well as the limits between which it is desirable to vary them ac-cording to circumstances, development would be much less of a puzzle than it now is to many persons. I have very little doubt that many others have adopted in their own practice some similar method to my own; if so, it will be of interest to discuss any points of difference which may exist if the Editors will accord the space.

C. Beckett Lloyd.

SPHERICAL ABERRATION.

The appearance, for the third time in the Journal, of a sentence of Mr. Herbert J. Gover's concerning spherical aberration, calls atten-tion forcibly to the fact that there are very vague and confused ideas in many minds as to what spherical aberration really is. Of course in scientific works on optics a correct definition of this pro-perty will be found; but photographers generally do not trouble themselves to study works of this character, and are content with what they glean from their regular weekly supply of photographic information.

A very common notion is to confound spherical aberration with roundness of field of definition. This is a curious mistake, for the very correction which removes spherical aberration is not compatible, when using an instrument of large angular aperture, with a flat field and good marginal definition. Mr. Gover has fallen into a mistake of another character as to the nature of the property in question. Taking his own version of the three published ones—"owing to the spherical form given to lenses they refract light unequally at different parts of the surface, and objects situated at different dis-tances will have a different focus"—the meaning of the sentence, if it has any meaning, is to ascribe to spherical aberration the fact that objects at different distances will come to their foci on different planes. This fact is one with which spherical aberration has really nothing to do, although it may be noted that it was at one time claimed for a certain lens that, by introducing spherical aberration, so-called "depth of focus" could be obtained. The fallacy of this claim was shown by the late Mr. Thomas Grubb in an article in your pages.

Spherical aberration is the property possessed by lenses which are segments of spheres of refracting rays of light unequally at different parts of their surfaces. The effect of this with a simple lens is that the rays which proceed from the margin of the lens go to form a focus nearer to the lens itself than those which pass through the central portion. There are, in short, instead of one image an infinite number of images having their foci on different planes, and conse-quently interfering with each other and giving a more or less con-fused image at any one of these planes, whichever may be selected as the nearest approximate focus.

The use of a diaphragm, by reducing the area from which these various confusing images come, reduces also the spherical aberration, but does not absolutely remove it.

On the introduction of photography the removal of spherical aberration became a subject of great interest, as the Daguerreotype and Talbotype processes were both what is now considered very slow; and the necessity therefore arose, if portraits or other subjects for which long sittings could not be given were to be taken, for a

lens in which the spherical aberration should be so corrected as to allow of a large aperture being employed. Professor Petzval, of Vienna, undertook the investigation of the subject; and, by a triumph of mathematical calculation, produced the lens which is still in its essential details followed by all makers of portrait lenses. The lens consists of two achromatised lenses, the posterior one of which has its components separated to a certain extent, these curves not being adapted for contact—that is, their inner surfaces are not ground to the same curvature. By this contrivance it became possible to so completely correct spherical aberration that good definition can be obtained with lenses of large diameter and aperture in proportion to the length of focus, and, consequently, great rapidity of action was secured. The only important variation that has been made in the construction of Petzval lenses was that introduced by Mr. J. H. Dallmeyer, who in one of his combinations put the flint part of the back combination next the sensitive film instead of having the crown lens in that position, whilst, however, still recognising the necessity for keeping the components of this back combination separate.

"Aplanatic" means without spherical aberration; the various cemented lenses, however, to which this title has been given are none of them really aplanatic, but are a long way behind the portrait lens in this particular. They were, however, so much freer from spherical aberration than either the previously-existing single-view lenses or the wide-angle doublets that their makers thought themselves justified in using the term. The first lens for which this name was appropriated was the single lens of Mr. Grubb, in which, by reversing the usual positions of the collecting and dispersing lenses, and, of course, consequently employing a set of curves entirely different from those previously in use, he succeeded in so far reducing spherical aberration that a much larger aperture could be employed than with the previously existing view lenses. Mr. Dallmeyer's rapid landscape lens was a step in the same direction. "Rapid rectilinear," "rapid symmetrical," and "euryscope" are among the titles given to lenses in which, whilst using a cemented doublet, it has been endeavoured to remove as much as possible spherical aberration so as to permit of a large aperture and consequent rapidity. But those makers do wisely who recognise the fact that at present no means has been discovered of making such a cemented combination really aplanatic, and who, therefore, do not supply with their instruments a larger aperture than that with which fair definition is obtainable.

W. E. Debenham.

QUICK EXPOSURES IN THE STUDIO.

Before the days of gelatine plates, how often has the professional photographer heard the wish (one might almost say the "parrot cry") expressed—"If only I could be taken without knowing, how like me my picture would be!" This is no difficult matter nowadays; but in those pre-gelatine times it required both skill and tact, a good studio, and chemicals in the highest state of purity and working order. Personally, I have for years made a speciality of taking babies' photographs, which necessarily require quick exposures, a second of time in wet-plate days being an everyday sort of exposure in my experience, and no doubt that of others used to work with such subjects; hence it was not so very difficult, other conditions being favourable, from time to time to take pictures of adults in accordance with the above wish. Those of my readers who have not yet attempted it will most likely be inclined to think that, if the negative were technically good, success would be assured by such a mode of portrait-taking; but I must say such was far from being the case.

The first occasion I attempted to secure a portrait in this manner was with a lady—a particularly difficult subject I admit—who had expressed this wish aloud. The light was good, and my chemicals were in perfect order, so without giving any hint of my intentions I got my sitter in position, and while professing to examine the face under various lights made two quick exposures and hastily developed. Coming quickly out of the dark room I told my sitter I was much obliged, and I would not trouble her further as I had obtained two excellent negatives. What a cry of surprise there was! and how delighted she and her friend were I need scarcely say. The picture was undoubtedly a good one, and was sent home in due course. What would my readers guess was the verdict? The lady brought the proof back with—"Oh! we don't like this. Mr. Webster did not tell me when he was going to take me or I should not have put on such an expression," and a request for a "re-take" was made. This is sober fact, and was very mortifying; yet it could, no doubt, be paralleled by the experience of dozens of other photographers since "instantaneous plates" have been introduced and enabled most photographers with anything like a good ligh[t] to do likewise. It was, however, a disappointment to me at th[e] time; on many occasions afterwards among my quick exposure[s] I met with somewhat similar experiences, though none was s[o] disappointing as the failure of this, my first, *coup*.

Since the advent of the period indicated by the thorough an[d] complete recognition accorded to gelatine for studio work—few portrait photographers now working wet plates—I have looked upon what may fairly be called "instantaneous exposures" as a matter o[f] course, and I now rarely inform my sitter when I am making the exposure. I must say, though, that it has only been by dint of considerable practice, and by the exercise, I believe, of both tact and ingenuity, that at one and the same time such an exposure can be successfully made and a fairly-satisfactory expression obtained.

It is difficult to give any exact hints in this direction to those who have not thought over the matter; but I may say at the outset that when the sitter is taken unawares, it is by no means a matter of course that the portrait will please. In the first place, the photographer must study as well as he can, in the necessarily short space of time afforded him, the idiosyncracies of his sitter. He must watch the play of his features, and try to discover whether there be any pet expression that the sitter is in the habit of (what shall I say) "wearing?" If such there be, it is no use trying to "steal" a picture, for no other expression will please.

I happen to possess the good fortune of having a considerable number of members of the aristocracy among my *clientèle*, and, did good manners allow it, I could point to one of them—a most amiable and courteous gentlewoman—who seems to put on an expression and lay it aside just as an ordinary mortal would an easy-fitting glove. With such subjects it is, of course, useless to make "snap" exposures, with their concomitant wasted plates.

When, however, a less conventionalised face is before one a different course may be pursued, and a little study will soon give us an idea of what is likely to please. *En passant*, I need not say that it is almost essential that some little conversation be kept up or we get no play of features on which to form a judgment. A few quiet remarks may be made without the most *exigeant* sitter feeling there is either fussiness or forwardness on the photographer's part, the slightest feeling of that sort being sufficient, with some sitters, to cause them to retreat within themselves for the remainder of the sitting, and so to spoil such effect as we are seeking for.

Among what might almost be termed the canons of portraiture must be placed the advice—"Never take an adult with a pronounced *smile*." It is never liked, and, if only on account of the fact that it makes the mouth large, would be rejected by the majority of sitters. Few people know themselves (or, indeed, are known) as they are, and far less so with their features in expressive play.

The most experienced lover of horses failed to recognise the positions of the limbs in some of Mr. Muybridge's famous equine pictures; and, similarly, the most experienced physiognomist would fail to recognise some expressions of the human face if it were possible to arrest them, as it were, at any particular phase.

A little careful watching and studying, however, will soon impart to a portraitist of patience and ordinary intelligence some insight into certain channels through which the play of features may be said to run; then the matter becomes much easier, and the translating of the language of the features becomes so mechanical that the whole attention may be concentrated in the endeavour to distract the sitter's attention from the work in hand, without which success cannot be attained.

I can assure those who may happen to read my remarks that it will well repay a little extra care, study, and cost to cultivate the power to take portraits in this manner. It is worth while, if only for the sake of seeing the pleased surprise of the sitter upon being told it is all over when he imagined his "torture" had not commenced, and it is certainly worth while for the sake of the increased animation, combined with naturalness of expression, that a collection of photographs taken in this manner so overwhelmingly shows.

In conclusion: I may say I take it for granted that some mechanical mode of making the exposure is adopted. To see the hand steal up to the lens and furtively uncap would ruin everything. Some description of shutter, moved at a distance from the lens, should be employed; and, finally, the head-rest, as a matter of course, must be utterly abjured. G. Watmough Webster, F.C.S.

P.S.—I should like to take this opportunity of saying a word about the occasional correspondence and interviews which I, in common, no doubt, with other contributors to this Journal, occasionally receive. In the first place, I shall not feel insulted if anyone—a *stranger*—writing to me for information encloses a stamped

addressed envelope for reply. If I spend time in reading a letter and writing a reply I think it is worth the expenditure of a penny. Next, if anyone really wishes for my opinion, I would ask him to couch his letter in as few words as possible. Some weeks ago a perfect stranger wrote to me eight pages of closely-written MS., asking a number of questions that might have occupied a third of the space. I replied, and my answer occupied four pages. Up to this moment I have never received either acknowledgment or thanks. On a previous occasion I sent a small quantity of a certain chemical to another photographer who did not know where to get it. That also was never acknowledged. "You can't make a silk purse out of a sow's ear," says the old proverb; but he must be a very ill-bred fellow who could behave in this manner, and I trust such a one will not write to me again.—G. W. W.

LENSES FOR INSTANTANEOUS WORK.

No. I.

The subject lately under consideration at the Photographic Club—*The Best Type of Lens for Instantaneous Work*—has given rise to much interesting discussion, but it is too comprehensive to be settled summarily. Of course, as every one knows, the capacity of any lens varies according to the aperture with which it is employed; that with a large stop it will not cover, in the photographic sense—that is, give fair definition over—so large an area as when a smaller stop is used. The question, therefore, at once resolves itself into the proportionate apertures which the various types of lenses in the market will bear.

Here, at once, a practical difficulty arises, on account of the method which everyday use has been found the most suitable for mounting the different types of lenses, each in its own peculiar style. We know, for instance, the kind of work the rapid rectilinear or rapid symmetrical will do, with a large aperture—let us say of $\frac{f}{10}$. It would be extremely interesting to compare the results obtained by other lenses with the same ratio of aperture; but, from the way in which these lenses are mounted, the largest possible aperture is about $\frac{f}{15}$. Exact comparison, therefore, is impossible, unless a new mount is made. How few would dare to meddle with their portable symmetrical for such a purpose! They consider it is not rapid enough for their work, and therefore fall back on a lens of a more rapid type, but yet are hardly satisfied with the results.

The discussion naturally took the direction of the proportion of focus to length of plate, and here the opinion was unanimous that hitherto too great stress has been laid on wide-angle lenses; that too great importance has been attached to this quality; and that, while their value cannot be overrated in certain cases, the practice has been to employ them more than is fairly required for pictorial effect. A case in point where a wide-angle rectilinear lens is absolutely necessary is the Town-hall at Brussels. The hall is situated in a confined square, and its superb spire rises to a great height, so that it is absolutely impossible to obtain a picture of it except with a very wide-angle lens.

For ordinary work it was generally allowed that for artistic effect the focus of the lens ought to be at least one and a-half time the length of the plate, while Mr. W. K. Burton was of opinion that more would be better, and in many cases even three or four times the length of plate would not be found too much. This is the case in the greater part of instantaneous work, where, as a rule, the picture is really a "bit." For seascapes, for instance, where it is generally impossible to get near the principal object, it is hardly possible to have a lens of too long focus. For cattle, again, it is hardly advisable to get too near them.

Long focus, it is needless to say, means small angle of view, and, therefore, larger proportionate aperture; while, at the same time, if the objects are moving the *apparent* movement is less in the same time—that is, supposing a lens with an aperture of $\frac{f}{10}$ is used a longer exposure could be given with a lens of longer focus without blurring. Much advantage thus lies with the employment of longer-focus lenses for a large class of instantaneous work, although this is neutralised in practice by the fact that short-focus lenses are found to work with larger proportionate apertures than those of long-focus. The angles embraced by various lenses on different sized plates will be found in The British Journal Photographic Almanac for 1883, page 213, and may be summarised:—

Focus of lens	two-thirds of the length of plate	gives an angle of		74°
,,	same as	,,	,,	53°
	one and a-half time	,,	,,	37°
,	twice	,,	,,	28°
,	three times	,,	,,	19°
,,	four times	,,	,,	13°

The problem to be solved is, first of all, what relative aperture will each type of lens bear for each angle employed; and it is one which, although it appears simple enough at first sight, is fraught with difficulty.

Besides the one already mentioned of the mounts being so arranged that it is impossible to increase the aperture, there are two others:—1. The test subject: for the grouping of the various objects in a picture seriously affects the covering of the lens. 2. The standard of definition: this appearing to be almost insuperable. Very few people really agree as to what is sufficient pictorial definition, some having what amounts to a positive mania for microscopic sharpness in every detail, distance and foreground, while others, myself among the number, are satisfied with far less; but some, again, as the late Mrs. Cameron, aim at actual "fuzziness."

If even a standard of sharpness could be adopted it would still be difficult, for the field of no lens is really flat. If, therefore, say a row of houses were focussed for the centre, there would be a falling off of definition towards the edges, no matter how small the angle of view, while if focussed half-way between the centre and margin of the plate all would be fairly sharp. Focus, then, always for this part, and then the comparison will be fair. True; but is this accuracy practical? I am afraid not, for with a large aperture not only is there no real focus—except, perhaps, in the centre of the field—but the little errors of dark-slide register and personal equation might well bring the zone of approximate focus somewhat nearer the margin of the plate. The edges would thus be sharper than the centre; but, from long habit of looking to the corners for signs of want of definition, the weakness in the centre would run a risk of being overlooked, and thus a fictitious value be assigned to the lens in question.

If these difficulties were surmounted the task would still be a serious and heavy one, for each of the various lenses of the same type would have to be separately tested, it being well known that in practice a larger aperture can be employed with a lens of short focus than with one of larger focus of the same class or type. Such a table of the capacities of different lenses would be extremely interesting, but is quite out of the reach of any one person, unless he be a millionaire with plenty of time and energy ready to be devoted to it. Nothing of the kind has ever been seriously attempted, and, therefore, the comparative value of the different types of lenses in current use is at present very imperfectly known; hence the immense diversity of opinions prevalent on this subject.

The discussion ran principally upon lenses of the wide-angle and rapid rectilinear type, and the general opinion was that the performances of those of the rapid type were not satisfactory—so much so, that if gelatine plates had been in existence a few years earlier *this form would never have been created.*

The single lens was also the subject of conversation and pronounced quite capable of ordinary instantaneous work with gelatine plates, while superior in many respects for ordinary landscape work. The principal practical objection to its use was that the position of the stop, necessitated by its curvature, required the lens to be large and bulky. This is, no doubt, the case where a large plate has to be covered with a large aperture; but it no longer holds good when the single lens is only required to cover a small plate at a long range of focus. In this case the large lens is a serious inconvenience—not only for its bulk, but because it introduces an amount of diffused light into the camera which cannot but prove prejudicial.

George Smith.

IODIDE OF SILVER IN THE EMULSION.*

We (*Wochenblatt*) have received the following letter from Herr V. Schumann:—

"I have just received the number of the *Photographisches Wochenblatt* in which you publish a letter from Captain Abney. Captain Abney in that communication refers to my experiments with gelatino-iodo-bromide of silver, and also touches upon the results obtained by me with pure gelatino-iodo-bromide of silver, which are opposed to all the previous experiments of all experimenters, at least, so far as he is acquainted with them.

"Captain Abney holds firmly, according to his own words, by his former opinion; and feels the more justified in doing so that, since the first publication of my results, he has repeated his own experiments and always again obtained his previous results. Like Captain Abney, I am astonished at the difference between our experiments; at the same time on both sides many repetitions of the same experiments were submitted, and there can no longer be any question of an exceptional behaviour of the gelatine emulsion, such as, with Captain Abney, I was formerly inclined to assume.

"If I had not tested the spectral behaviour a thousand times; if I had not had at my disposal *various* spectral apparatus made at several of our

* Concluded from page 420.

best German workshops; if I did not know that my spectrographs work reliably, at least within the limits set by their optical bodies, I should today leave no means unused to acquire full certainty of the reliability of my work. But the material which, for this purpose, I have amassed beside me—I shall leave the spectrographs in your possession quite out of the question—forms too solid a basis for what I have said about the spectral behaviour of gelatine emulsion for me to be able to entertain even the slightest doubt respecting the accuracy of my results. And I must once more emphatically declare that here, as in every experiment, the conditions chosen by me for the method of preparation must be scrupulously adhered to.

"In order to render it possible for others to repeat, for testing purposes, my experiment, I have repeated, at least where it was of importance, the exact formula and given the method of emulsionising. I should have joyfully greeted similarly-minute details from Captain Abney, which would have allowed me to repeat his experiments; but up to the present hour I have to do without them. I shall, however, as soon as I have finished the preparatory work regarding which I wrote to you yesterday, address a request to Captain Abney that he would send me his formula. The repetition of the experiment would then soon bring to light the cause of difference; and if Captain Abney would undertake to test at the same time an emulsion prepared according to my formula, as repeatedly given in the *Photographisches Wochenblatt*, the results so obtained by us might be compared by a third person and published.

"In my opinion the spectral difference between Captain Abney's preparations and mine can only result from a difference in the preparation. If it were first ascertained, by comparison of our formula, wherein they differ from each other, it could not be difficult to discover the cause of the dissimilar behaviour with regard to sensitiveness.

"The very great effect different treatment exercises upon the sensitiveness to colour of emulsion, can hardly be better illustrated than by my series of spectral views taken with mixed preparations, and with preparations digested after mixing. On that account I should almost desire you to send *these* spectrographs to Captain Abney. Should you do so, then be sure to mention particularly that the emulsion for these plates was poured *unfiltered* and *unwashed*, and that the washing was done afterwards. Without a remark to that effect it would be difficult to explain the very middling cleanness of the gelatine surface.

"I am looking forward with lively desire to the moment which will take me back into the laboratory. At present I am completing my quartz-calcic spar apparatus, by Moser. As I mentioned, I am making a revolver of prisms. When once the revolver is finished I shall be able to take on the same plate, in rapid succession, the spectra of different sources of light by means of prisms of calcic spar, quartz, rock salt, and flint glass, by using lenses—1st, of quartz and calcic spar; 2nd, of quartz; and 3rd, of crown and flint glass. A few tentative experiments, which have just been made, lead me to count upon some interesting results. I should like you to let the above appear in the *Wochenblatt*."

To the foregoing (says the *Wochenblatt*) we have nothing to add. It agrees so completely with our opinion, as given in the last number, that we can only express our satisfaction at the mode chosen by Herr Schumann of bringing the difference to an impartial decision. We do not think the result can be doubtful to the readers of the *Wochenblatt*.

PHOTOGRAPHIC ADJUNCTS.

A New Electric Light.

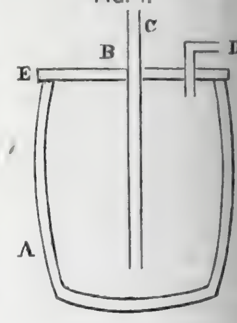
Among the novelties having a probable influence in the future upon photography is a new invention by Mr. Frederick Varley, of the Mildmay Park Telegraph Works, London, which threatens, when a few minor difficulties are overcome, to really reduce the cost of the electric light below that of gaslight, of which otherwise I see no prospect at present in all those cases in which small lamps are used for the illumination of ordinary rooms and other small spaces.

In the incandescent electric lamps a fine flexible filament of carbon, enclosed in a vacuum tube, is made white hot by the electrical current. Mr. Varley also uses flexible filaments, but in a thick, rope-like bundle, and he burns them in an arc lamp. The result is curious and novel. Instead of the dazzling point of light, emitting rays from a very small area, and looking like a brilliant star, the Varley light is more like a planet, presenting a disc of appreciable diameter. Another feature is that the space between the two filamentary carbons is so heavily charged with ignited carbonaceous matter that the total electrical resistance of the circuit is considerably reduced, so that many more lamps than those containing hard carbons can be put in the circuit, and worked without any increase in the amount of electrical power. Another novel feature is that most of the luminosity comes from the arc itself and not from the ends of the carbons; whereas in the present arc lights the luminosity comes chiefly from the ignited ends of the hard carbons, and not from the intermediate arc. The carbons do not burn into large cups and cones, but burn away flat at the ends; nevertheless Mr. Varley thinks that the usual cups and cones are there, at the ends of the fine filaments. He has not, however, been able to see them under a microscope. The filamentary carbons are flexible; those as thick as a cord can be twisted round the finger. The inventor can wind his carbons on a wheel, and pay them out by clockwork or otherwise to feed the light. The light is a noiseless one, the hissing due to the tearing away of particles from the ends of the hard carbons being absent. When the power is too weak a slight noise is made now and then, like the "cry" of a diamond when cutting glass.

The diameter of the Varley carbons has to be regulated according to the strength of the current, otherwise they burn away somewhat rapidly; but Mr. Varley informs me that when the carbons are properly proportioned in dimensions to the current they burn away more slowly than hard carbons. The luminous arc between the filamentary carbons is remarkably sensitive to the action of a magnet, being easily deflected thereby. The chief objection, so far as I know, to the new electric light is that the arc being a good conductor the carbons require a greater range of "play" in the matter of distance from each other than is the case with the present arc lights; hence a special lamp has to be devised to burn the carbons to the best advantage, and there are, consequently, difficulties to be overcome. As these difficulties, however, are merely mechanical they are not likely to exist long without being surmounted.

To make the carbons, Mr. Varley takes pieces of rope or of plaited cord, soaks them in paraffine or crude ozokerite—an inexpensive fossil wax—and carbonises them in a crucible filled with hydrocarbon vapour, to prevent the attacking of the materials by the hot oxygen of the air. The rope is put in the crucible A (*fig.* 1.), the top of which, E, is cemented on, and the whole covered with Stourbridge clay to protect the pot from destruction by the intense heat. A current of coal gas is kept constantly flowing down the pipe C, and it escapes by the bent pipe D, whence by means of additional tubing it is carried to the bottom of the coke furnace, and burnt there to contribute to the heat thereof. The firing is continued for ten or twelve hours, and the heat is intense enough to soften wrought iron to a plastic state—slightly below its melting point. Thin pieces of wrought iron laid between pieces of rope in the melting pot have in some cases been so softened as to receive impressions from the carbonised fibres, as if the iron had been soft wax.

FIG. 1.



Standard Apparatus for Governing Photographic Exposures.

Mr. Leon Warnerke has done much to render photography more scientific by the introduction of fixed units of measurement, and recently I had the pleasure of seeing his apparatus for measuring the duration of the exposures given by various shutters, when he exhibited the apparatus at the Photographic Club, Ashley's Hotel, Covent Garden.

It occurred to me at the time that standard apparatus to govern the exposures given by shutters, so that the operator can give what exposure he likes, measured even to hundredth parts of a second, might be made on the principle of the chronograph used at the Royal Observatory at Greenwich to indicate the time of the transit of stars. The extreme accuracy just stated cannot be obtained in recording transits, because a human observer is an essential part of the instrument when the latter is in use, and impulses take time in transmission along the nerves; indeeed, scarcely two observers are alike in this respect, one man's nervous system being usually quicker or slower in its action than that of his neighbour. In my proposed application of the principle of the chronograph to the regulation of exposures given by lens shutters, no human nerves take part in the operations.

FIG. 2.

Let A B (*fig.* 2) be a slip of paper pasted round the flat outer edge of a large wheel, moving in the direction A B, and driven at a uniform rate by clockwork. Let D be a little pricker on the armature of an electro-magnet, round which magnet a current is sent automatically by clockwork, say every tenth of a second, so that the pricker is brought down on the paper every tenth of a second, making dots on the paper at regular intervals, 1, 2, 3, 4, 5, 6, and so on. Let E be a fixed metallic straight thin piece of metal with good spring in it; this piece of metal does not quite touch the paper, a small space being left between the two. Suppose it be desired to give a thirtieth of a second exposure to a plate, put two metal studs in holes at F H, so that as they pass round they shall each in turn touch the metal spring and thereby complete each time an electrical circuit, the first one of which shall open the shutter, and the second close it. The distance F H being one-third the distance between the dots 2, 3, the time of exposure given is necessarily one-thirtieth of a second by accurate measurement. Drive the wheel at double the velocity, or put the peg H midway between H and F and the exposure given is one sixtieth of a second. In this suggestion points of detail have been left out, the necessity for which in a working machine is obvious. A mechanical arrangement would have to be made either in the wheel, spring, or shutter, so that two impulses only can be given by the studs, and that another exposure cannot be given to the same shutter by the next revolution of the wheel. The use of the pricker D is to show that the clockwork is driving the wheel steadily at the exact time of the experiment, as well as before and after.

If the Photographic Society of Gr at Britain be establishing standar s measurement, something of this kind might be useful to regulate ort exposures, and accurately test the relative rapidity of dry plates.

W. H. Harrison.

ON THINGS IN GENERAL.

he ingenuity of counsel in the late copyright case is certainly to be raised, even though it has been in the service of wrongdoing. Yet it almost singular that the contention has not been before raised, in the bsence of any rule to the contrary, as in the new Copyright Bill, that the roprietor of a large photographic establishment employing operators do the work is not the author of pictures produced in his studio, nd so is unable to register the picture as his own work in the manner ie present Act requires. As the Judge found for the defendants on his point he was not called upon to decide upon the other ingenious lea raised, namely, that the place of business was not the dwelling-ouse of the holder of the copyright. It is all very hard upon photo-raphers in a large way of business, and at first sight it seems difficult o see a way out of the difficulty. I suppose, however, it will end in ie operator registering any special picture in his own name, and then, fter registration, assigning the copyright to his principal—a round-bout, and by no means pleasant, way of doing things. One would almost hink the plaintiffs will appeal against the decision, except for the fact hat law is such a costly amusement; how costly those only know who ave indulged in it. Should this decision rule other similar events, it s to be presumed that copyright in all pictures produced under like onditions will be non-existent, and that, therefore, the pirates may iake complete use of them without let or hindrance.

There is, however, one thing the "land-sharks" cannot seize, and hat is the spirit of Mr. Harding Warner's ethereal productions—orks possessing such a subtle essence that the grosser perceptions of he Editors of this Journal fail entirely to perceive it. It is not given o every one to be so impregnated with that intensely-vitalised prin-iple as to become sensible of those mysterious entities, assuming hromatic characteristics, with which Mr. Harding Warner and his iends are *en rapport*. It is the fate of some people to end their days ithout public recognition of their peculiar powers, the possession of hich must be patent to all who read that gentleman's views on the olarities, or the true vitalising "Od" of our daily psychological xperiences.

The subject of hydrokinone seems to have taken a decided hold of xperimenters both on this and the other side of the Atlantic, papers pon its action having been read almost simultaneously in America nd in various parts of this country. It is in no small degree singular iat a chemical of apparently so much promise should have been so ttle experimented upon since Captain Abney first introduced it to the otice of photographers. Mr. E. Banks's idea of not only reading a aper upon, and detailing his own experience with this chemical, but giving also samples to various members of the Liverpool Amateur hotographic Association to try for themselves, is worthy of all commen-ation. Some time ago I purchased a quantity of the material myself, nd not remembering the exact details as to its use, referred to the idexes of my volumes of photographic literature, but found them seless; no reference whatever to any place where I could glean a rmula was to be seen. I am ashamed to say that bottle of hydrokinone es on my shelf now still unopened.

To return again to questions of law and photography: I was struck he other day to think that of the countless thousands of club pictures xecuted during the last half-dozen years there had been so little litigation n connection with them. The particular case that caused my thoughts o run in this vein was that Belfast one, where a photographer would ot send in his enlargements till his client had paid an extra half-guinea r enamelling the small copies. A bargain is a bargain, and if the man ad elected to have his enamelling done the photographer had a right o insist on total prepayment. No one knows better than a photo-rapher the shifts a person will resort to for the purpose of avoiding ayment of photographs he has had taken, so many people appearing o be under the impression that a photograph is returnable like a pair f boots not approved of. Practically, where is the remedy in such a ase, when prepayment has not been insisted upon?

Messrs. Brown, Barnes, and Bell, if not the heroes of a hundred ghts, are yet the heroes of a hundred-times' told tale, the episode of ieir photographer and the elephant having been described in many ores of publications. Could not they make extra capital of the icident and have the elephant photographed in the act of demolishing ie camera? I make them a present of the idea.

Wet-plate work is by no means so "played out" as might be iagined. The other day, at a meeting of the North Staffordshire hotographic Association, there was evidently a very strong muster of et-plate men to the fore, and the discussion on the merits of the two rocesses led to the giving of a challenge by the wet-platers to the dry for ie two parties to take a view under identical conditions. The challenge as accepted and the day fixed, so that I may have more to say at some future period upon the subject. One enthusiast of "wet" recorded his experience that, working alongside a friend using "dry," he (the wet-plate man) got three good views to the other's two! This, however, was in the early days of dry-plate work.

Free Lance.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

HAMILTON, CADZOW FOREST, BOTHWELL CASTLE, &c.

The tourist making his head-quarters at either Edinburgh or Glasgow may spend a pleasant and profitable day in and around Hamilton, the ancient capital of the middle ward of Lanarkshire, an hour and a-quarter by rail from the former city. Hamilton owes its importance mainly to its proximity to the palace of the Duke of that name—a structure more huge than beautiful, and hardly worth a plate from an artistic point of view. Until quite recently it contained a collection of paintings and objects of *vertu* probably unequalled by any private collection in existence, but which now, alas! as all the world knows, has been brought to the hammer and scattered over many countries.

Probably the first thing deserving the attention of the photographer is the magnificent and, perhaps, unique mausoleum erected by the late Duke, and which contains his remains in a sarcophagus brought by himself from Egypt. It stands in the palace grounds within a few minutes' walk from the town; and the intending visitor should apply to the Duke's chamberlain for an order, which, on being presented to the keeper, who lives in a cottage close at hand, will secure prompt and courteous attention. If the light be at all suitable one or more plates should be exposed on the exquisitely-beautiful door—an exact copy of the celebrated "Ghilberti gates" of the Baptistry of Florence, with the exception of the two upper panels, which had to be left out in consequence of the smaller size of the door.

If the tourist be sensible enough to be satisfied with light, portable apparatus, he should walk a distance of a little over a mile to reach Cadzow Forest, celebrated for its ancient oaks—so ancient as to have been part of the Caledonian forest which extended through the south of Scotland, and are probably old enough to have sheltered the Druids in the practice of their rites. At the entrance to the forest, which, in reality, is a part of the Duke's park, is the quaint Barncleuth—a favourite object with artists of the brush; and which, in combination with a picturesque old well in the foreground, has been again and again an object of attraction on the walls of the Royal Scottish Academy.

Next to the ancient oaks, the great attraction of Cadzow Forest is the famous breed of Scottish wild cattle, the undoubted descendants of those who inhabited the country in Druidical times. They are white, with black muzzles, horns, and hoofs; and, although at times ferocious enough, are not on the whole aggressive, but are fairly amenable to the drop shutter. It is, however, difficult to get anything like artistically-composed pictures of the cattle, as they seem to have inherited the Scotsman's habit of "setting his face to the foe." On the approach of a stranger they at once "dress into line," with the oldest bull at one end, and show a dogged determination to maintain the position at all hazards. They are, however, so utterly unlike any-thing that can be seen anywhere else, that a little patient perseverance is well spent; and, especially if the aid of one of the keepers can be obtained, some unique pictures may be easily secured.

On the edge of the so-called forest and on the banks of the Avon is the picturesque ruin of Cadzow Castle, the ancient residence of the Hamilton family. Very little of the building remains, but the tourist possessing an artistic eye will readily find subjects for a number of exposures in the combination of glorious trees, glistening ivy, and brawling torrent which this romantic place affords.

Within a few minutes' walk of Cadzow Castle is Chatellerhault—a comparatively modern building, intended to be a *facsimile* of the beauti-ful residence on the estate of that rather unpronouncable name in France which formerly belonged to the ancestors of the Dukes of Hamilton. A plate or two may be spent on this in passing, and then the tourist should return to Hamilton, from whence, if he have not had sufficient work for one day, he may either walk or hire a carriage for a few shillings and proceed a mile and a-half to Bothwell Bridge, the scene of the famous battle between Monmouth and the Covenanters. The bridge, as it stands at present, includes merely a small portion of the original structure, and is only worth a plate or two in consequence of its historical associations.

Bothwell village and church may be passed, and the tourist should proceed on at once to Bothwell Castle, about a mile and a-half farther. The space at my disposal is far too limited to admit of anything like a description of this, in my opinion, the grandest ruin in Scotland. Its early history is unknown, as the first notice of it is that it was the residence of Murray of Bothwell in the time of Sir William Wallace.

Although I have brought the tourist to Bothwell Castle at the close of the day, he will really find work, if so inclined, on it and its environs for several days; and I have no hesitation in saying that,

although Hamilton had no other attraction, a photographer who can appreciate the picturesque, select the artistic, and delight in historical reminiscences, would, if he only knew it, gladly undertake a long journey to secure by the aid of his camera, "counterfeit presentments" of these historical remains, with their charming pictorial surroundings.

JOHN NICOL, Ph.D.

FOREIGN NOTES AND NEWS.

A GOOD KEEPING, READY-MIXED ALKALINE DEVELOPER.—CARLO RELVAS' METHOD OF DEVELOPING PLATES.—"FESTIVE LAYS" OF THE BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.—FADING OF PHOTOGRAPHS.—A NEW LANDSCAPE PROCESS.

THE following is the substance of the communication recently made to the Berlin Association for the Cultivation of Photography, by Herr Benecke, of St. Louis:—While the usual chemical dry-plate developer must always be freshly prepared by mixing two fluids, and is rapidly decomposed by oxidation, so that it is not available for successfully developing several plates in succession, a developer like that now shown, prepared by the formula of Mr. Cramer, of St. Louis, may be mixed and stored for months (in well-corked bottles, of course) without its capabilities suffering. Herr Benecke himself had, in the course of the voyage from America, developed a picture with some six-weeks'-old developer, and a couple of weeks later still the editors of the *Mittheilungen* successfully employed the same developer. The composition of the developer contains, as essential ingredients, pyrogallic acid and sulphite of soda. Some time ago, in his *Progress of Photography*, Dr. Vogel pointed out the keeping qualities of a developer made by mixing these preparations; still pyrogallic acid should score another honour by the introduction of this interesting developer. Its composition is—

Crystallised sulphite of soda	9	grammes.
Bromide of ammonium	1·5	,,
Bromide of potassium	4·5	,,
Pyrogallic acid	6	,,
Dissolved in water	96	c.c.
Sulphuric acid	12	drops.
Strongest ammonia	9	c.c.
Water	21	,,

The solution must be stored perfectly well corked. To develope a normally-lighted plate one volume of developer is diluted with eleven volumes of water; for under-exposed plates take one volume of developer to three to six volumes of water; in case of over-exposure one volume of developer to twenty of water. Usually the 1:11 developer is poured on, and should the shadows appear too quickly it is rapidly diluted with water; but if they are too slow in coming more developer must be added. The addition is best made at one corner of the flat developing dish to which the fluid is allowed to run. The developer, when once it has been diluted, may be poured into bottles, corked up, and used over and over again as long as it remains clear. The editors of the *Mittheilungen* considers the above formula specially adapted for Cramer's plates, for on the plates upon which they tried it (Schippang's, Monckhoven's, and Vogel's) it acted so as to produce too hard and over-intense pictures; but that might easily be avoided by reduction of the bromine salts, which is to be the point in view in future experiments.

Herr Carlo Relvas' manner of developing gelatine plates is to lay them first in old ferrous oxalate developer, then in a freshly-prepared developer, and, lastly, back into the old. He maintains that in this way he secures more powerful plates, and that the development proceeds with more regularity. The editor of the *Mittheilungen* says that the commencing the development with old ferrous oxalate, which is continued until the lights have made some progress and the completion of the development with fresh developer, is also usual in Berlin. Herr Schwartz has long proceeded in this way with landscapes, and especially recommends it for flat plates.

Festive Lays of the Berlin Association for the Cultivation of Photography is the title of a recently-published booklet, in which are collected the numerous humourous and other poetic compositions having a photographic bearing which have from time to time been sung at the banquets of the Association for the Cultivation of Photography. The principal lyrists represented are Herr E. Linde and Dr. Jacobson. Some of the *Lays* have already found their way to America, where they are much appreciated by the German brethren of the craft. The volume is dedicated to Professor H. W. Vogel.

Dr. J. Schnauss, in dealing with the fading and yellowing of photographs, runs rapidly over the causes—faults in the *picture* itself, in the *mount*, and in the *mountant*. The experiments of others (particularly of Dr. Vogel with mounts and mountants) are recapitulated, but most of them are familar to the readers of these pages, though the following may not be so:—Further: there is almost always a remnant of acid (sulphuric acid) in the paper and also in the mount. Feichtinger's experiments showed that in a sheet of each of three different kinds of writing paper 0·0025, 0·0016, and 0·0018 of a gramme of anhydrous sulphuric acid was contained. Perhaps this is derived rather from the alum or aluminic sulphate used in sizing the paper, and which is decomposed by the plant fibres in consequence of the contraction of th surface, than from the so-called "antichlor" (hyposulphite of sod with which paper is treated to free it from every trace of the chlori used in bleaching. Paper sized with *resin* always gives an acid reactio when moist blue litmus paper is pressed between two pieces of it, whi that sized with *animal* glue gives no such reaction. Such paper ma be macerated with strong alcohol, and, after evaporation, the residu precipitated with barium salts; aqueous extraction is insufficient. Th free sulphuric acid renders both the paper and the cardboard ver brittle.

M. de Saint-Pol-Lias—known by his journeys of discovery in Malacc and New Zealand—relates in a French newspaper how photography i represented by the natives in the wilds of the latter country. On native, who had often observed how M. de Saint-Pol-Lias took land scapes, explained the enigmatical procedure to his countrymen thus:- The white man makes pictures of our country. Where it suits him h stops, looks at the landscape with his large eyes, and swallows the pic ture down, and while doing so he makes dreadful grimaces. He the sticks his head into a bag, retches violently, and spits the formerly swallowed picture of the landscape against a piece of glass, of which h carries a considerable number about with him. He then washes th piece of glass so that the picture may remain fixed upon it. This pro cess, says the person who reports it, is specially worthy of recommen dation for use during long journeys on account of its simplicity. Th traveller would then only need to take with him a number of glass plates a bag, and a sufficient quantity of tartar emetic or some drug of simila action. The introduction of the process in portrait photography, espe cially into high-class studios, would, however, not be altogethe unobjectionable.

RECENT PATENTS.

APPLICATION FOR PATENT.

No. 3,584.—"The Framing, by Simpler Means than at Present in Use, of Photographs and Other Small Pictures." J. F. COOKE.—*Dated July* 21, 1883.

PATENTS SEALED.

No. 393.—"Improved Photometer." ALFRED JAMES BEER.—*Dated January* 24, 1883.

No. 748.—"Improvements in the Manufacture of Bichromate of Potash." J. H. JOHNSON.—*Dated February* 10, 1883.

BELGIUM PATENT GRANTED.

"Production of an Intense White Light." C. CLAMOND, Paris.—*Dated June* 20, 1883.

GERMAN PATENT GRANTED.

"A Polar Planimeter with Free Suspension." F. HOFFMAN, Bamberg and G. CORADI, Zürich.—*Dated March* 15, 1883.

AMERICAN PATENT.

"Plate Holder for Camera." MATHIAS FLAMMANG, Newark, N. J.—*Dated May* 27, 1882; *granted June* 26, 1883.

ALLEGED INFRINGEMENT OF COPYRIGHT.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.

Before the Master of the Rolls and Lords Justices Cotton and Bowen.

NOTTAGE AND ANOTHER *v.* JACKSON.

THIS case (full particulars of which we have previously given) came on for hearing on Tuesday last, being an appeal of the plaintiffs from the judgment recently given by Mr. Justice Field at the trial of this action in the Court of Queen's Bench. The plaintiffs, who trade as the London Stereoscopic Company, at Cheapside and Regent-street, sought to restrain the defendant from infringing their copyright of the "Australian Cricketers" taken in June, 1882.

As previously stated, the manager of the Regent-street branch arranged with the captain of the team to photograph them at the Oval, and one of the operators of the company, Mr. Reynolds, took the negative in question, which was sent to Barnet, where the prints were made. The photograph was duly registered at Stationers' Hall, the names of the plaintiffs being entered as the authors and proprietors. An objection was taken at the trial that the plaintiffs were not the authors, but Reynolds, who took the negative, and that there was no ground of action. Defendant contended that the person who took the negative was the author, and in him alone was invested the copyright. The plaintiffs contended that they were the authors, but the defendant responded that they were proprietors only. Mr. Justice Field at the trial took this view of the case, and entered judgment for the defendant.

Mr. Petheram and Mr. Shortt appeared for the appellants, Mr. Bell and Mr. Crump for the respondent.

Their lordships, at the conclusion of the arguments, said they would take time to consider their judgment.

Contemporary Press.

STELLAR PHOTOGRAPHY AT HARVARD.

[NATURE.]

r the meeting of the Astronomical Society, which was held on June 8th it, Professor Pickering, of Harvard College Observatory, so well known · his stellar observations, and who is a Foreign Associate of the Society, tended and gave an interesting account of the work which has been done ıring the past few years at his observatory.

Some few years ago Professor Pickering took up the work of determining e intensity of the light of the principal stars by eye observation, without king the question of colour into consideration—work which has been ready dwelt upon in this journal. For this purpose he used a photoeter, completing his observations, which number some 90,000, about a ear ago, and a large part of his results are already in print. The published sults of the more important investigators of star magnitudes, from the me of Almagest and Lûfi, have also been reduced. Sir W. Herschel's servations, which appeared almost a century ago in the *Philosophical ransactions*, have likewise been taken in hand at Harvard Observatory nd completely discussed. Sir John Herschel's works, the *Uranometria ova*, the *Durchmusterung*, as well as many other works in the same field, ave also been made use of in preparing the Harvard Catalogue, which ierefore shows those cases in which the photometric observations carried it by Professor Pickering differ from the results obtained by other obsers, when their observations are reduced to the same system. These eye servations of stars having been completed, Professor Pickering, in connection with his brother, Mr. W. H. Pickering, has taken up stellar photoaphy from the same point of view. By this means a comparison is obined between the brightness of the star as seen by the eye, and its brightess as determined by its greater or less action upon the photographic late; and by a comparison of photographs taken on different nights any ariation in brightness may be detected; whilst the exact positions of stars ay, of course, be more accurately and permanently recorded than by eye servations. Mr. A. A. Common recently, by taking photographs of the ebula in Orion on different nights and comparing them, has thus been ble to detect a probable variation in one of the stars in the nebula, and in 358, Professor George P. Bond, by measuring the diameters of stars in hotographs, was able to determine the relative brightness of the two stars hich form the double ζ Ursæ Majoris.

But the work at Harvard University was to do more than this. The ars which Professor Bond examined were close together. Professor 'ickering wished to compare stars far removed from each other. For this urpose the ordinary method of stellar photography, by which photographs re taken at the foci of large telescopes, would not suffice. These photoraphs only comprise a small region of but one or two degrees in diameter. different method was therefore employed in the Harvard observations. wholly different form to the ordinary equatorial telescope was used. It not unusual to construct photographic cameras to take pictures of buildngs which subtend an angle of 60° or even 90°. But when applied to the tars, however, the images at the edges are very poor, and only very small pertures can be used. It has, however, been found that some of the best nses for pictures can be obtained covering a circle of 20° diameter without erious distortion, and, at the same time, large apertures can be used, thus educing the time of exposure. In order to still further this work, Mr. W. H. 'ickering investigated the sensitiveness of various photographic plates, nd obtained some so sensitive that stars of the fifth and sixth magnitude ave been photographed without using clockwork, they forming dots or naking lines, as their images pass across the photographic plate, the length f these lines depending of course upon the time during which the plate is xposed. If the plate be exposed during ten seconds a distinct dot is obained, whilst an exposure of thirty seconds causes a short line to be formed. 'he plates used at Harvard Observatory are six by eight inches. They are ivided into six equal parts, each part being in turn exposed. By this neans six regions of the heavens, each about 15° square, may be photoraphed on one plate; and by a variation in the dot and line system emloyed, sometimes taking the dot and sometimes the line first, three ictures may be taken on a single division of one of the plates without iving rise to any confusion. Instead of simply six, therefore, eighteen hotographs are taken on one of these plates, so that on a single plate a ortion of the heavens of more than three hours' right ascension, and exending from 30° S. to 60° N., may be included. Since each portion of the late covers a region of about 15°, the camera mounting has a series of otches or stops, by which it may be instantly moved through that amount ither of right ascension or declination.

When photographing the following is the exact method employed:—The irst exposure takes the region between 30° and 15° south declination, and etween one hour and a-half and half-an-hour west of the meridian. First, he plate is exposed for ten seconds, and each star records itself by a dot. 'he plate is then covered for ten seconds; next, it is exposed for a period f thirty seconds, and each star makes a line on the plate. By means of he clamping arrangement to which we have referred the plate is then noved through one hour in right ascension. This takes up the remaining ew seconds of the minute, so that the taking of the next photograph egins with the first second of another minute. The camera is then on the neridian. The same part of the plate is again exposed, and in order to disinguish this series of stars from those first photographed, this time the plate s exposed first during thirty seconds, and then during ten, so that the esult is a line followed by a dot. This gives the second series. But the ame portion of the plate may be again used. The remaining ten seconds f the second minute, like those of the first, are spent in moving the camera hrough another hour of right ascension. Then a fresh exposure is made or thirty seconds, a line simply being obtained without a dot, and this ompletes the series. The first class of images is in dots and lines, the second in lines and dots, the third is recognised by the presence of lines alone. The thirty seconds which remain of the third minute are employed in exposing a second portion of the plate, and changing the position of the camera, which now takes in the region from 15° S. of the equator. The same process is then gone through again, three exposures as before being made in three different positions of right ascension. By continuing this process, taking three photographs on each of the six portions into which the plate is divided, the whole region included between the declinations of −30° and + 60°, and between three hours of right ascension, one and a-half hour on each side of the meridian, being one-eighth of the whole heavens, excluding the circumpolar stars, will be photographed on one plate, the whole operation occupying but eighteen minutes. With regard to those stars in the vicinity of the Pole, some other method will have to be adopted. Thus much for one branch of the work—and an important branch—carried on at Harvard Observatory.

Another portion of their work consists in the preparation of a photographic map of the entire heavens. The method just described, in which clockwork is dispensed with, only enables those stars whose magnitude is not less than five or six to be photographed, and stars of a less magnitude than this must, of course, be included in a map of the heavens. The camera in this work, therefore, is driven by clockwork. By this means stars of the eighth magnitude record their images on the photographic plate, and as many as 200 are visible in the paper print within a circle of five degrees in diameter. A photograph taken in this way of a portion of the constellation of Orion, besides showing the three stars of the Belt and the Sword-Handle, gives an interesting picture of the nebula.

With reference to the question of the colours of stars it is interesting to note the faintness of α Orionis in the photographs. To the eye its brilliancy is almost as great as that of β, whilst in the photograph it is not more prominent than λ. The reason is to be found in the colour of α. It is a red star, and consequently makes but little impression on the photographic plate.

Again, in the constellation Cetus the three stars which are brightest to the eye are α, γ, and δ; α, which is the brightest of the three, has close to it a very faint companion, scarcely visible to the naked eye, its magnitude being given as 6·3, whilst that of α is 2·7. This is the appearance of this part of that constellation as seen by the eye. A photograph of this region was taken at Harvard with the result that the small star is seen in the photograph nearly as bright as α, it being only three-tenths of a magnitude less. The colour of these stars again explains this, α being of a reddish tint, whilst the small star is of a deep blue colour, and being so the rays which flow from it have a greater influence on the photographic plate. A comparison of the number of stars seen in the photograph of Orion with the number in the photometric catalogue, further illustrates this effect of colour. In that part of this constellation included between 5° north and 5° south declination, and 75° to 90° of right ascension, sixteen stars were common to photograph and catalogue; a like number, being either too small in magnitude or too red in colour, although catalogued, remain unrecorded on the photographic plate; whilst five others seen in the photograph are not given in the catalogue. A reduction has been made of the results given by the plates of different makers, with the view of ascertaining the value of the deviation. In two of such plates the average deviation was 0·21 of a magnitude, and in two measurements of the same plate it was found to be 0·07 of a magnitude.

It is obvious from this account of the work at Harvard that star photography is entering into a new phase, and one which will entirely replace the present system of eye observations, for the reason that, whilst the eye is so variable, photographic plates may now be obtained, doing their work with almost definite wave-lengths of light. The constant record of the plate must in time, therefore, be preferred to observation by the variable eye. At the same time as photography advances, if it be considered necessary to obtain photographic star maps to record the observations of the average eye, there will be no difficulty in this being done.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 1	Benevolent	181, Aldersgate-street.
,, 1	Halifax	*Courier* Office, Regent-street.
,, 2	London and Provincial	Masons' Hall, Basinghall-street.
,, 2	Leeds	Mechanics' Institute.
,, 2	Bolton	The Baths.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

THE usual monthly technical meeting of this Society was held on Tuesday last, the 24th instant,—Captain W. de W. Abney in the chair.

Some cabinet-size photographs were produced, the work of an American photographer, and a letter, in which he requested the opinion of the Society upon his work, was read.

The SECRETARY was directed to write informing the photographer that it was not within the province of the Society to express an opinion as requested.

The CHAIRMAN reported that since the last meeting there had been two applications from instrument-makers to be informed of the particulars of the Society's standards as fixed by the Lens Committee, and suggested that that committee should consider the desirability of having papers printed to be forwarded in reply to all such requests.

Mr. G. L. Addenbrooke produced a negative of a flash of lightning taken during a recent night storm. He had set his camera to the focus required for distant objects, and observed the quarter of the heavens from which the flashes appeared to be coming. Pointing the camera in that direction, he waited till the next flash came and then closed the dark slide.

Mr. A. Cowan remarked that the light from lightning flashes was so powerful that he had fully printed a transparency at about midnight by exposing the plate under a negative, one of ordinary density, to the light from two successive flashes.

Mr. Leon Warnerke inquired whether anyone had had recent experience of emulsion making during electrical disturbances, and whether or not the emulsion was spoiled in consequence.

The experience of the Chairman, Mr. Cowan, and Mr. W. E. Debenham was that they had not found emulsion in any way affected by the recent stormy weather.

Mr. Addenbrooke remarked, with reference to the complaints that had been made of the effect of electrical disturbances upon gelatine emulsion, that such disturbance was generally accompanied by conditions of weather that were peculiar in other respects.

The Chairman inquired whether anyone could say how transparencies on gelatine films for window decoration could be preserved from the effect of damp. He had found them to tarnish decidedly after only two or three months' exposure, becoming brown round the edges. He also said that this experience was not his own merely—that a photographer in his neighbourhood whose storing place was somewhat damp had found his unvarnished negatives exhibit a similar deterioration.

Mr. Cowan said he had found no change in transparencies which had been exposed in windows for two or three years, and which had received no particular care beyond being covered by glass, to the edges of which they were attached by a paper binding.

Mr. Debenham suggested that the different results might be caused by the presence of a greater or less amount of gas vapours in the apartments in which the transparencies were kept.

Mr. W. Ackland suggested exposing a transparency to an unusual amount of moisture by keeping it in a fern case, to see what staining effect would be produced.

Mr. T. Sebastian Davis raised a question to which he had referred at a former meeting—Is it possible to prevent halation entirely when photographing a difficult subject, such as dark foliage against the sky, by merely coating the plate more thickly with emulsion, and, if so, what is the guide as to how thickly to coat; then, if this *be* possible, is that the best way of producing the desired result, or should backing be employed in preference? He used twenty-six grains of nitrate of silver converted into bromide and chloride, and thirty to forty grains of gelatine to each ounce of emulsion.

The Chairman thought that no plate could be coated so thickly as not to show black printed matter through when laid upon it; and if any trace did show through, the coating would not be thick enough to prevent halation entirely under trying circumstances.

Mr. Ackland said the time of boiling so affected the transparency of the emulsion that very much would depend upon that. He also said that ammonio-nitrate emulsion was so much less opaque than that which was made by the boiling process, that it cost considerably more for silver than the latter, if the plates were to have equal body.

Mr. Warnerke said he had no fixed rule as to how much gelatine to use in emulsion. He coated a plate and examined it. So long as a flame could not be seen through the film whilst wet, he considered it coated densely enough. If the emulsion seemed to be unusually creamy in character he added more gelatine to it. As to which was better—thick coating or backing—he thought it best to coat thickly, and then for difficult subjects to add backing.

Mr. Davis used as backing a coat of burnt sienna mixed with as little dextrine as would hold it together. He preferred to back before coating so as not to expose the coated plate unnecessarily to light. With plates thus backed first, the pneumatic holder was not used, but they were coated on the hand.

Mr. W. England did not for his own use find it necessary to back his plates, but when they were to be backed, it was convenient to lay them for the purpose in the ordinary screw-plate cleaning-frame.

Mr. P. Mawdsley said that black carbon tissue squeegeed on with glycerine, so that it could easily be removed and used again was, provided the plates were employed at once, an excellent backing; so was collodion stained with aurine.

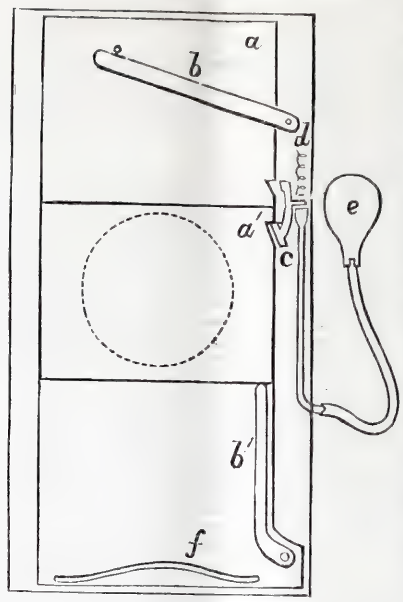
The Chairman remarked that if aurine were used it stained the film unless the plate were soaked before developing, and many objected to this soaking. The plan with carbon tissue was good, and so was the use of asphaltum dissolved in benzole.

Mr. Warnerke said that the moist colour supplied by artists' colourmen in tubes contained just the proportion of gum and glycerine to make a good backing. Another excellent backing was paper which had been coated with colouring matter and gelatine, and just so much glycerine that it would dry soft. This could be squeezed on to the back of the plate without being wetted, and was easily stripped off.

Mr. Davis inquired what was the largest quantity of silver now used in emulsion by those present.

The Chairman said that equal parts of nitrate of silver and gelatine were, he believed, generally employed, but that for himself he used 178 grains of nitrate to 210 grains of gelatine, and made that into ten ounces of emulsion. He found that eighty ounces of this would coat a gross of whole plates.

Mr. Cowan then showed a shutter which he had constructed to attach to the front of his camera, so that it would be available for any of the lenses used with that camera. In the construction of this shutter, which was of a drop form, but with the dropping portions enclosed so that no light entered along their edges, he had adopted all those ideas which he found separately carried out in other shutters, that would help to make the present one complete. The diagram shows the shutter with the front



board which carries the lens front removed to display the action. $a\,a'$ are light boards which are raised into their place by the levers $b\,b'$. These levers are worked by buttons, the pins of which pass through the front board. When the sliding boards are raised into position the lower detent on the lever *c* is pressed by a weight or spring *d* into a notch in the lower board; and as the upper one rests upon the lower, they are both held in place. The levers $b\,b'$ are then turned down out of the way, and the direction of the buttons—both in one line—on the front of the shutter, shows the apparatus to be ready for action. When desired to give the exposure the pneumatic ball *e* is pressed and the lever *c* is thereby moved, so that the lower board is allowed to fall, whilst the detent on the top of the lever enters the notch on the upper board and keeps it from falling. The exposure is thus continued until the pressure being removed from the ball *e*, the lever returns to its original position, and the detent on the top of it being released from the notch, the top board falls and closes the opening. A light spring *f* breaks the fall of the first board, so as to prevent jarring during exposure. If a very rapid exposure be desired the pneumatic ball is pressed momentarily, and the boards then follow each other with such rapidity as to give an exposure as short as with some ordinary drop shutters. The internal pneumatic arrangement consists of a piece of india rubber stretched over a common small thimble.

The whole appliance worked admirably, and elecited much commendation from the members present.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on the 19th inst., the chair was occupied by Mr. F. W. Hart.

Mr. A. Cowan showed an exposure shutter intended to be attached to the camera. The front of the shutter fitting was adapted to receive the flange belonging to the largest lens intended to be used with the camera, and so, by means of adapting flanges, the shutter could be used with all lenses of the same or smaller diameter. The moving parts of the apparatus consisted essentially of two light boards, one of which, when ready for exposure, closed the opening and the other rested upon it, working in the same grooves. By pressing a lever actuated by a pneumatic arrangement, the lower board was allowed to fall, whilst a catch in the other end of the lever kept the upper board in place. On removing the pressure a spring brought the lever back into its original position, and the catch being thus released the upper board fell and closed the opening. If the pinch given to the pneumatic ball were momentary the opening and closing were effected as rapidly as with some drop shutters; but any desired longer exposure could be given by holding on the pressure which kept the catch in its notch in the upper board. A stout wire lying under the bottom board served (when turned by a thumb-piece or handle outside the shutter) as a lever to raise both boards into position ready for action, whilst a similar lever was supplied to raise the top board alone and leave the lens open for focussing. Mr. Cowan remarked that he had adopted, in the making of this shutter, the contrivances existing in several others, and mentioned particularly those of Mr. Woodbury and Mr. Wilmer.

The Chairman said that the most convenient arrangement of adapters he had seen was that of Mr. Warnerke, who used a camera front made of ebonite. This front had a screw thread cut in it to fit the largest lens, and a set of ebonite adapters was fitted thereto, each one screwing into the next larger one. A possible disadvantage of such an arrangement, however, was that the smallest lenses—presumably those of the shortest focus—would be *farther* from the ground glass than the larger instruments.

Mr. W. M. Ashman said that that was not at all necessary, as the adapting flanges might be a little recessed, so as to present a flush surface when fitted together.

Mr. Tejeda (a gentleman from New York, who was present) was invited to give his experience as to emulsion plate-making in that city. He said that the difficulty arose when the temperature became much raised, as it did there during summer. It was then found that, with the same processes which gave good results during cooler weather, the bromide of silver deposited in a coarse state from the gelatine, and this whether boiling or the use of ammonia was adopted. The only remedy he had found for that state of things was to keep all the mixtures as cool as possible and be content with a very slow emulsion—only about twice the speed of collodion.

Mr. J. J. Briginshaw showed some instantaneous views taken on plates made by Mr. A. L. Henderson on the plan of which he had recently spoken as requiring considerably less nitrate of silver than the ordinary method.

A question was read :—" By how much ought the lenses of a telescopic objective to be separated to render the chemical and visual foci coincident, the focus of the lens being eleven feet ?"

Mr. W. E. Debenham replied that any such separation would probably interfere so much with the correction for spherical aberration as to spoil the definition of the instrument.

Mr. J. B. B. Wellington said that he had by accident made up an emulsion containing about three parts of iodide of silver to one of bromide, and inquired whether there was any way in which it could be utilised.

It was suggested that it would serve when making fresh batches, to take as much of this emulsion to start with as should supply the required quantity of iodide of silver for each batch.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The first outdoor meeting of this Society for the session took place on Wednesday, June 20th last, the leader for the day being Mr. Auty, of Tynemouth.

It had been arranged to go by sea to Marsden, but the morning being stormy and the sea rough only one member turned up at Tynemouth to join Mr. Auty. A coble not being obtainable on account of the boisterous weather, the morning was spent in taking views of Tynemouth Priory, all of which were, unfortunately, spoilt by vibration of the camera caused by the wind. Some instantaneous views of the harbour mouth were more successful.

The weather having improved during the afternoon a coble was procured, and with a rattling breeze the little party of three were soon on their way to Marsden Rock, about five miles off. Sailing out of the mouth of the Tyne, down the coast by South Shields, and passing Frenchman's Bay and Manhaven, they landed safely at the Velvet Beds, about half-a-mile distant from Marsden. Several successful photographs were taken.

About half-past six the party re-embarked and reached Tynemouth without mishap, where they partook of Mr. Auty's hospitality and inspected his fine instantaneous storm pictures.

On Wednesday, the 18th inst., the second outdoor meeting of the above Association took place. On this occasion Mr. J. P. Gibson, of Hexham, took charge as leader of the party.

The members met at the Central Station, Newcastle, at 6.25 a.m. There were present Messrs. Goold, Ridley, and Galloway, of Newcastle; Mr. Auty, of Tynemouth; and Mr. Borrows and two friends from South Shields, Mr. J. P. Gibson joining them at Hexham. Thence, proceeding by train to Chollerford, after breakfasting at the inn, the company set out for "The Chesters," the residence of Mr. John Clayton, the owner of the property upon which the most important stations on the line of the Roman wall stand.

Mr. Clayton kindly permitted the members to inspect his collection of Roman relics, which contains many fine specimens of jewellery, coins, Samian ware, and other pottery; and when the party had examined the very numerous Roman altars, figures, aud inscribed stones in Mr. Clayton's museum, they visited the Roman station of Cilurnum, and saw the Forum, or ancient Roman market-place, the Treasury, the Hypocaust, and the gateways of the camp, as well as a portion of the wall itself, which have remained intact since the time of the Roman occupation of Britain.

Tempted by the beautiful stretches of river and woodland, none of the party would devote a plate to the Roman antiquities, and they left the camp for the banks of the North Tyne, which had been flooded the day before, and still showed by the depth of its rich, transparent, brown colour that its waters were derived from the hilly moorlands of the borders. Many fine river subjects were photographed, all the gentlemen present being provided with cameras varying in size from quarter-plate up to 15 × 12.

On their return to Chollerford Professor Herschel, one of the vice-presidents of the Society, who had left Newcastle by a later train, joined them. They then took train to Barrasford Station, and, walking down by the river side, the Castle, which is situated on the opposite bank, was photographed. On the arrival of the ferry-man with his boat from the other side of the river a group was arranged on the landing-place of the ferry. In order that all the members might appear in the photograph a youth was instructed to uncap the lens, and two plates were exposed, which turned out successful.

The river was then crossed, and several views were taken of Haughton Castle and lake. Returning by the village of Humshaugh, the party visited the approaches to the Roman bridge at Cilurnum. The bridge itself, having been made of wood, has long since disappeared; but its foundations and abutments of massive masonry still remain, showing the marks of the Roman chisel-work very distinctly.

On arriving at Chollerford Inn the day was finished up with tea and a pleasant chat on matters photographic, the party leaving for Newcastle by the last train. The day, although rather dull, was perfectly calm, and very satisfactory for outdoor work. Sixty-seven dry plates of various sizes were exposed during the day.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held on Thursday, he 19th inst., at the Wedgwood Institute, Burslem,—Mr. A. Humboldt Sexton, F.C.S., President, occupying the chair. The minutes of the last meeting having been read and confirmed,

It was announced that the Committee had decided that an excursion should be made to Ashbourne and Dovedale, Derbyshire. This having been approved of unanimously by the meeting, it was resolved that the excursion should take place on Thursday next, August 2nd. The party will proceed from Stoke to Ashbourne by the North Stafford Railway, and from thence to Dovedale by waggonettes or suitable conveyances. The Hon. Secretary was requested to go over to Ashbourne and make all necessary arrangements, and also to issue additional invitations to amateur and professional photographers in the neighbourhood, who were not members of the Association, to accompany the excursion party.

The Chairman said he was extremely sorry he was obliged to resign the office of President of the Association, as he intended leaving the neighbourhood in a few days for Manchester.

Mr. F. J. Emery said he was sure all the members present would hear with great regret that their President was about to leave them. He proposed a vote of thanks to Mr. Sexton for the very able manner in which he had fulfilled the duties of the office since his election.

Mr. Burgess seconded Mr. Emery's proposition, which was accordingly passed, accompanied by a cordial expression of good wishes for the Chairman's success in his new undertaking.

Mr. W. Alex. Jones having been elected a member of the Association, the meeting was adjourned.

BURY PHOTOGRAPHIC AND ARTS CLUB.

The monthly meeting of this Club was held at the Coffee-Rooms, Bury, on Monday, the 16th inst. There was a good attendance of members,—Mr. E. W. Mellor, President, occupying the chair.

The minutes of the last meeting having been confirmed, the following gentlemen were elected honorary members:—Mr. R. N. Phillips, M.P., Mr. Thos. Roberts, J.P., and Mr. J. W. Kenyon. Mr. J. Whalley was elected an ordinary member.

There was an excellent show of views and groups taken by the members at their last outdoor meeting at Bolton Woods, which were declared to be very satisfactory.

Mr. H. Dearden exhibited a new and convenient washing apparatus designed by himself. Mr. E. Eccles showed a useful and instantaneous shutter designed by Mr. Kershaw.

A discussion then took place on the various methods of development used for gelatine plates.

Mr. J. Rishton, of Haslingden, gave an able and interesting description of his method of intensifying gelatine negatives.

The next outdoor meeting was fixed to take place on bank holiday, August 6th, the district of Clitheroe, Downham, and Sawley being selected. Members' friends can join the party.

Correspondence.

THE EFFECT OF PRESSURE UPON SENSITIVE SALTS.

To the Editors.

Gentlemen,—When Captain Abney read his paper before the Photographic Society of Great Britain, on *The Effect of Pressure on Sensitive Compounds*—the burden of which was that pressure produced the same effect upon the sensitive compound that light does, so that the pressed portions of the film gave an image in reduced silver on development—considerable surprise was generally expressed, as this conclusion was in direct opposition to that which Mr. Warnerke had arrived at, and to that which was the experience of everyone else who had anything to say on the matter.

It was found, however, and particularly shown in your own article on the subject, that when, instead of simple pressure, a tearing action was given the result *was* to cause development, as stated by Captain Abney, but that pressure alone produced the apparently insensitive modification of the silver bromide noted by Mr. Warnerke.

On reading that which is now printed as the text of Captain Abney's paper, it appears that, if my memory is to be trusted, there are, besides the title, which is admittedly changed, various statements quite different from those that were actually read. I certainly do not think there was any such sentence as I now find that "mere pressure makes the particles more compact and therefore less sensitiv ." If there had been there would have been no occasion for any surprise at the conclusion at which Captain Abney had arrived. Again: although Moser's experiments were referred to in the discussion which followed, I do not think there was any mention of them in the paper itself.

My object in writing is to raise the question as to how far it is desirable to allow the correction of a paper, read before a society, to be made by the author before being published as the report of what *was* read; whether such correction can fairly be taken to include those modifications of the author's ideas which the subsequent discussion or after-experiments may have induced (and in this case what nonsense the reported discussion might appear to be); or whether any such correction should be limited to verbal and grammatical matters only.—I am, yours, &c., Legist.

July 21, 1883.

HYDROKINONE.

To the Editors.

Gentlemen,—I have tried carbonate of potassium with the above (half the weight) with the best results when used fresh; but it does not seem as if it could be used twice, although it will act if made up some days before.

Trying to use it twice and failing, I well washed the plate and developed it with iron and oxalate of potash (Eder's formula), and got

a beautiful negative. As the plate was purposely *fully* exposed and came out of good density, I am thinking whether the application of the first developer had not, after all, something to do with the result.—I am, yours, &c., W. T. F. M. INGALL.

Greenhithe, Kent, July 24, 1883.

"A NEW SCIENTIFIC SUBJECT."

To the EDITORS.

GENTLEMEN,—I beg to tender my thanks to Mr. A. Brothers for calling my attention in this week's Journal to an error in my article on the above. Instead of "From our earth radiates an atmosphere," it should have been "From the *sun* radiates an atmosphere called by men of science," &c., &c. The error arose in the hurry of copying from the note-book, and was not observed in the correction of the proof.

With regard to Mr. A. Conan Doyle's criticism upon the article: it is very plain to those few who understand about the new psychic force, "Od," that there are some men of science who know little or nothing of the laws of nature, and when something is stated that is beyond their powers of comprehension they turn it into ridicule, and thus expose themselves as to their want of knowledge in occult science. Excellent and jolly fellows they are, too, many of them, but they fail in this one point.

Let me assure Mr. Doyle that my feelings, after reading his very laughable critique by the light of fact, as expressed by the pen of Baron von Reichenbach—from whose writings the ideas expressed were culled, and which have formed the subject of many experiments in the obtaining of photographs in the colours of nature and other purposes—that they are "*quite serene;*" as also upon the note by the Editors upon the photograph I sent of plants in a conservatory, of which quite twenty persons have seen the colour of the silver-leaf geraniums; so that we do not all see alike, and some of those here who examined the print are Londoners.—I am, yours, &c. W. HARDING WARNER.

The Hollies, Clifton, July 21, 1883.

EXCHANGE COLUMN.

I will exchange rock work, by Reeves and Hoare, for anything useful in photography.—Address, A. LEE, 4, Cleveland-terrace, Bath.

Wanted, Dallmeyer's 8 × 5 rapid rectilinear lens or a pair of 5 × 4 stereo. rectilinear lenses, in exchange for Dallmeyer's ten-guinea twelve-lens field glass.—Address, S., 96, Lambeth-road, London, S.E.

I will exchange a good whole-plate lens and mahogany camera, nearly new, for a large show case with plate-glass front, skin rug, or accessories.—Address, E. HALL, photographer, Saint Michael-street, Malton, Yorks.

I will exchange a nine-inch square bellows-body camera, every movement, three double and one single dark slides, for a good symmetrical lens for $8\frac{1}{2} \times 6\frac{1}{2}$ pictures; difference in cash.—Address, H. BUTTRUM, Stony Stratford.

Wanted to exchange, for anything useful in photography, a model dark tent for changing dry plates up to 12 × 10. It weighs but a few pounds, and is put up and taken down in a few moments.—Address, GEORGE JAMES, 23, Margaret-street, Hull.

I will exchange a Meagher's stereo. repeating camera, screw focussing, quarter-plate tourist rack bellows-body camera, double slide, lens and extra slide, and a whole-plate portrait lens, for photographic goods.—Address, ALBERT SCOTT, 88, Briggate, Leeds.

Wanted, in exchange for a Grubb's A 2 *carte* lens, rack and pinion and diaphragms, in splendid condition, a wide-angle whole-plate landscape lens, by Dallmeyer or Ross, or a Ross's No. 4 portable symmetrical.—Address, J. PIKE, 11, Grey-street, Newcastle-on-Tyne.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

J. H. B.—We will make inquiries and let you know.

CLIMATE.—We are unable to supply the information.

SAMUEL I. WATKINS.—We have no further information than that supplied in our *Foreign Notes and News.*

JAS. ROBB.—The only plan of successfully reversing the negative is to reproduce it in the camera. There is no reliable method of transferring the film.

B. A. (Cambs.).—The preparation of the paper is decidedly at fault. It will be perfectly impossible for you to obtain with it presentable impressions.

J. V.—We imagine your best plan would be to advertise in some of the Australian papers. We cannot from our own knowledge recommend any particular town.

T. BULLEN.—The negative was stained in the development and not in the preparation of the plate. The fault lies at your own door and not at that of the manufacturers.

A. J. S.—Any picture-frame maker will supply you with light frames or stretchers. If you explain the purpose you require them for he will supply what is suitable.

MELBOURNE.—The spots are caused by the negative being insufficiently washed; hence the silver from the albumenised paper has stained the film. We fear there is no remedy.

S. REYNELE.—The emulsion has evidently become decomposed by the long boiling. The addition of fresh gelatine will now be of very little use; nevertheless, the addition may be tried before throwing the emulsion away.

R. S. J.—If you had carefully read the articles on *The Optics of Photography*, which appear in our columns weekly, you would have had no occasion to ask the questions. Read the last two articles, which give all the information you require.

S. B. J.—The proprietors of *Punch* will certainly not permit you to copy the cartoons and publish them as scraps of the *carte de visite* or any other size. Were you to copy them, rely upon it you would be proceeded against for piracy.

EBOR.—If the ivory be stained with the silver salts we fear you cannot remove them so as to be able to employ it again. Cyanide of potassium will remove the image, but it leaves the ivory of a disagreeable, yellow colour, of which it is difficult to get rid.

A WORKMAN.—Notwithstanding the small amount you have paid you have doubtless purchased a very good apparatus—that is, supposing the lens was made by the optician whose name it bears. Take it to him and he will inform you whether or not it is genuine.

LONDON, S.E.—So far as we are aware cameras and dark slides made of *papier mâché* are not articles of commerce. It is quite possible, however, that they might be made of that material, and would possibly answer the purpose as well as wood, though it is somewhat doubtful.

J. G. JONES.—We have not the two lenses at hand, so cannot answer your query definitely; but as both lenses are of the same focal length, that which has the larger aperture will be the quicker instrument. This is, of course, assuming that both lenses will work with their full aperture.

WARWICK.—The decision may be looked for in a few days. You had better wait until judgment is given before commencing proceedings. Unless you can make reasonably sure of obtaining a conviction you had better let the matter rest as it is, although it is, of course, very annoying.

R. STEVENS.—For your purposes you will find a lens of the "universal" or "group" series the most generally useful, and next to that one of the "rapid" type. We should not advise you to purchase a portrait lens, unless you are prepared to supplement it with a "rapid" for outdoor subjects.

ALF. DAVIS.—The bichromate of ammonia is preferable to the bichromate of potash in the process in which you are experimenting. The examples show that you have very much over-exposed the print. Try again, and give only about one-fourth what you have been giving hitherto. If you do not then succeed, write again.

C. E. WHINFIELD.—If you have really made an improvement it is quite possible that you might dispose of the process. Your best plan will be to produce some examples and then submit them to some of those firms who make enlargements a speciality. They might be disposed to purchase your process if they considered it possessed sufficient merit.

OMEGA.—The spots on the carbon prints appear to be due to small particles of insoluble gelatine. How these are produced it is difficult to say. On one occasion we remember seeing some spots, very similar to yours, which, when traced to their source, were found to proceed from small particles of bichromate of potash coming in contact with the tissue while it was drying. Of course particles of alum would have the same effect as the bichromate.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, the 1st August, the subject for discussion will be—*On the Selection of Views.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For the Week ending July 25, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

July	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
19	29·78	W	58	53	110	70	51	Cloudy.
20	29·75	E	62	57	79	66	53	Cloudy.
21	29·58	W	58	55	103	65	54	Cloudy.
23	29·86	W	57	53	99	66	49	Cloudy.
24	29·74	NE	58	52	104	69	52	Cloudy.
25	29·96	W	58	54	76	62	52	Cloudy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1213. Vol. XXX.—AUGUST 3, 1883.

A SYSTEM OF STANDARD DEVELOPING SOLUTIONS.

The suggestion made by Mr. C. Beckett Lloyd in our last number is one that will commend itself to many of our readers who, from choice or otherwise, are in the habit of employing plates of different makes and which require to be treated differently. No one, probably, has experienced more fully than we have ourselves the inconvenience, alluded to by our contributor, of having to develope, for experimental purposes or for actual work, plates of every conceivable description; and as it would be obviously impossible to keep in the developing-room a complete set of the solutions recommended by each maker of plates, varying as they do so considerably, we have long followed the practice of using separate solutions of bromide and of ammonia, mixing them in such proportion as a rough calculation shows to be most nearly in accordance with the formula issued with the particular plate.

Mr. Lloyd's proposal, however, goes further than this, inasmuch as he uses solutions which enable him to measure off accurately the required number of grains of pyro. or bromide, or minims of strong ammonia which an analysis of the formula exhibits, such analysis being kept in permanent memorandum form as an adjunct to the dark room. This seems to us a most useful and wholly unobjectionable course; for, even when adhering for some time to one particular form of plate, it is little, if any, more trouble to mix up the developer from *three* solutions than from *two*. If the extra trouble be an objection the standard solutions of ammonia and bromide may, under those circumstances, be mixed in the proportions given in the formula, and the total number reduced to two. The only amendment we would propose to make would be to simplify the calculations by altering the comparatively complicated proportions observed by Mr. Lloyd in his solutions by making them uniform. Thus, the proportions given in his article are—pyro. one in ten, ammonia one in four, and bromide one in twenty; whereas we would have them all alike. No better proportions for general use could be selected than one in ten, by which we establish a sort of decimal system, which greatly facilitates calculation; thus, in each case a grain of pyro. or bromide, or a minim of strong ammonia, will be represented by *ten* minims of its particular solution. One other point we would notice in connection with developing formulæ, as at present given, is the impossibility of calculating with accuracy the exact quantity of each ingredient contained in the quantity of solution ordered to be used. Taking, haphazard, the first commercial formula that comes to hand for the ammonia and bromide solution, we have—liquor ammonia, one ounce; bromide of ammonium, one ounce; water, half-an-ounce. Without actual and careful trial it would be impossible to tell how much ammonia or how much bromide is contained in half-a-drachm of this solution, for the simple reason that, without measuring it, we cannot tell what is the total bulk when mixed. Thus, ammonia and water contract in volume when mixed, as may be proved by pouring a quantity of each separately into a bottle and shaking vigorously with the finger placed on the open neck, when it will be found to be held there by suction. On the other hand, the bromide of ammonium will cause an increase of volume of the solution, but not equal to the bulk of the undissolved bromide. Again: if we (say) take pyro. one ounce, water nine ounces—or pyro. one ounce, water ten ounces—we have in neither case a ten-per-cent. solution as many suppose, because no allowance is made for the alteration in volume by solution, to say nothing of the further complications introduced by the fact that an ounce avoirdupois contains 437½ grains, while a fluid ounce has 480 *minims*. It is necessary, therefore, in making the solutions to follow the course adopted in making volumetric test solutions, viz., to dissolve the substance in a portion of the water and then dilute it carefully to a definite volume. Following this plan we would suggest the following solution, corresponding with the Lloyd's A, B, and C:—

A.

Pyro. .... 1 ounce (437½ grains).
Water..................... to make 9 ounces.

Ten minims contain, as nearly as may be, one grain.

B.

Ammonia, s. g. ·880............................. 1 ounce.
Water .... to make 10 ounces.

C.

Bromide of ammonium or potassium ...... 1 ounce.
Water .... to make 9 ounces.

Observe that, in the case of the solids which are, presumably, bought or weighed by the avoirdupois weight, if the volume be made up to ten ounces, each ten minims would contain a very little over nine-tenths of a grain of the solid; but by making nine ounces of solution the error is so minute as to be practically inappreciable.

If now a table be prepared of the analysed formulæ, as proposed by Mr. Lloyd: for every grain or minim of the three ingredients required in a given quantity of developer, *ten* minims of the corresponding solution must be used, and all calculation is well-nigh done away with. In order to show the working of this system we append a table of the developing formulæ given in our Almanac, translated into what Mr. Lloyd calls "rational terms." The quantities given are, in each case, to make two ounces of developer. In the case of Edwards's and Nelson's formulæ the glycerine and alcohol and the sugar are omitted, the pyro., bromide, and ammonia being given to complete the list of variations to which attention has been called:—

Maker.	Pyro.	Ammonia.	Bromide.	A.	B.	C.
Mawdsley	6 grs.	5½ min.	1 gr.	1 dr.	55 min.	10 min.
Wratten, ord...	4 „	⅔ „	⅓ „	40 min.	6 „	2 „
„ inst...	6 „	4/3 „	⅚ „	1 dr.	66 „	8 „
Swan	3 „	6 „	6 „	30 min.	1 dr.	1 dr.
Nelson	3 „	25 „	5½ „	30 „	½ oz.	55 min.
Edwards	4 „	4 „	½ „	40 „	40 min.	5 „
Thomas	2 „	12 „	5 „	20 „	2 dr.	50 „
Rouch............	2¾ „	10 „	2¾ „	27 „	100 min.	27 „

These calculations are only approximate, as they are made without any knowledge of the total volume of the mixtures from which they are made. In one or two instances the formulæ have been altered since our Almanac appeared, the new formulæ having been taken. The figures show sufficiently wide variations to create astonishment.

Of course our readers will understand that in view of such enormous variations, as well as the elasticity of the developing process, it is unnecessary to calculate to such fractions of a grain as we have done above; but it might prove useful if makers would state their formulæ in these or similar terms.

THE REPRODUCTION OF WORKS OF ART.

Since the leading article, entitled *Copies of the Old Masters*, appeared in our issue for April 20th last, the question of the photographic value of the different colours, as seen in nature, when rendered by photography, has twice been brought before the Photographic Society of Great Britain by Mr. J. R. Sawyer, who has read two very interesting and valuable papers on the subject. Each of these papers have been well illustrated with examples of photographs from different colours, obtained with varying proportions of the sensitive salts—iodide and bromide of silver—both in collodion and in gelatine; also with the addition, to the latter, of that material which is again exciting some little attention in the photographic world, namely, eosine.

The translation of colour into monochrome, by photography, is one of those subjects which crops up at different periods, excites some little attention for a time, and then sinks into oblivion, again to be resuscitated at some subsequent date. At the present time attention has no doubt been drawn to the matter from a report having gained currency that the admirable photographic reproductions of paintings by many of the old masters, from several of the continental galleries, owe their excellence to the negatives having been produced by a "secret process" recently "discovered;" also to the fact that, on several occasions of late, examples of the rendering of colours in their "true relation" by photography has been shown at the meetings of the Photographic Society of France. These are pronounced, by those who have seen them, as being farther in advance than anything hitherto accomplished by photography. This superiority is said to be due to the addition of eosine to the gelatine emulsion with which the plates are prepared.

There is nothing novel in the employment of eosine or other colouring matter in conjunction with silver salts for the purpose of obtaining a truer rendering of colour into monochrome, as that was done years ago by Mr. M. Carey Lea, Major Waterhouse, Dr. Vogel, and others with more or less success. Yet we find that a patent for "improvements in the application of eosine in photographic processes" has been taken out in England. As the specification will not be published for some months to come, it would, of course, be premature to speculate wherein the improvements consist, or in what way the method now patented differs from that hitherto employed. In the meantime a few practical hints on obtaining the best copies from works of art will not be out of place.

In our previous article it was mentioned that much of the excellence of the continental copies of paintings was in reality due to the skilful and judicious retouching of the negatives, which is done by artists of undoubted ability. We also mentioned incidentally that, in some instances, the retouching was not all confined to the negative itself, but that a transparency was made from it, and that in turn was worked up, and from this a fresh negative was produced. This method of reproducing works of art, we believe, has hitherto been treated somewhat as a secret process. Let us now look at the advantage of this plan as applied to a picture containing reds, blues, violets, greens, and yellows. In the photographic copy the yellows and reds will come out dark, when, for a correct rendering, they should be of varying degrees of light or middle tint, as an engraver would render them. The blues and violets will be light, whereas they should, of course, be dark, in order that the copy shall be a true transcript in monochrome of the original picture. How is this to be remedied?

In the first instance, a negative must be obtained as perfect and free from reflections as possible. This negative, by preference, should be on a gelatine plate, as that will give a greater harmony than collodion. The negative should be very fully, indeed, for ordinary purposes, over-exposed, and must also be considerably under-developed, so that the extreme density only represents the intensity really required for the half-tints; this is essential, or success will be impossible. In this negative all the drawing and detail, as well as the original touch of the artist, is secured.

What is now required is to intensify certain portions only, so as to give them the requisite printing density. This is best done by coating the back of the negative with a thin matt varnish; then with a paper stump, plumbago is skilfully applied, and it will readily adhere to the matt surface. The lights are thus intensified, and the yellows and reds, or such colours as should be light in the print and have come out dark in the negative, are delicately strengthened, taking care not to overdo the work or interfere with the drawing. The extreme high lights must be dealt with on the front of the negative with a blacklead pencil. As the work of retouching, or rather local intensification, progresses, it is desirable to take a print from time to time, in order to accurately judge of what has been accomplished and what is still required. In this manner all the gradations, from the half-tone we began with to the highest lights, can with judgment be rendered in their true relation.

But it is clear that such colours as are rendered lighter than they should be—such as, for example, the blues and violets—cannot be improved by working on the negative; hence we must make a transparency from it, and do the remainder of the working on that. The back of the transparency is coated with the matt varnish, and then the deepest shadows are intensified in the same manner as the lights were in the negative. Then those portions—the blues and violets and the more actinic colours which are too thin—are strengthened, as were the non-actinic ones in the negative. The effect of the work as it progresses can be readily judged of when working on the transparency, though it cannot so well be in the negative. When sufficient density in the different portions has been obtained by working on the back of the transparency the finest details in the shadows may be strengthened with a pencil on the front; and, finally, any reflections of light from the points of pigment in the original painting, which are so frequently an eyesore in photographic reproductions, can be touched out with the pencil on the front of the plate.

This power of removing the reflections from the points of colour is an important advantage in connection with the working on a transparency, as it is impossible to remedy such defects when retouching the negative. When the transparency is finished a new negative is made from it. This, if the retouching has been done by an artist who is *au fait* with the work, will possess the colours of the original painting rendered in their true relation as they would be in an engraving, while at the same time the original touch of the artist is preserved.

In the publication of works of art, quite apart from the other advantages gained, a reproduced negative is a great desideratum, inasmuch as it contains no retouching to become injured in printing, and if by chance it should get scratched or broken, or a great demand for prints should arise, another or any number of negatives can be readily produced.

ADVERTISEMENTS AND REPLIES.

The usefulness and, indeed, the actual necessity of the advertisement columns of a technical journal possessing, like our own, a widespread circle of readers need not be enlarged upon. Every employer and every assistant in the profession has need to resort to them when an exchange of service is desired, and it would be next to impossible to find a substitute for them. With such a universal employment it is not to be wondered at that they lead to difficulties between those who advertise and those who reply, editors and publishers alike being frequently appealed to by the parties to these little unpleasantnesses. Cases of hardship—due to negligence, or worse—have been shown to have occurred when a little thoughtfulness on one side and care on the other would have prevented any soreness of feeling being created. Occasionally instances of what, from the evidence brought forward, appears to be actual dishonesty have come to light, although the true merits of a question

f difference cannot often be ascertained from the *ex parte* statenents of an aggrieved person though he have every desire to speak n an unbiassed manner.

As an example of an occurrence by no means infrequent may be ited the applicant for a situation who sends examples of his work nd does not get them returned. He writes and complains to us of the ad treatment he has received, treatment which at first blush seems to e beyond excuse. But the unprejudiced arbiter sees at once many ossibilities. At the outset it may be observed that loss in the ost, in sending or returning, are very possible contingencies that ay occur through defective or illegible addresses in either journey f the letter or parcel; and such losses are by no means easily or uickly rectified. But, quite apart from accidents of this kind, any other causes may operate. Thus:—Specimens may not have een asked for, some principals objecting to receive specimens in he first instance. Under such a supposition it is the plain and bvious duty of the sender to enclose with his specimens a stamped nd addressed envelope for their return, and the operator should nderstand that their despatch is entirely at his own risk; though e apprehend that, even failing such an enclosure of stamps, there ould be few advertisers who, with perhaps some delay, would fail return the whole of the specimens, even if in an unstamped rapper.

We have heard of instances where, though the advertisement xpressly stated that specimens were not to be sent, applicants have evertheless sent them; those who do so really almost deserve the unishment of having their specimens confiscated. Then, again, a easonable time must always be expected to elapse before the adverser has an opportunity of comparing the merits of rival applicants; e opportunity of "winnowing out" unsuitable replies often inuencing advertisers not to ask for specimens, except from a select w, solely in the interest of applicants. All these are facts which ust be borne in mind when any one claims to have a grievance on ch a subject.

On the other hand, there are employers so utterly without ought or care, except for their own interest, that they require to e applied to specially for the return of specimens in anything ke a reasonable time—conduct deserving very grave reprehenon. And there have lately been shown to exist utterly unrincipled men who retain specimens so obtained solely to adorn eir own show-cases. We should almost be inclined to consider e pillory too good for such offenders.

Looking at the matter from a business-point of view, it would em that as a set of specimens of an applicant's work—retouching operating, &c.—are of paramount importance and value to him, ought to be needless to advise him to take every precaution gainst their loss in post or otherwise. Foremost among such preutions should be, when writing to advertisers unacquainted with the pplicant, the enclosing of a sufficient number of postage stamps to ver their return; for it must be remarked that, though there ay be a remedy in a court of law, anyone who attempts to obtain will, in all probability, be the real loser whatever the issue, and would be the height of folly to contemplate such a cure for loss hen prevention is so easy, apart from actual dishonesty or gross eglect.

There is, however, another aspect of the question which should be luded to; we mean the care of original testimonials. Now, we most nphatically advise everyone who transmits testimonials for the purse of furthering his application for a situation never to send originals the first instance. If his application meet with attention it will be me enough then to send, under proper precautions, the original docuents themselves; though, with the facility the art affords, it is in little degree surprising that photographed copies are not emoyed for the purpose. They would carry the proof of their nuineness with them, and might be inexpensively produced on a all scale, and thus obviate the gradual production of a thumbed d creased testimonial, which never has a prepossessing effect upon y employer.

Finally: while urging upon every employer who in response to vertisements receives specimens and testimonials the need for king care of them and returning them with the least possible delay, we would at the same time recommend every applicant, even when writing to a well-known firm, not to send original testimonials, and to accompany any lot of specimens he sends with a stamped addressed wrapper or envelope for their return; he will then have greater certainty of experiencing no loss beyond the value of the stamps, and that he can put down as a species of insurance.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XIV.—Lenses for Special Purposes. The Lantern Objective.

A race-horse is not expected to be of much use in drawing a plough over heavy land, and no one would think of entering a stolid omnibus horse for steeplechasing. Yet many who are the possessors of only one lens not merely put it to a variety of forms of work, which is excusable, but expect it to perform all kinds of work alike well, which is unreasonable.

The task we have imposed on ourselves in this and the following chapter is one which is not quite so easy as to a superficial observer it might appear, being that of indicating the best class of lens for special purposes. One's ideas relative to this have to become reconstructed at occasional intervals to suit the changes that are taking place in the conditions of photographic delineation; for what would have proved the best—nay the only—optical means capable of being employed successfully a few years ago have not only been supplemented but superseded by other methods. Revolution in processes have demanded revolution in all other means coincident with or dependent upon them. So much has been and is still being said concerning the application of lenses for such special purposes as quick or slow landscapes, that we may well be excused from giving this a primary position just at present; hence we shall commence with one upon which comparatively little has been written, namely, the application of lenses for demonstrative purposes.

"A rose by any other name will smell as sweet," and while recognising the great ingenuity displayed, and the inroads upon the Greek and other foreign languages made, in trying to obtain novel appellations—whether euphonious or euphuistic and merely "jawbreaking"—for the whilom toy, but now philosophic instrument, so well known as the magic lantern, we shall here speak of this interesting piece of apparatus, which figures under innumerable aliases, such as "demonstrating lantern," "optical lantern," "euphaneron," "triplexicon," "pamphengos," "artopticon," "sciopticon," and we do not know how many others genius, whim, or trade enterprise may have ushered into existence. We shall, we say, speak of it merely as the "lantern."

The subject of lantern optics is intimately associated with, nay included in, photographic optics, owing to the dependence of the one upon the other. The lantern objectives of non-achromatic and prephotographic times are now known no more unless among the lowest class of toys. The art of luminous projection has now become amenable to the laws which govern the construction of photographic combinations, and takes its place amongst those educational means intimately linked with and dependent upon the application of scientific laws.

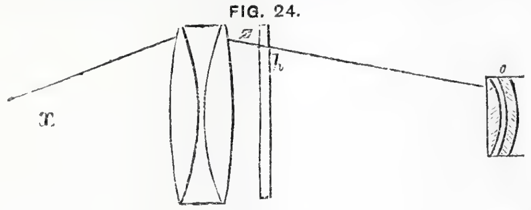
During the past few weeks we have had occasion to investigate the distinction between an image from a lantern formed with a lime or electric light on the one hand and a large and voluminous oil flame on the other, and find that the conditions affecting the transmission of light which falls upon a transparency up to the screen, through the intervention of an object-glass, vary in a greater degree than many persons imagine.

We have always held, and still entertain, the opinion that dimensions of the object-glass is not an element in the illumination of any object or portion of one on the screen when the light emanates from a point, as it practically may be considered to do in the case of a lime light of the highest order. In such a case the path of the rays may be projected on a sheet of paper from the radiant to the screen, or at anyrate to the outside of the objective (which amounts to the same thing), and in this case it will be found that geometric and physical optics will coincide with a wonderful degree of approxima-

tion. In such a projection we have two separate and distinct sets of conjugates to deal with. The first is that of the condensers—the *radiant* or fan of the lime cylinder being the minor conjugate of this system, the anterior conjugate being found in or nearly so—the precise point being still a matter of dispute—the immediate vicinity of the front lens of the portrait combination, assuming such form of objective to be employed. But there is also a second set of conjugates to be recognised—those of the objective. In this latter system the anterior conjugate forms the face of the screen upon which the image is received, the posterior conjugate being the picture that is to be enlarged.

Now, when a lime light is employed, the rays from the source of light pass direct from the radiant—which is practically a point—to the picture; and, conversely, the light by which any given spot of the picture is illuminated passes through one particular spot of the condensers, this ray being in turn transmitted through one particular spot of the objective. So far, therefore, as the illumination of that individual point of the picture is concerned it is altogether immaterial what is the diameter of the object-glass, provided that particular ray is transmitted. And at the place where the rays cross in the objective—provided everything be well made and the highest degree of theoretical accuracy be prevalent—a stop no larger than a quarter of an inch might be introduced without affecting the amount of illumination in any degree. The ray *z*, in *fig.* 24, represents that which is transmitted from the radiant

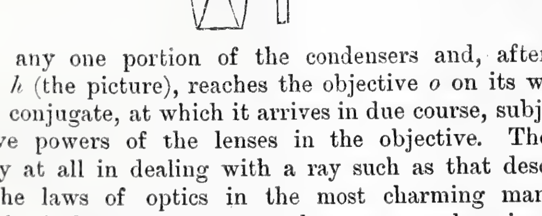
FIG. 24.



through any one portion of the condensers and, after passing through *h* (the picture), reaches the objective *o* on its way to the anterior conjugate, at which it arrives in due course, subject to the refractive powers of the lenses in the objective. There is no difficulty at all in dealing with a ray such as that described; it obeys the laws of optics in the most charming manner, and ultimately finds its place upon the screen under circumstances which leave nothing to be desired. But in all this an intensely-powerful radiant is presupposed.

It is not invariably expedient, however desirable it may be, to have the lime light always pressed into one's service as a source of illumination; and in recognition of this a large number of exceedingly powerful lamps, on the lines laid down by Mr. Marcy, of Philadelphia, have been introduced as lime light substitutes. This light, which is now employed in all the oil lanterns of the best class, claims special attention, and in an investigation of its peculiarities it will be found that an objective which is quite competent to accomplish the transmission of the light from an oxyhydrogen flame impinging upon a lime cylinder may be altogether inadequate for giving effect to the considerable volume emitted from a large surface of light. To render this apparent, let a given spot of the picture *h* (*fig.* 25) be illuminated. Observe, looking backwards to-

FIG. 25.



wards the light *r*—which, in this case, is one of the sciopticon class, under whatever other trade name it may be known—observe, we say, from what a number of directions the light comes to illuminate that portion of the transparency. As the introduction of more rays would only tend to make our diagram confusing we confine them to those alone which are utilised in the illumination of the point at *h*, which may be the head of a gentleman, a ship on the sea, a horse in a farmyard, a special scene in the Rocky Mountains, or an inscription on a temple wall in India. Although the rays between the elements of the condensers, in *fig.* 25, are represented as being parallel, yet the intelligent reader will readily understand that they are really intended to be converging. The diagram, as drawn shows in a sufficiently clear manner the principle sought to be explained.

Now, to exhibit that special feature in the photographic transparency, in the way in which it should be done, necessitates the embracing by the objective of every ray that has passed through such point and bringing them all together to one focal point upon the screen. This involves the necessity, first of all, of having the objective of such a diameter as to allow of not a single ray of light being lost. The lamp *r* instead of, as in the case of the lime light (in *fig.* 24), sending its rays out from a single point emits it from a large angular surface—angular, we mean, as regards the point *h*. Here we may mention that, although the rays are shown as crossing each other at *h*, this has no relation to conjugate focus, but rather to parallax. Conjugate focus will deal solely with the mean or average of those rays here shown converging towards *h*. Not only, however, must the objective be large enough to admit all the rays which fall upon it, but it must be corrected in such a manner as to bring all these devious rays to a focus upon the screen.

Reasoning in this manner we lighted our lantern and projected on the screen a sharply-defined transparency copied from an engraving. The definition was good to the edge and the illumination was equal. The objective was a quarter-plate combination of one inch and three-quarters diameter, four and a-half inches back solar focus, and had been most carefully selected with a view to perfection of definition and flatness of field. Now, if our hypothesis were correct, a greater number of rays would be caught and transmitted by a lens of similar focus but larger diameter, and fortunately we were provided with such an objective. Upon substituting it for the other, although the size of disc and image remained the same as before, the illumination was increased to an extent which was estimated by those present at from twenty-five to thirty per cent. When the lime light was substituted for the sciopticon form of flame no such difference was apparent.

The fact is that, when the flame possesses large dimensions, the conditions of illumination as between the picture and the screen become assimilated to those under which a photographic picture is obtained from life, rapidity of action in the latter case and intensity of illumination in the former being convertible terms, and both being dependent upon the angular aperture of the objective.

WE have received from Mr. A. A. Campbell Swinton, of Newcastle-on-Tyne, a remarkably-good picture of a train at full speed, in connection with which he writes:—"The subject is the special Scotch express that leaves London at 10 a.m., passes Low Fell, where the photograph was taken, at about 1 p.m., and gets into Edinburgh at 7.20 p.m. I had no means of ascertaining the exact length of the exposure; but, as the engine and train are pretty distinct in the photograph, and were descending an incline at a speed of fully fifty miles per hour at the moment of exposure, the latter must have been very brief. At the time of taking, the sky was overcast with black clouds, and the light was consequently very bad. The plate employed was, as regards sensibility, according to Warnerke's sensitometer, No. 23. The development was performed without any special difficulty. I think the above shows that it is quite possible to obtain instantaneous photographs of rapidly-moving objects under very unfavourable conditions of light."

WE have on a previous occasion alluded to the collecting under one roof such works as drawings for printed pictures, engravings and photographs, etchings, and so forth, and from an article in a literary contemporary we find that some form is being given to the ideas of those interested in the matter. It is suggested that endeavours should be made to secure the services of Mr. Reid, of the British Museum, whose labours in this direction have been priceless. Photography would take an important place in the scheme if

carried out, Mr. Reid having, among other things, added to the collection under his charge vast numbers of photographs from old masters' drawings.

The *Voyage of the Sunbeam* has been one of the most popular volumes of travels ever published; but interesting, yet strange, as are the experiences therein recorded, we doubt if they surpass in attractiveness, spiced with no inconsiderable degree of peril, the adventures of another "sunbeam" in whose exploits many photographers take considerable interest. Some weeks ago an attempt at a balloon ascent from the grounds of Lillie Bridge was made; but, owing to the violence of the wind, had to be abandoned. The reading of the anemometer notwithstanding, the aëronauts had determined to persevere, but the elements were too strong for them. Twice did the force of the gale drag the balloon from off the huge pipe whence issued the gas to inflate it, and, though upwards of forty-three thousand cubic feet had passed, it had to be wasted, and the balloon taken home again. However, two more ascents are fixed for Monday and Tuesday next; and our esteemed contributor, Mr. Cecil V. Shadbolt—whose successful photographic work from the "Reliance" last year will be remembered by our readers—has made arrangements to secure some photographic records of the "sail." We are sure our readers will join us in wishing him every success.

Solutions weak in gold, such as old toning baths, do not always show very clearly the presence of gold upon the addition of sulphate of iron; but M. Ad. Carnot has described a test of great delicacy which will indicate quantities so small as to possess no photographic value. To a small portion of the suspected liquid he adds a few drops of arsenic acid and chloride of iron solutions and a similar quantity of hydrochloric acid. He then introduces a fragment of zinc. The liquid soon takes a purple colour near the zinc, and, upon shaking, the whole liquid assumes the same tint. The arsenic acid may be left out, but then the colour is less brilliant. Phosphoric acid gives a blue coloration.

Iodide of cadmium—for long so important a chemical in the manufacture of collodion—is now less heard of since gelatine has eclipsed its claims to superiority; but we find a new use for it in testing for certain chemicals. A solution containing five per cent. of iodide of potassium and a slightly-larger quantity of iodide of cadmium is employed in testing a number of well-known valuable medicinal drugs.

Our readers may be aware that the South Kensington authorities hold examinations every year of students who have attended science classes, those passing "first-class" in the various stages receiving a prize. These classes throughout the country do not receive the attention among those interested that they deserve; the chemistry classes, for instance (which are established in nearly all towns of any size), offering most useful training to young photographers, who must have chemical knowledge if they are to take high rank among the photographers of the future. It is announced that for the future those who obtain a "first-class" in the elementary stages will receive a certificate only instead of a prize, and the money so saved will be employed for providing scholarships, thirty-six in number, of which twelve will be awarded every year. They will be of the value of thirty shillings a-week, tenable for three years. We hope the time may not be distant when some, at least, of these scholarships may be held by young working photographers.

It is, as we not very long ago pointed out, no difficult matter to photograph the sun with ordinary studio appliances, and those who may wish to attempt it should know that at the present time the surface of the luminary has more spots upon it than have been known for many years. Last week large numbers were to be seen.

We lately called attention to the "feat" which, according to *La Nature*, was being attempted by certain photographers—to wit, the obtaining a photograph by the light of the moon. Last week it announced that the exploit has been performed. The bridges of the Rhone at Lyons were clearly represented, and the gas lights reflected with a remarkable intensity of light. Of the two views one was exposed twenty-five minutes and the other an hour—not a long exposure, certainly, if the photographs were good, but a long way after other experimentalists.

The volume of *Greenwich Observations for 1881* recently published owes much of its value to photographic records, the spectroscopic and photographic observations, including those made upon the spectra of sun-spots and prominences, measurements of the displacements of lines in the spectra of stars, * * * * and measures of positions and areas of spots and faculæ upon the sun's disc, on photographs taken with the photo-heliograph.

In many towns it is a common custom where interesting archæological remains made of stone are, by the operation of alterations and removals or the disentombing of old architectural remains, brought into public gaze to range them up in some places out of doors exposed to all weathers, till after a time, when rain and frost have done their work, they are discovered to be in a dangerous situation, and are once more buried, as it were, in some out-of-the-way place, after all the fine work is destroyed and the valuable archæological information they could impart destroyed. We would urge upon all in authority in such places the desirability of having photographs taken of these objects in their pristine condition, and, printed by some permanent process, they would become most valuable in course of time.

How valuable a copy, for instance, would be the reproduction, if genuine, of one of the greatest "finds" of modern time which has lately been made—neither more nor less than the whole Book of Deuteronomy, with curtailments, written on pieces of sheepskin in characters resembling those on the Moabite stone, the writing not being visible till spirits of wine is applied, when they at once come out quite clearly. We should say that a photograph also of the writing, when so rendered visible, would be of great value in aiding the examination in respect to their genuineness. The "find," purchased by M. Shapira, is now in London.

WITH THE ECLIPSE EXPEDITION.

In my letter from San Francisco I stated we left Caroline Island on the 9th of May, three days after the eclipse. During the next few days we took the rest of which we were so greatly in want, and started with renewed energies to prepare our reports on the following week.

On Saturday, the 19th of May, two members of the scientific corps entertained the officers by a musical sketch descriptive of life on the island, and as it was greatly appreciated it was repeated a few days later before the whole ship's company. The 23rd was the senior watch officer's birthday, and it was celebrated with due honours. In the evening, about half-past eleven, night quarters were sounded. I happened to be on deck when the drum was beat and was able to watch the whole drill, and in a very few minutes the men had stowed their hammocks and taken up their quarters.

Next day we came in sight of Hawaii, and in the afternoon entered the pretty harbour of Hilo. We noticed as we entered that flags were flying on all the flagstaffs, and that the s.s. "Lihilihi"—a boat plying between the Sandwich Islands, which went in ahead of us—was likewise decorated; but as it was the 24th we imagined it was to celebrate the Queen's birthday. As soon as we had anchored a boat was sent ashore with two of our party to take time observations, and another to make arrangements for the trip to Kilanea. On the boats' return we learned that the display of bunting was in honour of King Kalekana, who was on a tour through the islands after his coronation, and that as the town was *en fête* we could not get horses till the 26th, as they would have to be re-shod.

After lunch the following day all the photographers on board—we numbered five—started on a visit to the Rainbow Falls. On the way there we took pictures of a smaller fall, but exposed most of our plates on the larger fall. This river has at this place cut out

a nearly circular hole into which it falls from a height of about 200 feet. Standing in this hole opposite the fall, on the right-hand side, the cliffs the water comes over are composed of black lava without any vegetation, while the left-hand side is densely covered with beautiful ferns. The contrast between the gloomy rocks on one side, the bright green on the other, and the white water, is very striking.

We found a party of ladies at the top of the cliff dressed in Hawaiian costume, and one of our party asked permission to photograph them, as they made a picturesque group. They replied in the native language, and as it was supposed they could not speak English we were rather free in our remarks.

After taking them we walked to a point above the falls, and some photographs were taken from there. We then, having exhausted our stock of plates, returned towards the town. Just as we approached the landing-place the king rode up, attended, amongst others, by the ladies we had seen at the falls. A gentleman came to us and said that His Majesty would like a copy of the photograph, as we had taken his sister-in-law. He also remarked that he would like a print, as his wife, an American, was amongst the group; so, to our horror, we learnt that these ladies had understood our conversation.

Shortly after the king came to us, and, as we had to wait some time for our boat, we went with him to Mr. Spencer's (the American consul's) house; here we remained chatting for some time, and were invited to see a native dance in the evening.

About eight o'clock a large party landed and went up there. The dancing was interesting, but would not compare with that of the Egyptians; and, as a number of us were going to Kilanea next morning, we did not stay long.

It may interest your readers to know that since my return I have developed the plates exposed on this trip, and I find that they are fair, but not very good, pictures. In my next I will describe my trip up Kilanea. H. A. Lawrance, F.C.S.

SPHERICAL ABERRATION.—LIGHT-BROWN TONE IN PRINTS.—CHEAP CHLORIDE OF CALCIUM.

Spherical Aberration.

I saw with surprise the astounding statement which Mr. H. G. Gover made with regard to spherical aberration, and which Mr. W. E. Debenham quotes. I also saw in Mr. Gover's paper several other equally-astonishing remarks, but they all seemed to indicate such hopeless confusion of mind that it seemed to me useless to criticise them, nor is it my intention to do so now, but to write a few lines suggested by Mr. Debenham's article in your issue of July 27th, and also by an article by the same gentleman that appeared several months ago, and which treated on the subject of alteration of the focal length of a lens by the insertion of a stop.

Mr. Debenham in his last article displays the strict accuracy which usually characterises his writings; nevertheless, there appears to me to be a discrepancy between his statements in it and in the other article referred to.

It will be recollected that the subject was started by a leading article in this Journal, stating that the insertion of a stop in a lens usually increased its focal length, and this to a very appreciable degree when the lens is one of long focus. This was emphatically and somewhat violently denied by Mr. W. J. Stillman, who, however, gave no reason for his denial except his own personal experience. An article by myself corroborated your remarks, and after that Mr. Debenham took up the subject—on the whole siding with Mr. Stillman. Mr. Debenham's conclusion was that, in a well-made lens, there is no alteration of the focal length by the insertion of a stop.

I now quote from Mr. Debenham's last article :—"'Aplanatic' means without spherical aberration; the various cemented lenses, however, to which this title has been given are none of them really aplanatic;" that is to say, they do exhibit to a certain extent spherical aberration. Now, I say that in a lens which is not absolutely devoid of spherical aberration the result of inserting a stop *must* be to alter the focal length.

Spherical aberration in a lens means that the rays passing through that portion near the centre focus in a different plane from those passing through the portion farther from the centre. Generally the central rays are of the greatest focal length. When we focus with full aperture of a lens exhibiting spherical aberration we focus for an average ray, which will be one passing through a circle near the margin of the lens.

When we insert a stop we focus for rays passing nearly through the centre only. If we focus with full aperture, and afterwards insert a stop, the result *must* be that the plane which will have the sharpest representation after the insertion of the stop, is either nearer or farther from the lens (generally the latter) than that which had the sharpest representation before the stop was inserted. It does not follow, however, that the plane which was shown sharpest with full aperture will be less sharp after a stop is inserted; on the contrary, probably it will be made somewhat more sharp, but it will not, as before, be the *sharpest*, for some other plane will be still more sharp.

This is a somewhat involved statement, which I shall try to make clear by taking an example. Let us suppose we are focussing for a landscape, and wish to divide the focus equally between the foreground and the distance. This will be accurately done by focussing for an object twice as far away as the foreground. Suppose we focus for such an object with full aperture. Now, let us insert a stop. That object will probably be made somewhat sharper than it was; but an object farther away than it will be still more sharp, and the amount of want of definition in the foreground and the distance will not be equal as before. The distance will now be more sharp than the foreground. Nevertheless, the latter may be sharper than it was with full aperture.

If our focussing had been for the distance the insertion of the stop would place the plane of maximum sharpness behind the film altogether, and no plane would be as sharp as is possible with the lens and stop used.

This, many may say, is mere theorectical reasoning, and practice will not bear it out. It is a saying of Mr. Debenham's that theory and practice aways agree, and in this he is absolutely correct. If our practice does not agree with our theory so much the worse for the theory. It is wrong, is insufficient, or, what is more probable, the theory is correct, but the result of it does not come within the limits of our imperfect means of observation.

This, however, does not hold good with regard to the question in point. There is an appreciable difference in focal length between a lens worked full aperture and the same lens with a stop. This is easily demonstrated. The first experiments which I made were performed in company with Mr. W. Cobb and Mr. A. Cowan, at the studio of the former. The procedure was as follows :—The lens and camera were placed opposite some printed matter. A stop was inserted of about a quarter the full aperture of the lens. The printed matter was accurately focussed, an eyepiece being used, and the focus being adjusted by racking the lens first before and then behind the point which gave maximum sharpness, and then dividing by two the space travelled over in so doing as accurately as might be. A mark was now made on the camera. The lens was then put quite out of focus, the stop removed, and the same process performed with full aperture, a mark being again made. The observations were made independently by each member of the party, and the results coincided, showing the focal length to be greater with the small stop than with full aperture.

These observations were repeated by Mr. A. L. Henderson afterwards, with a result precisely opposite to what we had obtained Here it would certainly appear that theory and practice do not agree. The fault, however, is with the theory. A portrait lens does not necessarily exhibit a longer focus for central than for marginal rays. It consists of a front combination having considerable positive aberration (central rays longer than marginal) and a back combination with considerable negative aberration. I do not know whether it is possible for the two aberrations mathematically to counteract each other, but certainly it is just as likely that there may be a slight overplus of negative as of positive aberration. This is the case in many portrait lenses, and doubtless is in the one with which Mr. Henderson experimented. The aberration is, I believe, positive in all lenses of the "rapid" type. Experiments made with such of long focus have shown a most appreciable change of focal length on the insertion of a stop.

Mr. Debenham pointed out that the phenomenon, where it does show itself, is independent of focal length, and is controlled by diameter of lens only. When I speak of lenses of great focal length I mean to signify also that they are of comparatively large diameter.

I intended to write a few words on another subject touched on by Mr. Debenham, namely, diffusion of focus as a means of obtaining so-called "depth of focus." I find space presses, but with the Editors' permission I shall return to the subject on another occasion.

Permanency of Prints of a Light-Brown Tone.

I have to apologise to Mr. A. Brothers for taking no notice before this of a question he asked in a recent number of the Journal, as to whether light-brown toned prints are less permanent than those of the deeper purple tone. I postponed my reply to

r. Brothers till I could reply to another question, which appeared the same issue, on the subject of chloride of calcium.

To take the toning question first: I may say that my own expe- ence of light-toned prints extends back barely three years, and at no sign of fading has shown itself in that time either in the se of light- or dark-toned prints. The time is, of course, too short form a criterion. I have, however, access to a collection of very rge prints taken from paper negatives by the late Professor Cosmo nes and Mr. Horatio Ross. These are from twenty-five to thirty ears' old. They are printed, some on plain salted and some on bumenised paper. The latter are, for the most part, of the nearly ack tones which were approved of at the time when they were inted, but some are of a beautiful brown, approaching sepia. hese latter show no greater signs of fading than do the purple ints; indeed, the majority of them appear to be as fresh as the ay they were toned. It is notable that none of the prints on salted aper have faded at all. These are, to my mind, far superior to the bumenised prints; the surface and colour are most artistic. What pity it seems that this process should have given place to that of bumenised paper, which appears to be inferior in every way.

Cheap Chloride of Calcium.

I had to make inquiries about the chloride of calcium from Mr. . B. Brown, of Edinburgh, who uses it largely. To my note e replies as follows:—"The calcium chloride crude can be had from lessrs. Gaskell, Deacon, and Co., Widnes, Runcorn, near Liverpool. he price is about £2 10s. per ton."

W. K. Burton.

DOES THE AMOUNT OF GELATINE AFFECT THE RAPIDITY AND QUALITY OF THE NEGATIVE?

[A communication to the London and Provincial Photographic Association.]

'his is a matter which deserves more attention than I think it has eceived. From experiments I have made lately I have come to ne conclusion that the amount of gelatine *does* very materially ffect the quality and sensitiveness of emulsion. I know that lessrs. Sceptic, Don't-believe, and Won't-try will, as a matter of ourse, take exception to this statement; yet "facts are stubborn hings." I have not only reasoned the thing out but demonstrated hat my theory is correct. But I suppose I must not bring the ubject forward as new or I shall have a shower of claimants about ne. One of the greatest misfortunes I have laboured under is the ifficulty I have to make myself perfectly understood. With these reliminary remarks, I will at once proceed to give my views.

In the first place, I will take the case of a very sensitive emul- ion—one which generally gives, when not thickly coated, a very hin image. In this case a small quantity of gelatine having a natt surface will give a better or denser picture, because less light vill penetrate the bromide of silver. A plate giving a matt sur- ace is always slower than when a larger quantity of gelatine is used—that is, when the same amount of silver bromide is present. have frequently noticed (and others also) that a soft gelatine dded to emulsion before coating gave quicker pictures. This I ccounted for by the so-called molecular change taking place more apidly in soft than in hard gelatine.

I have somewhat modified my opinion, and to this effect: that the mount of gelatine has as much, if not more, to do with the rapidity than any molecular change has. A slow plate (varying from two to ten times the rapidity of wet collodion) is usually of a yellowish or cinnamon colour when viewed by transmitted light, consequently it does not transmit as much light; and then there is scarcely a limit to the amount of gelatine that may advantageously be added. A large quantity will allow more light to pass through, and there is a corresponding increase in rapidity. I have not yet worked out the smallest amount of bromide of silver necessary to give good results. The greatest number of plates I have coated with an emulsion made with 200 grains of silver nitrate was about thirty-six dozen quarter-plates.

This emulsion, when viewed by transmitted light, was a cinnamon colour, gave splendid, *dense* negatives, and was about twice as rapid as my wet collodion then in use. I will not just now give you the exact formula; I will do so at another time when my experiments are somewhat more advanced. Suffice it to say that I used a large quantity of gelatine, converting half the silver into ammonia nitrate, then boiled, getting the silver bromide, in the first stage, in a very fine state of division. I do not say that it was a necessity to boil; but in this case I thought to increase the sensitiveness by boiling, as I did not use much ammonia. Please bear in mind that you can stop out more light with a pound of black paint than with a pound of greenish-violet, and this is about the relationship between rapid and slow emulsions.

Some present may not be aware that it is not an absolute necessity to wash or precipitate emulsions or to get rid of the salts. I have made many batches, which produced very fine negatives, by simply increasing the bulk of gelatine—say to as much as from eight to ten times the usual quantity. I am obliged to use potassium bromide. It will be seen that when using that quantity of gelatine, increasing the bulk of emulsion, little or no crystallisation will take place; and I do not doubt the permanence of the uncrystallised condition of the salts in this emulsion, and, therefore, that the necessity for washing to remove these salts is done away with. We find gelatine lozenges and jujubes keep an indefinite time. They contain a great deal more soluble and hygroscopic salts than an emulsion such as I have described.

I leave the matter in your hands for discussion. If I have not made the matter sufficiently clear I shall be pleased to do so more fully.

A. L. Henderson.

LENSES FOR INSTANTANEOUS WORK.
No. II.

If the real question at issue were "What is the most rapid type of lens?" the answer would unquestionably be—"the Petzval combination," so generally adopted as the portrait lens. To this day it is not only the most rapid lens known, but there is every reason to believe that it is not capable of any considerable improvement. Some of the varieties of this type, formerly in use under the names of "orthoscopic" and "universal," it seemed to be thought might very likely come into favour again. Anything distinctly new in the way of lenses is hardly to be expected; and, after all, is it really necessary? The increased rapidity of gelatine plates has put almost every class of subject within the range of the simplest form of lens; and it is still within the bounds of probability that more rapid plates still will, if necessary, be forthcoming. Indeed, I know that plates of a "hundred times" have been made; but such is the difficulty of manipulating them on account of their extreme sensitiveness to light, even "ruby," that this particular batch, which were made for a special purpose with highly satisfactory results, were, when tested in the manufacturer's own studio in the usual way reported as useless and condemned to be washed off—a fate which, it is almost needless to state, they escaped. By more rapid plates I, of course, include more efficient or more powerful systems of development; for, as with collodio-emulsion plates, it is now said that their rapidity is three times greater with ferrous oxalate developer than with pyrogallic, so it is by no means improbable that a more active developer may be found for our modern plates. By the way, ferrous oxalate is not a new developer for collodio-emulsion plates; it was the developer recommended for a commercial plate at least five years ago. It is, therefore, in this direction that increased rapidity *must* be sought; for, whatever the future may have in store for us in the shape of more generally-useful lenses, it cannot possibly give us depth of focus and large aperture at the same time.

It must be borne in mind, first, that wide aperture is quite incompatible with depth of definition, and that this holds good for the most perfect aplanatic lenses precisely in the same ratio as it does for the cheapest lens; and, secondly, that with gelatine plates of maximum rapidity the exposure with an aperture of $\frac{f}{30}$—a small stop—is just the same as would have been required with wet collodion with the extremely rapid portrait lens worked with an aperture of $\frac{f}{4}$, while the field covered and degree of definition would be immensely greater. It will, I think, be found that an aperture of $\frac{f}{15}$ is as great as any lens in ordinary use will allow to cover anything like a fair angle of view—30° to 40°; and that with this ratio of aperture there is not any very great difference between the various types, while such an aperture is quite as great as can ever be allowed if a reasonable amount of depth of definition and equality of illumination are desired.

If, therefore, Mr. W. K. Burton's tables of exposures may be accepted, nearly the whole range of so-called instantaneous subjects, coming, as they do, within the categories of "sea and sky" or "open landscape," would require an exposure of less than a quarter of a second with this aperture, and are, therefore, well within the capacity of any moderately wide-angle lens, either single or compound. This, indeed, was abundantly proved by specimens shown taken with each of these types.

Some little time was devoted, at the meeting already referred to, to the possibility of lenses being so constructed that a change of position in the mount would lengthen or shorten the focus at will; such, at anyrate, appears to have been done with a microscope

objective. Another possible system was that of interposing another lens either behind or between an existing double combination, and so changing the focus. Indeed, a very wide field is open for some such arrangement; and, as Mr. J. Traill Taylor has not only succeeded in some such plan, but has also found that the back lens of a rectilinear can be replaced by a simple non-achromatised lens without impairing the photographic value of the combination, I think the time should not be far distant when the ordinary amateur should be able to provide himself with a set of thoroughly effective lenses at a moderate cost, even though they may not be as perfect optical instruments as the lenses now in fashion. Is it not a fact that, while making every possible concession in favour of the highest-class lenses—that an aplanatic, for instance, may be worked with full aperture, while an ordinary single lens must be worked with a comparatively small aperture—the picture taken with the common lens and small aperture is better in every respect than the other? If this be so, is not rapidity only a secondary consideration? Do not *all* the high-class lenses give far better results when stopped down? If they were as perfect as they are fondly imagined to be, one aperture would be as good as another. That they are not superior to a common lens, it is, of course, needless to dispute for a moment; but the difference is not so very great, while the temptation to use them with a larger aperture than they or any lens can fairly bear, has led to the production of innumerable sorry pictures—more on account of inequality of lighting than lack of definition.

The real question is, perhaps, not so much which is the best type of lens as which is the best battery of lenses, so as to include every possible range of subject. This is really the question which every amateur would like answered. We may, therefore, confine ourselves to the smaller sizes—not exceeding $8\frac{1}{2} \times 6\frac{1}{2}$—for it is generally acknowledged that the smaller the plate the less the difficulty of extreme rapidity; so that for large pictures including any considerable angle it is absolutely necessary to take a smaller negative and afterwards enlarge it.

We will suppose, then, that one has a camera of the ordinary tourist's size—say up to $7\frac{1}{2} \times 5$. The first essential is that it should have a good range of focus, not less than twice, but preferably three times, the length of plate. If he *must* have a rapid lens, with all its disadvantages—unequal illumination and want of depth of focus—he had better choose one of a focus of about one and a-half times the length of his plate. If he be wise he will stop it down, if only for the sake of depth of focus, using every effort to improve himself in developing, so as to get the best possible result with the least exposure, keeping the extra power of fuller aperture in reserve for duller days and more rapid subjects. By least exposure I mean, of course, the smallest practicable aperture; for the duration of exposure should be as long as possible consistent with the class of subject. Equally, of course, if he can afford it, he cannot do better than go to a maker of repute; for such lenses are like plate—they have a real market value, at anyrate while they are in fashion.

It is a pity that this class of lens is not so mounted that either the front or back lens might at will be used as a single lens. I have one, by a leading maker, in which the back lens is fastened in the flange, I therefore cannot try the front lens alone without an adapter. Another has the back lens removable, so here I can try the front lens but cannot try the back one by itself; the hood is fastened to the front lens, and, therefore, another shutter has to be fitted to the mount before it is available. And I have yet another in which the front lens is fastened in the hood and the back lens in the flange, so that to try the back lens (which alone can be tried separately) I must have another shutter. Surely, as these lenses might be used separately—each at times with advantage—the makers *might* so mount them as to enable it to be done; and, even if it were not at first so profitable as selling another lens of double the focus, it is by no means certain that the second lens is bought at all, while it is far more probable that the plates are not exposed at all for want of the longer focus. I am not myself an admirer of this type of lens; but it has this advantage—that the lenses, being of larger size than the wide-angle doublets, are available for use singly for long focus bits, such as marine views, or at least could be if the mounts were made symmetrical and the lenses interchangeable without touching the hood or flange.

A wider angle is sometimes wanted, both for panoramic, landscape, and architectural work. As the latter *then* necessitates a rectilinear to avoid distortion, one of a little less than the length of plate should be selected; and here, again, there is no reason why the mount should not be made symmetrical with the rapid lens, so that one shutter would fit both.

Now, provided that the mounts are symmetrical, there is no reason why the lenses should be exact pairs; indeed there are good reasons why they should not be. With a set of this kind we shou have four lenses interchangeable in either mount, making six se rate combinations—all practically rectilinear over the plate th were intended to cover—and four single lenses of different fo making a choice of ten. Neither would, possibly, be the most p fect combination that could be made; but I leave it to my read to judge whether it would not have a special value—not only by economy, but its convenience and portability. A simpler set—co sisting of one short-focus rectilinear and a few single lenses—wou do everything needed except ultra-rapid pictures, and even th with extra rapid plates and extra care in manipulation and develo ment.

Whether such a set as I have described is likely to be put in t market is problematical. As far as I can judge it is not very pr bable; for my endeavours in this direction have not only n been favourably received, but have met with very decided oppo tion on the part of the opticians.

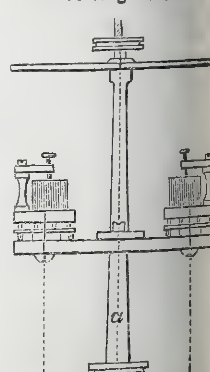
I do not wish to be misunderstood: while admitting that a so-call aplanatic lens—necessarily commanding a much higher price—w work with a larger aperture, and therefore, being more rapid th one not so corrected, is superior as an optical instrument where t large aperture is absolutely required, I contend that the exigenci of pictorial effect demand almost imperatively that a small apertu be used; and that, therefore, while in some cases no lens can be t perfect, in the immense majority of cases equal, and even superic results can be obtained with a far simpler and more inexpensi form.

The common single lens, from a purely optical point of view, ha all sorts of defects; but even its defects can be turned to advantag Let anyone who doubts this take the commonest quarter-pla single lens he can procure—say, about five and a-half inches focus- with a stop of about $\frac{f}{50}$, he will get a landscape crisp and sharp to th very corners; with $\frac{f}{15}$, excellent definition; while, if he will open ou the aperture to about $\frac{f}{8}$ and try a bust portrait, he will have the ver lens he wants for the portrait of her he loves best—one that l can hold quite close so as to look into her eyes, and so correct th perspective of a portrait taken with a lens of so short a focus. A the same time the spherical aberration of the lens will throw th margins out of focus and so "vignette" the head and shoulders in far more artistic way than the ordinary floating head; while, on th other hand, if he will cut the mount down so as not to obstruct th light, and use a smaller stop, he will be astonished, perhaps, t find that it will cover (say) $7\frac{1}{2} \times 5$, with fair pictorial definition t the edges. George Smith.

SPECTRAL INVESTIGATIONS.

The three and a-half days during which the Whitsuntide holiday have set me free from business I have used in the arrangement of m revolver of prisms. By working part of the night, also, I finished th little apparatus on the 15th May, and at once tested it slightly. T all appearance I have made no blunder, for the contrivance prove extraordinarily convenient. The advantage of being able to inser another prism in a moment, without troublesome fixing of fresh prism plates, &c., is so evident that I shall not waste words upon it; and, if such be the case when observing, the gain of time is still greater when photographing, the spectrum.

Illustration of Revolving Prisms.



The change of prisms requires seven or eight minutes on an average. I now hope to change them in as many seconds. The revolver is only arranged for four prisms. Each prism is fastened by screws upon an adjustable plate which turns upon its axis. The four plates are mounted upon a larger disc, and when using the revolver I place this disc in the position of the scale tube; so that the latter cannot be used when I work with the revolver. In the accompanying diagram only two of the prisms are shown. The axle *a* occupies the place of the scale tube. I have still to make a light-tight cover, which is quite essential for rapid working. In June I shall have my holidays, which I shall employ in making photo-chemical experiments. V. Schumann.
—*Wochenblatt.*

PRACTICAL AIDS TO INSTANTANEOUS PHOTOGRAPHY.

[A communication to the Liverpool Amateur Photographic Association.]

In treating upon the above subject I find it difficult to add anything new to that which has already been written and said by abler member

f our Society, so I shall content myself by explaining the practical dvantages of apparatus which I have found in my own practice to be f the utmost value, and by the aid of which I have been enabled to rocure the pictures before you.

In my opinion the taking of rapid pictures does not receive that ttention from the members of our Society to which it is entitled, eeing the numerous experienced members we have who possess a election of the most rapid lenses and expensive cameras, with quite an ssortment of shutters of different makes, and who expend liberally in aying high prices for the most rapid plates; yet, when opportunity rises, all these advantages are neglected, or, if used, are employed vith great doubt as to the result. This should not be the case; for, vith a little necessary attention and study, instantaneous work with a hutter ought to be as certain in its results as ordinary work with a ap. To attain this desirable end four items will be found indispenable, namely, a good light, a rapid plate, a rapid lens, and a shutter.

Without the first the other items are of little use in instantaneous vork. There are so many good rapid plates in the market, upon which he makers say that pictures can be taken in a fraction of a second, that nless our amateur makes his own he can hardly go far wrong in selecting; but I strongly advise keeping to one make and thoroughly proving ts capabilities. In this way far better results will be obtained than by continual change from one maker to another.

The lens must be of a rapid combination type and of sufficient focal ength to cover the plate *with full aperture.* This is essential to allow he full advantage of a rapid shutter. This latter requires more than a assing thought, and is an indispensable aid to the previous three tems; for upon its judicious use depends the success of the final operaion.

Although there are a great many kinds of shutter in use—some very arge, some very small, and some very rapid—yet very few possess any neans of adjustment for speed, which I consider to be a necessary and nost important item. I will take the drop shutter, placed between the enses, as an example. This, if not found sufficiently rapid of its own veight, is usually pulled down by a rubber band, which increases its speed considerably; but possibly one quarter of the speed would have een sufficient for the subject being photographed.

I would suggest that all makes of mechanical shutters should be upplied with the maximum amount of force to start with, but with an ppliance to regulate the speed—say by a screw with degrees marked pon it—so that a record could be taken of the pressure applied. Thus pon developing a picture with a known pressure, the following information would be obtained once for all.

If the picture were fully exposed but the figures had moved, it would t once be inferred to be useless trying that class of subject at the speed mployed, which would have to be increased until movement of the igures was no longer discernible. If, when the figures are sharp, the late appears under-exposed, the attention must then be turned to the ight, the rapidity of plate, and the nature of the developement; knowing hat to take this class of picture successfully, it must not have a longer xposure than the record of the test subject. My own shutter (which s a rotary one) has this regulated pressure applied to the rotary disc. If this shutter worked between the lenses it would be all I could wish; out, unfortunately, it fits upon the hood—a most inconvenient place.

The next aid is the *finder*, and this I have found of very great use in watching any moving objects until they arrive at the exact position desired upon the plate. It is a very simple little instrument which any one can make for himself, being merely a small box having at one end a piece of ground glass of a shape corresponding to that in the camera, and at the other end a double-convex lens such as is used by watchmakers, covering on this focussing-screen somewhat less of the subject than the working lens. I have found this simple little instrument of inestimable value in quickly arranging the perpendicular lines of buildings when operating from the top of an omnibus, &c. This brings me to my new portable camera holder for use on boat or omnibus, &c.

Most amateurs who have attempted to plant a camera on a crowded boat will, no doubt, have experienced the difficulty in finding a safe and suitable position for the camera-stand; but if there be a handguard or rail—such as is usually to be found on our steamers, omnibuses, and tramcars—this little holder will provide a firm resting-place for the camera. It forms a kind of adjustable clamp, with an universal or ball-and-socket movement. When it is attached to the camera the clamping-screw is adjusted to the thickness of the hand-rail, to which it is then pushed on and screwed quite firm, when it will be found securely fixed and out of the way of passers-by. The ball-and-socket movement will enable you to quickly turn the camera in any direction, and will remain sufficiently firm to admit of the required exposure.

The street views I pass round have all been taken from the tops of omnibuses by the aid of this holder. The buildings are quite straight, although the omnibus in many instances was not level. The finder being attached enables you to adjust the camera quickly, and to a nicety.

Regarding the development of a plate which has had a brief exposure: I find an energetic and quick one the best, with as little restrainer as possible.

Very possibly there may be nothing new in these few remarks; but if they are the means of directing the attention of my fellow-members to this most entertaining branch of our art, the ends of this paper will have been attained. RICHARD CROWE.

THE BRITISH MEDICAL ASSOCIATION.

THIS important Association, now holding its annual meeting in Liverpool, has on view amongst the illustrations in the temporary pathological museum in the College, Shaw-street, a number of photographs which serve to show how useful our art-science may be made as an aid to medicine.

Although the photographs shown are not in many cases attractive to the ordinary photographer from their purely technical character as relating to medical subjects, still they are very interesting. One of the first series to be noticed on entering the room, is a group of portraits illustrating the physical features of idiocy, by D. E. Shuttleworth, B.A., M.D., of the Royal Albert Asylum, Lancaster. Next in order come a series of photographs of miscrscopic sections, by Dr. Paul, President of the Liverpool Microscopic Society, amongst which are to be noticed the prints of embryo of chickens in various stages, sections of the spinal cord of a cat, and a section of spinal ganglion of the same animal. We noticed a splendid print of the muscle of the newt, showing the striation very clearly, and several photographs of diatoms—arachnoidiscus and navicula—as well as a vegetable section of the clematis. These, though not medical, are exquisite as photographs.

There are also photographs, from Dr. Alexander, of hip disease and osteo arthritis; by Dr. Malley, of bacillus anthracis and tuberculosis; with many others of equal importance, which, however, our limited space prevents us from noticing. But we must not omit to mention the photographs of the larynx, shown by the lime light, exhibited by Dr. Lennox Browne.

The importance of photographic records to science cannot be overestimated, and it is encouraging to see that this fact is being gradually recognised. The dispassionate record of what the camera actually saw at a given moment will always be more satisfactory evidence than the enthusiastic description of what an observer thinks he saw. The camera is always ready to tell "the truth," and "nothing but the truth;" and while, of course, the "whole truth" can only be elicited by the careful study and comparison of the photograph with the object it records, no bias need ever be feared on the part of the instrument.

Numbers of medical men have readily admitted the usefulness of the camera. Coloured photographs of skin diseases are used as faithful descriptions for students in one instance at least, and Dr. Norris has used photography largely on this occasion, as mentioned above, in connection with the microscope, to depict the so-called "third corpuscular element" in the blood. There are also photographs of "marrow" and "bone" corpuscles.

The value of change of work as a means of recreation is so strongly urged by medical men that it is easy to turn round and offer them the same prescription. It seems needless to suggest that the camera is nowadays, since the introduction of gelatine plates, ready for everything at a moment's notice, and might be much more frequently used than it is to photograph cases of deformity, and to show the marvellous powers of surgery to relieve such cases.

The President of the Liverpool Microscopic Society sometime since used photographic slides of his own production in illustrating his inaugural address on *Nerve Tissues*, thus severely testing the powers of the camera in connection with the microscope on a most difficult subject, and at the same time demonstrating conclusively its usefulness. We have no doubt that photography is destined to play a very important part in connection with medical science in the near future.

POST-MORTEM PHOTOGRAPHY.

POST-MORTEM cases come in the way of most photographers at some time or another; and for some reason—hereafter to be determined—are very rarely refused when they do come. This class of work is not of the pleasantest description; and that is possibly the reason why it is never undertaken by the principal himself, and only on rare occasions by the chief operator, that gentleman often refusing point blank to execute the work, even when it is to be done for one of the firm's best clients. Hence the work is mostly delegated to the assistant operator, and even at times to the general assistant. As to whether work of this description should be accepted at all there are many arguments both for and against; but, although the latter must be allowed to predominate, still the work goes on, and some one or two firms in London derive no inconsiderable portion of their yearly income from this source alone.

In the first place, it is a difficult matter to ascertain, with any degree of certainty, the cause of decease and whether or not there is any danger of infection. Persons anxious to obtain a photograph of a deceased relative are not always to be relied upon to tell "the truth, the whole truth, and nothing but the truth" as to the ailment to which the said relative succumbed. If the operator happen, as is often the

case, to be a married man with a family the danger is increased; for, though he may, haply, escape infection himself, still he runs the risk of conveying home in his clothing germs of a disease which may attack one of his children. As children are always more liable to take disease from infection than are adults, who shall be bold enough to say that the whole family may not be stricken down? The least evil to which the father may be rendered liable is the worry and anxiety of a sick family for some weeks, culminating in his being mulcted in a heavy sum by way of payment to the family doctor. In a case like this, and which is not altogether suppositious or without precedent, the employer does not hold himself liable for the expense or anxiety incurred, and were the operator to refuse the work he would in all probability lose his situation. Then, again, in many cases the precaution of asking the cause of death is not even taken, and so the risk is doubled; for there are still some persons honest enough to answer truthfully when interrogated on the matter.

In the second place, it must be admitted that *post-mortem* portraits are never entirely satisfactory, owing to many causes, one of which is that the relatives of the subject expect the resulting photograph to represent their deceased relative as they knew him or her in life; and the lens, however skilful the operator, cannot overcome or hide the alterations effected by the hand of death. Another reason for this non-appreciation of results is that the photograph is always taken under difficulties as to light and space. In many cases the body is in a bed in the very darkest corner of the room, and the friends will not, under any circumstances, allow it to be removed to a more convenient situation. All the operator can do, with the aid of looking-glasses and sheets of white cardboard, only tends to alter the likeness by throwing lights that are either too broad or not broad enough, and simply flatten the face and render it almost, if not totally, unrecognisable. Sometimes the relatives are most obliging and ready to do anything possible to aid the photographer in his uncongenial task. I have had cases in which the offer has been made to carry the corpse into the garden, and have heard of one case in which a bereaved husband offered to have the body of his wife conveyed to the artist's studio so that he might secure a good picture. In the majority of cases the operator finds the body already coffined, and is asked to take the picture so that the coffin will not show. This is not a particularly easy thing to do; but, by the aid of skilful vignetting, it can mostly be managed.

I remember one case in which the deceased was a young lady of some twenty years. A picture was wanted 18 × 15, and I was despatched to do the work. The lens used was a rapid rectilinear, and for a wonder the body was in a well-lighted room. I obtained a perfect negative, the head being more than half life-size. But I do not think I shall ever forget the retouching of that negative—it was such sickening work. Of course only one print was wanted, but the father did not object to pay the price asked, namely, 50/-, which, however, did not go into my pocket, but into that of my then employer, who, it is needless to say, had nothing to do in the matter but graciously to approve my work and take possession of the proceeds thereof.

Usually it is a child the photographer is called upon to photograph, the reason being that most adults have at some period of their life been portrayed, and an enlargement from that portrait is generally preferred to a *post-mortem* picture. But children are often cut off before they have ever been photographed, and the desire to have something to remember them by, and to recall their once-familiar features, must be taken as the excuse for the existence of this class of work at all. I generally take two plates of every subject, and whenever or wherever it is possible I have one of them a Rembrandt, and find that this is usually preferred; as with the ordinary lighting obtained in a bedchamber it is next to impossible to obtain a picture that does not look even more corpselike than the corpse itself.

Mr. George R. Sims, in his clever and effective series of articles entitled *How the Poor Live*, mentions several cases of dead bodies being kept for several days in the general living room of the family. Judge my horror, then, when recently, on being called out to photograph the deceased child of a *shopkeeper*, I found that the corpse was kept in the general living room, in the grate of which a bright fire was burning, and where two or three other children were playing about. I suppose the excuse would be want of room; for it happened in Scotland, where every room is parted with that can be let, no matter what little space is left to the family in which to "pig" together. This room was evidently a sleeping room as well as a living room, and yet the occupiers could afford to have the child photographed.

As regards pounds, shillings, and pence: I cannot help thinking it would in many instances be found remunerative to submit the *post-mortem* photograph, together with the latest one taken during life (where such an one is obtainable), to an artist and set him to paint an opal from it, of course representing the subject as in life. Then the relatives might have a portrait on which there would be some pleasure in looking, and that would recall to their memories their living child; instead of which an ordinary *post-mortem* portrait can only, at best, recall to their minds the child as it appeared after death. Then, too, from the opal could be reproduced *cartes*, which they might send to their friends. This cannot be done with the ordinary *cartes*, or, if it is, the picture will not find its place in the album, as the reproduction undoubtedly would.

It would be found that, if one of these pictures were shown when a *post-mortem* case came in, in nine cases out of every ten the order would be given for an opal and *carte* therefrom; or, if the client were not well enough off in worldly gear, a cabinet in black and white might be shown at a lower figure. The opal I would suggest to be about 12 × 10, or at least a whole-plate, which might be done for £3 3s. or thereabouts; and the cabinet size in black and white, which might still be on opal, could be put in at (say) £1 1s. That is, of course, in excess of the ordinary charge made for going out to do this kind of work.

I give out this suggestion for what it is worth, as, of course, it would be adapted to the usage of each particular studio, as different sizes are in use at different studios. I trust it may be found of some practical value.

C. Brangwin Barnes.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

THE VALLEY OF THE WYE.

The beauties of the River Wye have long been a favourite subject of both the poet and the painter, but they have been very much more taken for granted than seen; indeed, till the opening of the Ross and Monmouth and the Severn and Wye railways, the difficulties of approach were too much for the average tourist, who likes to have a plain and easy path to his destination. The facilities now afforded are all that could be desired. The Great Western Railway Co. issue tourist tickets available for a month, price 35s. 6d., second class. You travel *viâ* Swindon, Gloucester, and Ross to Monmouth, returning by way of Tintern and Chepstow to Gloucester and home, with liberty to break the journey at several places detailed; but as you can only go once over the same ground it is best to pay for the local trips and save the ticket intact for the return journey.

Thanks to the kindness of Mr. Bedford, to whom I was indebted for some invaluable advice as to what to see and where to go, I selected Symonds' Yat as a stopping-place, and if the reader who proposes going does the same he will have no reason to regret it. You start from London at twelve o'clock, arriving about four; or at three, arriving about half-past seven. The journey to Ross needs no description, and from thence to Kerne Bridge and Lydbrook you get glimpses of the river, as a foretaste of what is to come. Soon you pass through a dark tunnel, and on emerging you are at once at Symonds' Yat and in the midst of an earthly paradise. The Wye flows through a deep gorge, and high on each side the limestone rocks are clothed from base to summit with beech, oak, ash, and firs, presenting a variety of tints of green too beautiful for description by me. Here and there the rock stands out high above its surroundings, as if

"To sentinel the enchanted land."

The sun is sinking to its rest over the river to your right. The spires of rock are aflame with crimson, the river is a sheet of molten gold, and as you look and look again the one defect of photography obtrudes itself upon you, and you say to yourself—"What would it be if colour could be linked to perfection of form!"

But there will be plenty of time and opportunity to see and to admire, and you cannot stay all night gazing. You want something to eat and a bed later on, and, fortunately, both are at hand. Davis's refreshment house is close to the station, and if the tourist be wise he will have written to know if he can be taken in. If "taken in" he will be "done for," but in a sense very different to what is usually understood. It is just like being at home. There is no army of servants, ever, like the horse-leech's daughter, crying—"Give, give!" Mrs. Davis will wait on you herself, and she has the happy gift of making it appear that there is no one but you for whose comfort she cares. Do not delude yourself; she is the same to everybody. Eat and be thankful; and then come out under the verandah and smoke your pipe. It is the gloaming time: the greens are brown, the river in front of you still glows with the light reflected from the west, where the sun has set; and if the deep peace and quiet does not steal into the heart, with thankfulness that the world around you is so sweet and fair, you have no right to be a photographer.

Who is "Symonds?" Who is he? And what is his "Yat?" Well, who he is or was nobody knows and nobody cares. His "Yat" is a high bluff which terminates the Caldwell Rocks. The origin of the name is doubtful. Some think it a gradually-degraded form of the word "gate," and others that it is a Celtic word signifying "height." It does not matter; the thing is there. You pass out at the back door of Mr. Davis's house and begin to climb, and you keep on climbing, only that it is a steep but well-made path, and not where you have to call your hands to the assistance of your legs. By-and-by you turn and turn again, and at last you come out at the top—a small piece of table-land. No need to tell you that you have reached your goal, for a few steps further and you would go sheer down 600 feet. Three counties—Hereford, Gloucester, and Monmouth—are in sight. Below you look on three rivers as it seems, but it is only one—the ubiquitous Wye. It twists and doubles, and returns upon itself as if reluctant to

leave the district it helps so much to beautify. You are standing over the tunnel through which you came. It is only 440 yards long, and the river grasps it at either end; but follow its course from one point to the other and you must row or walk five miles to compass the distance.

But I must not thus linger over beautiful scenery, or this communication will be too long, and specific aid to the photographer will be wanting. Fortunately, he will need no help to discover "food" for his camera in rock and river, and Mr. Davis and his son—most courteous of guides—are always at hand to give advice or information if it be sought. He will tell you where "Mr. Bedfood"—appreciated as he deserves—stood to take this view or that.

When you wish to go further afield a third-class ticket (always travel third locally, for the carriages are just as good as second) will take you to Kerne Bridge for Goodrich Castle—most beautiful of ruins; or the other way to Raglan, for Raglan Castle; Tintern, for Tintern Abbey; or Chepstow, for Chepstow Castle. A little shilling guide, to be had at the Monmouth (Troy) station, will give all the information needed about these world-famed places; but the photographer will require no help in placing his camera (the morning light should be chosen) so as to secure pictures of their grand old walls and windows, their decay decorated with ivy and lichen, contrasting so beautifully with the tints of the stone—the slow result of centuries of time!

Raglan Castle afforded a refuge for a while to Charles I. at the time when he was being "hunted like a partridge" by the victorious Cromwellians. Subsequently it was besieged, and made a brave defence; but famine allied itself with the besiegers, and the garrison was compelled to surrender. I was setting up my camera to take the gateway, when the son of the custodian of the place came up to me. "You ain't a perfessional photographer," he said. I admitted the fact, but asked him how he knew. "Because" he replied, "when a perfessional comes *it always rains*. Ask Mr. Bedford!"

The visitor should not fail to visit the Lady Park Caves, which have been opened out by Mr. Davis, who holds them under lease from the Crown, and who will conduct the tourist through them. They cannot be photographed, of course, as their only light is derived from the candles carried in the hand, but they are very wonderful. Their origin is doubtful, and antiquaries wrangle as to whether in far-distant ages they were worked for iron ore, or if they have been hollowed out by the rush of water long continued. Some of the chambers are too high for the candle to light the roofs, and for others one must stoop very low. But in the long course of ages, the dripping water, charged with the lime of the rocks, has woven over the surface of much of the walls a veil of seeming alabaster, while stalactites and stalagmites, slowly forming, carry the mind back uncounted years.

My communication has been a long one, and yet I must leave much unsaid. Only one thing more: I presume those I address will spend one Sunday at anyrate in the district. Let them walk through the woods over the Caldwell Rocks to English Bicknor Church. They will never forget it. Here and there the rocks jut out and form vantage grounds to view the fair prospect below. Do not go too near their edge. Deep down the sheep on the meadows look like pieces of white paper on the green.

> "Aloft the ash and warrior oak
> Cast anchor in the rifted rock."

Should any reader think of visiting the place, to him I give the advice of Lady Macbeth—"Stand not on the order of your going, but go at once," for the "warrior oaks" will soon be there no longer. Their beauty and comeliness have marked them for destruction, and their brown sides bear the red cross which dooms them to fall. How many of their human compeers have been lost from similar causes!

There is only one drawback. The weather in the district is usually a good deal "mixed." There is more rain and cloud than seem to be needful; but I am sure that, come storm or sunshine, no one will regret that they spent their holiday at Symonds' Yat. F. H. Carter.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The Exhibition of this Society for 1883 will be held in the Central Exchange Art Gallery, Newcastle-on-Tyne, in November next, and will be inaugurated by a *conversazione*. The Exhibition will remain open daily (Sundays excepted) from 10 a.m. till 9 p.m. The following medals will be offered:—A silver medal will be given for the best set of three seascapes or landscapes, interior, or architectural views, restricted to members of the Association; a medal for the second, and three certificates of honour.—A silver medal and certificates will be given for the best single landscape or seascape, architectural subject, or interior; restricted to members of the Association.—Also, a silver medal and certificates for the best figure study; restricted to members of the Association.—A gold medal for open competition for the best picture in the Exhibition, and a silver medal for the second.—A silver medal for open competition for the best figure study, and a silver medal for the second.

Photographic prints coloured by hand will not be admitted for competition, but may be sent for exhibition.

Photographic apparatus and appliances may be sent for exhibition, also negatives and transparencies properly mounted, at exhibitor's own risk.

The Hanging Committee may reject any picture or apparatus.

The original work of the exhibitor only allowed to compete. There will be no restriction as to the size of the picture or pictures. Exhibitors and competitors may exhibit a single picture or any number of pictures. The pictures must be mounted and framed.

The Judges selected are Colonel P. S. Sheppee, Chester-le-street; H. H. Emmerson, Esq., Cullercoats; and G. Bruce, Esq., Duns, Berwick.

Any further information will be supplied by application to Mr. Schumann, 15, Mossley-street, Newcastle-on-Tyne, or to the Honorary Secretary, J. Pike, 43, Northcote-street, Westgate-road, Newcastle-on-Tyne.

GELATINO-BROMO-IODIDE OF SILVER.*

Singly-exposed plates have generally but a subordinate value for comparative experiments, because one can seldom reckon upon the constancy of the source of the light. For this reason the singly-exposed plates were not included in the reproduction; but my experimental series of plates, made by combining four strips, were used for today's lichtdruck supplement. This lichtdruck, executed in the lichtdruck establishment of A. Naumann and Schröder, of Leipzig, which is well known for its excellent productions, reproduces—thanks to the especial care bestowed upon it by that firm—even the most delicate details of my original so faithfully that I may well maintain that lichtdruck has here done more than a silver print upon albumenised paper could have done.† One must have seen the negatives, in some cases very thin, with their colour, which retains the chemical rays but little (the plates were developed with Eder's normal developer), in order to be able to appreciate fully the difficulties which would arise in printing them upon albumenised paper. Before the details in the high lights had appeared the shadows would be over-printed. One would in that way either get very flat pictures, in which the Frauenhofer lines of the photographic maximum would be more or less wanting, or else very powerful prints, which are, however, much abridged towards both sides and contain but few delicate lines. Of course it is evident that the negative must not be intensified if its original character is to be truly preserved.

The four negatives used for today's lichtdruck were taken on the 25th December, 1882, in the time between 1.37 and 2.23 p.m., by cloud light, with exposures of one, three, ten, and twelve minutes respectively. For the two first the aperture of the slit of the spectroscope was 0.146 mm., for the others only 0·073 mm. Hence the proportionate strength of the light to the length of the exposure was not the same, but as 1 : 3 : 5 : 6, by which, to be sure, equal conditions in the part of the sky lying in the field of vision of the collimator is presupposed. I can, however, attach but a subordinate value to this lighting proportion amongst the four striped plates with respect to each other, because the clearness of the horizon during the exposure, however uniform it may have seemed to be, was certain to have undergone changes, which extended not only to the optical brightness, but also to the chemical action of the rays in question. Therefore a comparison of the four part spectrographs with one another is not, strictly speaking, reliable.

It is, however, otherwise with the lighting of the four stripes of which each single plate is composed. The exactly parallel-edged micrometric slit of the spectroscope, the way in which the slit is opened and closed during the taking, and especially the reliability of the Steinheil spectrograph (which I have sufficiently tested), assure me of the equal insolation of the four preparations, Nos. 138, 139, 140, and 141,‡ simultaneously exposed upon one striped plate. The proportionate sensitiveness, graphically represented by the expanse of the four spectra, can be regarded as furnishing a measure for the one plate, and for the light used there under all circumstances.

The first glance at the present supplement teaches that the influence of the iodide of silver upon the gelatino-bromide of silver is very powerful when a suitable mode of preparation is employed. While with an exposure of one minute of gelatino-bromide only extremely slight traces of a photographic action appear, which, if one can judge by the negative lying before me, can be followed towards the red as far as F $\frac{4}{5}$ G; the bromo-iodide emulsions 139 and 140 exhibit not only a much more extensive but also a much more intense spectrum, which reaches at least to the borders of the blue at F. The emulsion No. 141, made from separately-prepared gelatino-bromide and gelatino-iodide, on the other hand, remained in the same spectrograph far behind the other three preparations Nos. 138, 139, and 140. In this case the insensibility is so great that I, myself, cannot discover any trace of an

* Continued from page 195.

† It is impossible to reproduce by typographic means the lichtdruck print referred to, as its value as an illustration of Herr Schumann's remarks rests solely upon the accuracy of its gradations, which could be but imperfectly rendered by the engraver. —Eds. *B. J. P.*

‡ This was the method with iodide of silver emulsion in gum solution and subsequent digestion.

image on the negative. The remaining three spectra show the same proportionate sensitiveness as the first. In consequence of the longer exposure, the action of the light on the stripe No. 141 no longer remains invisible; but its spectral behaviour still deviates so considerably from that of the remaining preparations that, besides a considerable want of intensity and slight sensitiveness to the less refrangible rays, a surprising insensitiveness makes itself remarked in the violet between G and h. This is the minimum of mixed gelatino-bromo-iodide discovered by Captain Abney.

As in the visible part, so also in the invisible portion of the spectrum are the emulsions Nos. 139 and 140 favourably distinguished from the others by a greater excitability. The blackening of the negative I can follow up, in the plates exposed for twelve minutes, to even beyond N. And even in the lichtdruck the M group of the Frauenhofer lines appears distinctly, in spite of the very moderate intensity of the negative at that spot. The photographic maximum of these emulsions has changed its position considerably as compared with the photographs previously taken by means of my small spectroscope, made according to H. W. Vogel's directions. While, for example, I formerly found pure gelatino-bromide of silver most sensitive at F $\frac{6}{10}$ G, the maximum is pushed into the violet in the spectra obtained with Steinheil's spectrograph. This can already be recognised from the lichtdruck, and still better so from a number of spectra taken by me by means of the wedge slit. I have sought the cause of this displacement of the photographic maximum in this case, less in the composition of the atmosphere, which—to be sure, as Professor H. W. Vogel has frequently testified, exercises a very remarkable influence upon the place of highest excitability—than in the great transmittent power of my Steinheil spectrograph for the more refrangible rays. According to this, therefore, the results obtained with the small Vogel's spectrograph are also to be adopted with some reserve. The heavy flint-glass prisms of this apparatus arrest, on account of their yellow colour, most of the ultra-violet and part of the violet and blue rays, and so far as to permit only a chemically-active light, which has been weakened at one side, to reach the sensitive film of the plate. In this one-sided absorption—which is more obvious towards the ultra-violet than towards the red—the principal cause of the displacement of the photographic maximum is at all events to be looked for.

The heavy and more or less yellow-coloured flint glass of the Browning's spectroscope used for the small Vogel's spectrograph deviates, in respect to its power of absorbing the more refrangible rays, considerably from the kinds of glass used for photographic objectives. Even should the one lens absorb more light than the others, this disadvantage would never be more felt than with the Browning spectroscope. If my conjecture respecting the determination of the maximum with Vogel's small spectrograph be confirmed, then such determinations will have a very subordinate value for photographic practice; and for theoretical purposes they will not only be useless but harmful. Harmful because such results will never lead to the solution, but only to the complication of the already ticklish question of the true position of the place of highest excitability of the silver salts. This is also added to by this—that the heavy flint-glass prisms not only from the front backwards keeps back a quite considerable quantity of the more refrangible light, but also that in consequence of the rapid change by lapse of time their refracting surfaces arrest still more rays, and one cannot at any time count upon sufficient constancy in a spectrograph furnished with such prisms. Where it is a matter of determining the sensitiveness to colour for photography, and, therefore, of the attainment of results which shall furnish the photographer with reliable explanations regarding the value of his plates, the light should only be analysed with such media as are most similar to those of the photographic objective. Light flint glass and crown glass correspond fully to this requirement. Glass, however white it may be, always keeps back part of the ultra-violet rays. Calcic-spar acts better; and quartz is the most transmittent for ultra violet. Whether—and, if so, how much—prisms of quartz and calcic-spar displace the maximum will be shown by a special spectral apparatus, the optical bodies of which consisted at first only of quartz and calcic spar.

Induced by my results, which I obtained with the Steinheil spectrograph, I completed the quartz-calcic-spar apparatus and furnished it with two objectives of quartz and of crown and flint glass. Hereafter followed the making of a revolver* with a light-tight closure for four prisms of quartz, calcic-spar, crown glass, and flint glass. With the instrument so completed it is possible to insert another prism in regular order, and so to examine the influence of the medium upon the photographic maximum under nearly the same sunlight. In what way I acquired a certainty respecting the constancy of the sunlight during several successive exposures, and regarding the construction of the spectral apparatus itself, I shall soon make a further communication. I also hope very soon to return to several series of experiments which I began to make with the quartz-calcic-spar apparatus on the 21st June. So far as a glance over the results as yet obtained shows the proportionate sensitiveness shown in the lichtdruck differs little, or not at all, from the more recent plates. This agreement of my experimental results, which I obtained with quite different apparatus, at different seasons of the year and with several prisms, should (quite apart from the artificial sources of light which I this time also used for spectrography, and which likewise showed the same behaviour as formerly observed) indicate that the modern dry plate possesses quite different properties with regard to the spectrum than was assumed from previous experiments. V. SCHUMANN.

—*Wochenblatt.*

* My experiments before making the revolver had shown that the changing of the prisms took up a great deal too much time; so much so, that a comparison of two spectra taken consecutively, with different prisms, was rendered inadmissible as evidence.

FOREIGN NOTES AND NEWS.

A DISAGREEABLE EXPERIENCE. — DEATH OF DR. LAGRANGE. — A STRANGE SITTER.

FRAU E. VOGELSANG—whose name is more or less familiar to readers of these pages—has just had a very disagreeable experience, which she relates for the warning of other portraitists, so that they may take care of what becomes of their spoilt copies.

A short time ago Frau Vogelsang, who carries on business as a portrait photographer, received a summons to attend at the police court on account of a contravention of the seventh section of the act for the protection of photographs. Her horror may be imagined! She mentally passed in review all the photographic offences she could think of, and could only comfort herself that she was not consciously guilty of any. At the appointed time she repaired to the court (she does not seem to have employed an agent or consulted her lawyer, as anyone similarly placed would do in this country), and was not at all cheered by the sight of the faces that surrounded her there. The company was not at all "mixed"—in fact, it seemed to her quite "unmixed." Fortunately she was soon conducted to the Commissary, who received her politely, and said that she could have had no idea beforehand regarding the nature of the complaint made against her, which was as follows:—The preceding year she had taken the portrait of a young lady whose father is a manufacturer. This year, during a public holiday, one of the same manufacturer's workmen wrote to a "magician" who professed to show to young men and maidens their respective future partners in life, and received in reply a letter containing a portrait of his master's daughter. This transaction coming to the knowledge of the girl's father, he complained of Frau Vogelsang, by whom the portrait had undoubtedly been taken, though the mount bore the name of some provincial photographer. The Commissary had already had the premises of the "magician" searched and himself interrogated, and from his replies it seemed that he was supplied with portraits by a person who buys photographers' trimmings, scraps, and other residues, and carefully looks over these before burning them, selecting all rejected portraits and disposing of them to the aforesaid magician, at whose abode whole heaps of these "futures" were found assorted and ready to send off. The buyer of residues having admitted that Frau Vogelsang had sold him the trimmings, &c., in order that they should be burnt, the complaint against her was for the present dismissed, but is liable to be brought up again. She, however, thought it only right to communicate with the photographic journals, warning other photographers to take care what became of their rejected prints.

Some years ago complaints were made of the same misuse of portraits in North Germany, but at that time it was suspected they had been obtained either from unscrupulous photographers selling prints, through dishonest assistants, or, as in one case it was found, by a photographer, selling old or rejected negatives, with the portraits imperfectly defaced, for old glass, when the buyer used them to print from. The above is, however, the first case that has been taken up against a respectable photographer, who unconsciously ran the risk of losing her customers, who are amongst the most liable of any class to scares. Witness the trouble photographers in this country sometimes get into for placing specimens in their windows without the express permission of the sitter, and consider how much more serious the case would be should such a misuse as the above be made of prints. "Take care of the residues" is a maxim which has long been dinned into the ears of the photographer by the wise economist, and it has been recommended that all residues should be sent to be reduced; but henceforth it will be well to add to the former another maxim: "Burn your trimmings at home." This simple precaution may prevent a disagreeable experience such as that which has befallen Frau Vogelsang. It is not much trouble, and the waste may be quite as conveniently sent to the refiner in the form of ash as of paper. It seems that there is also another little point, namely, that it is better to deal direct with the refiner than with a "middle-man;" for such the German buyer of waste who proved so untrustworthy seems to have been.

We regret to have to record the sudden death, which took place on the 7th ult., of Dr. Wilhelm Lagrange, the Secretary of the Berlin Photographic Society. Dr. Lagrange was a comparatively young man, having hardly completed his forty-second year. He was a valued occasional contributor to the *Archiv*, the *Wochenblatt*, and other photographic periodicals.

A Madrid photographer has, according to the *Archiv*, had a strange sitter to deal with lately. A young lady came to his studio to have her portrait taken. Having placed her in position, he turned to arrange

camera, when, casting a last glance at the posing belle before ...ving the cap from the lens, he was horrified to see that she was ...ing the muzzle of a revolver to her temple. "Stop! stop!" he ...; "you surely do not mean to kill yourself! You would ruin my ...ness! and, besides, it would be a pity to spoil that pretty face!" ... lady laughingly replied—"It gives me no pleasure to spoil one of ... most beautiful productions, but I will tell you what I mean. My ...othed has deserted me, and I intend to send him a copy of my pho...aph in this position, with the remark that if he does not return ...ediately I shall pull the trigger." This astonishing intention was ... carried out, and a few weeks later the photographer had the ...sure of taking the newly-married couple without the revolver, ...h apparently had done its work harmlessly.

ALLEGED INFRINGEMENT OF COPYRIGHT.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL.

...efore the Master of the Rolls and Lords Justices Cotton and Bowen.

NOTTAGE AND ANOTHER *v.* JACKSON.

...his case (of which we have previously given full particulars) judgment ... given yesterday (Thursday) morning.

...e Master of the Rolls decided that the author was Reynolds (assistant ...he plaintiffs), and, the registration being defective, there was no ...right.

...ords Justices Cotton and Bowen took the same view.

RECENT PATENTS.

APPLICATION FOR PATENT.

...3,709.—"Photographic Backgrounds." F. A. MARRA.—*Dated July* 30, ...3.

PATENT SEALED JULY 27, 1883.

...o. 1,380.—"Improvements in, and Relating to, the Preparation of ...ures and Photographs to be Used in the Production of Pictures by the ... of Photography and Photo-engraving, and in the Production of Gela...: Reliefs and Printing Surfaces Therefrom." RICHARD BROWN, R. W. ...NES, and J. BELL.—*Dated March* 15, 1883.

...o. 577.—"Improvements in the Manufacture of Pure Spirits of Wine, ... in Apparatus connected therewith." MAURICE BAER.—*Dated Feb...ry* 2, 1883.

FOREIGN PATENTS GRANTED.

GERMANY.

...o. 23,577.—"Improvements in the Production of Plates for Printing-...sses by the Action of Light." Previously patented. J. ALLGEYER and BOLHOEVENER, Munich.—*Dated September* 24, 1882.

AUSTRIA-HUNGARY.

... Coloured Photographs, or so-called 'Photo-nature.'" J. CHAINE, A. ...RAND, and SALLONIER DE CHALIGNY, Lyons.—*Dated March* 11, 1883.

Contemporary Press.

...HOTOGRAPHING THE SOLAR CORONA WITHOUT AN ECLIPSE.

[SCIENTIFIC AND LITERARY REVIEW.]

... first attempts at photographing the corona were made with photo...phic lenses; but uncertainty as to the state of correction of their ...omatic aberration for this part of the spectrum, as well as some other ...bable sources of error which I wished to avoid, led me to make use of a ...ecting telescope of the Newtonian form. The telescope is by Short, ...h speculum of six inches diameter, and about three and a-half feet focal ...gth. A small photographic camera was fastened on the side of the ...escope-tube, and the image of the sun, after reflection by the small plane ...culum, was brought to focus on the ground glass. The absorptive media ...re placed immediately in front of the sensitive film, as in that position ...y would produce the least optical disturbance. Before the end of the ...escope was fixed a shutter of adjustable rapidity, which reduced the ...erture to two inches. This was connected with the telescope-tube by a ...rt tube of black velvet for the purpose of preventing vibrations from the ...ving shutter reaching the telescope. On account of the shortness of the ...posures it was not necessary to give motion to the telescope.

...t was now necessary to find an absorptive medium which would limit ... light received by the plate to the portion of the spectrum from about G ...H. There is a violet (pot) glass made which practically does this. I ...d a number of pieces of this glass ground and polished on the surfaces. ...ree or four of these could be used together, castor-oil being placed ...tween the pieces to diminish the reflection of light at their surfaces. ...me inconvenience was found from small imperfections within the glass, ...d it would be desirable in any future experiments to have a larger supply ... this glass, from which more perfect pieces might be selected.

In my later experiments I used a strong and newly-made solution of potassic permanganate in a glass cell with carefully-polished sides. This may be considered as restricting the light to the desired range of wave-length, since light transmitted by this substance, in the less refrangible parts of the spectrum, does not affect the photographic plates. Different times of exposure were given from so short an exposure that the sun itself was rightly exposed to much more prolonged exposures, in which not only the sun itself was photographically reversed, but also the part of the plates extending for a little distance from the sun's limb. Gelatine plates were used, which were backed with a solution of asphaltum in benzole. After some trials I satisfied myself that an appearance peculiarly coronal in its outline and character was to be seen in all the plates. I was, however, very desirous of trying some modifications of the method described, with the hope of obtaining a photographic image of the corona of greater distinctness, in consequence of being in more marked contrast with the atmospheric illumination.

Our climate is very unpropitious for such observations, as very few intervals, even of short duration, occur in which the atmospheric glare immediately about the sun is not very great. Under these circumstances I think it is advisable to describe the results I have obtained without further delay. The investigation was commenced at the end of May of this year, and the photographs were obtained between June and September 28. The plates taken with very short exposures show the inner corona only, but its outline can be distinctly traced when the plates are examined under suitable illumination. When the exposure was increased the inner corona was lost in the outer corona, which shows the distinctly-curved rays and rifts peculiar to it. In the plates which were exposed for a longer time not only the sun but the corona also is photographically reversed; and in these plates, having the appearance of a positive, the white reversed portion of the corona is more readily distinguished and followed in its irregularly sinuous outline than is the case in those plates where the sun only is reversed, and the corona appears (as in a negative) dark.

WILLIAM HUGGINS, D.C.L., LL.D., F.R.S.

"SHADE-VALUE" IN PHOTOGRAPHY.

[CHAMBERS'S JOURNAL.]

ALTHOUGH the photographic camera has been aptly described as a "retina which never forgets," and although we know that the image it produces is true as to form, it is within the experience of everybody that photographic portraits are not always good likenesses. We are inclined to attribute this failing to the circumstance that by photography it has hitherto been found impossible to give colours their true *shade-value*, if we may invent a term to serve our purpose. What we mean is this—yellow to the eye is a brilliant light tint; but in a photograph it is reproduced almost black. Red, instead of giving the idea of fire and light, comes out black. Blue photographs perfectly white. Such changes of course play sad havoc with complexions and contrasts of colour generally; and persons with hair and skin exhibiting exceptional brilliancy of colouring are quite justified in remarking—"I never make a good photograph." According to a note brought before the Photographic Society of France the other day, this stigma upon photographic portraiture is not to remain. By the addition to the usual ingredients of the sensitive photographic surface of one per cent. of eosine, the difficulties which we have described can be altogether obviated.

We need hardly point out that this modification has nothing whatever to do with the realisation of that dream which many have pondered over—the production of photographs in natural colours. We are of opinion that this must remain at present, if not for ever, an impracticability. In the meantime, we must content ourselves with such artificial methods of colouring as are contrived from time to time. A modification of the fashionable crystoleum process—fashionable, alas! because it requires no artistic power—has been patented by Mr. J. W. Hyman, of New Jersey. The photograph, printed in the usual manner on paper, is first of all immersed in a mixture of naphtha, paraffine, mastic drops, ether, and vinegar. This treatment makes it quite transparent, so that body-colours in oil, if laid broadly in their proper places on the back of the picture, show through with very good effect. By fixing the finished picture upon canvas with a mixture of glue and glycerine a very close imitation of an oil-painting can be produced.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 7	Sheffield	Freemasons' Hall, Surrey-street.
,, 7	Halifax.........................	*Courier* Office, Regent-street.
,, 9	London and Provincial	Masons' Hall, Basinghall-street.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

THE annual outdoor meeting of the above Society was held at Hampstead, on Saturday last, the 28th ult. Many of the members met early in the afternoon, some few (very few) with cameras, and much enjoyed the air and beauties of the Heath, as well as the charming scenery in its neighbourhood. Several of the members, by chance, had the opportunity of witnessing the practical working of the heliograph—in which they appeared much interested—by a party of military gentlemen, who, from an elevated part of the heath, were signalling to another party stationed on the hills several miles distant. They were also enabled to see the system of military signalling by the aid of flags only.

Later in the afternoon the members assembled on a picturesque part of the heath, where they were photographed in a group by Mr. P. Mawdsley,

After this the party adjourned to the Bull and Bush Hotel, where a substantial tea was provided, the Rev. F. F. Statham, M.A., President, occupying the chair. About twenty gentlemen were present.

After tea the company retired to the gardens, and several gentlemen showed themselves adepts at the game of bowls. At dusk the party again adjourned to the hotel, where the remainder of the evening was spent in agreeable conversation and the enjoyment of the "fragrant weed;" and thus one of the most enjoyable outdoor meetings of this flourishing Society was brought to a close.

According to an arrangement come to at the June meeting of the Society it was to be decided at this gathering whether a second outdoor meeting should be held at the end of August. As many of those present would be away from London at the date fixed upon, and others it was known would be absent, it was unanimously decided that a second outdoor meeting should not be held this year.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 26th ultimo, Mr. A. L. Henderson occupied the chair.

Prospectuses which had been received in connection with the forthcoming exhibition of the Royal Cornwall Polytechnic Society were distributed amongst the members.

The Chairman showed some prints from negatives taken in Jersey by Mr. J. Tayler, with a pinhole opening instead of a lens.

Some of the members having expressed surprise that the lines of the buildings were not truly upright in all the prints, having understood that pictures taken by pinhole apertures without lenses were necessarily free from distortion,

Mr. W. E. Debenham explained that the true rendering of upright lines depended upon the camera back being strictly vertical.

Mr. F. W. Hart showed a camera made in 1843. The dark slide was similar to those in use at the present time, but the lens was an uncorrected meniscus, and the body of the camera was furnished with two scales engraved on ivory. The lines on the one scale indicated the place of the visual focus, for certain distances in feet, of the subject to be photographed; and those on the other scale showed the chemical focus for the same distances.

The question of the production of "statue portraits" in the style lately introduced from America, in which the head and bust of the sitter appears as if supported on a pedestal, was next discussed; being introduced by a member, who handed round one of the pedestal negatives and two photographs illustrating its use, which had been supplied therewith.

Mr. A. Cowan thought that it would be better, instead of scraping away the lower part of the negative of the sitter, as directed in the printed instructions, to have a shut-off board in the camera close to the plate.

Mr. W. H. Prestwich would prefer a black board in front of the lens close to the sitter.

The Chairman suggested that a transparency might be so arranged in the camera as to give the image of a pedestal on the negative direct. He then referred to methods for vignetting in the camera, and the making of negatives of "doubles" of the same person in different attitudes, which were published years ago.

Mr. Cowan said that if a screen with serrated edges were employed for the purpose, it must either be kept moving during exposure or else a lens having a large aperture and no diaphragm must be used; otherwise the points of the star would be indicated on the negative. A plan for a graduated background, which had given good results in the old time of long exposures, was to have a fixed dark background, and a white one mounted on a roller close in front of it. This white background was gradually raised or lowered during the sitting.

The Chairman then read a paper entitled *Does the Amount of Gelatine Affect the Rapidity and Quality of the Negative?* [See page 447.]

Mr. Debenham said that the first gelatine emulsion of Dr. Maddox was an unwashed one made with bromide of potassium, to which plan the paper just read was, so far, a return.

Mr. Cowan inquired whether the mere addition of gelatine to an emulsion giving a slow plate would result in its producing a quicker one.

The Chairman replied that it certainly would.

Mr. J. B. B. Wellington asked whether this additional amount of gelatine did not make the development slower.

The Chairman answered that it did not.

Mr. E. J. Golding had been working in the direction indicated by the paper which had been read, but had not found it to be practicable with any but a slow emulsion. With a rapid emulsion, where the particles of silver bromide were not in a fine state of division, the use of an extra quantity of gelatine had given him an image which was very thin and transparent, and seemed sunk in.

Mr. A. Haddon held that no rapid emulsion could be prepared except in the presence of a solvent of bromide of silver, the office of which solvent was to dissolve the fine particles and deposit them by crystallisation in the form of larger and more sensitive modification of the silver compound.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held on Thursday, the 26th inst., at the Free Library, William Brown Street,—Mr. J. H. T. Ellerbeck in the chair.

The minutes of the June meeting having been read and confirmed, Mr. T. Churchland was elected a member of the Association.

The Hon. Secretary read the Chairman's report of the recent excursion to Southport.

Mr. Ellerbeck said :—The second excursion of the season was held at Southport, on Saturday, the 21st instant, by invitation of the President, Mr. B. Boothroyd. The numbers attending were few, owing to the incl mency of the weather. It rained at starting, came down heavily arriving, poured all the way to the Botanic Gardens, Churchtown, a came down in torrents all the time till leaving. In spite, however, of the untoward circumstances, all enjoyed the afternoon thoroughly, being und cover; and the ferns and flowers at the gardens came in for a due share attention. It is to be hoped that good pictures were the result—a consu mation more devoutly to be wished than expected. The day closed by adjournment to the residence of the host, who did his best to compensa for the disappointing weather, and succeeded in doing so so thoroughly th all were delighted with the excursion. Mr. H. Greenwood proposed hearty vote of thanks to Mr. and Mrs. Boothroyd, which was carri unanimously. The party arrived in Liverpool about 9.30 p.m., the ra still continuing. One fact is worth recording: the directors of the Sout port Botanic Gardens admit all photographers—amateur or otherwise free, trusting to the distribution of the results for compensation, as adve tisements of the beauty of the place. This is an example we should glad to see followed in other districts.

Messrs. H. N. Atkins and Phillips exhibited prints from negatives tak on the occasion. Mr. Atkins's prints were in silver and in platinotyp and the latter seemed to be fuller of detail than the former.

The Hon. Secretary announced a donation to the library by the Chai man of his recent work on photography.

The Chairman stated that arrangements were being made for an excu sion, in the month of August, to Gawsworth, near Macclesfield. Membe who were desirous of going were requested to forward their names to M J. H. Day.

Mr. R. Crowe then read his paper on *Practical Aids to Instantaneo Photography.* [See page 448.] Some extremely clever pictures of swan geese, street views (taken from the top of an omnibus), and of Blondin i various positions on the high rope were passed round by Mr. Crowe.

The Chairman, after expressing his appreciation of Mr. Crowe's appl ances and of the results which he had exhibited, asked for information a to the stop used and the exact extent of the exposure.

Mr. Crowe replied that he invariably used the full aperture of his len and thought that the average length of exposure was a quarter of a second The street views had been taken on omnibuses *en route* to and from busines He (Mr. Crowe) gave an amusing description of his adventures on omni buses in the struggle to obtain striking street views, and of the disaste which had occasionally occurred before he had perfected his appliance He thought the most useful shutter would be one on Mr. Kirkby's principle— to work between the lenses.

The Rev. H. J. Palmer said that Mr. Crowe's stand would be of speci value on board steamers, for the purpose of taking instantaneous seascape and views of the shore.

Mr. Crowe observed that he had found a difficulty in the usual excessiv thickness of the top rail; but on most steamboats a lower rail could be use for his stand.

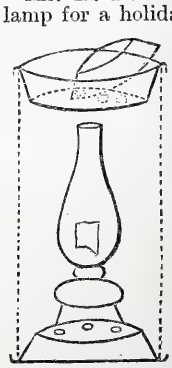
The Chairman, in thanking Mr. Crowe on behalf of the meeting for hi very useful communication, wished to call special attention to the excellenc of the street pictures, which he had seldom seen exceeded.

Mr. Crowe passed round two instantaneous negatives of Tal-y-Cafy ferry—one taken upon one of the most expensive plates in the market an the other upon one of the cheapest. He pointed out that there was no much to choose between them.

Mr. J. A. Forrest exhibited some very fine pictures taken by him a Tal-y-Cafyn on the occasion of the June excursion of the Society.

The Chairman called the attention of the meeting to the circulars on th table of the coming Exhibition of the Photographic Society of Grea Britain, and said he feared that the proposed charge of 5s. to exhibitor would act upon many photographers as a prohibitive measure.

Mr. H. N. Atkins said that, in recently trying to devise a portabl lamp for a holiday excursion, he had finally decided on using two of th circular stamped soup plates, about six inches i diameter, used commonly by emigrants, and readily to be obtained in Goree Piazzas, Liver pool. Taking one of these, he bored three hole one inch in diameter in the bottom, and laid it bottom upwards, on the table. He treated anothe in the same way, and then, taking a sheet of Thomas's or Swan's parchmentised ruby paper, he made a cylinder with a couple of pins. A paraffine lamp with an inch wick was placed on the bottom tin, the cylinder of paper was slipped over the lamp, and the second tin capped the cylinder. To prevent light reaching the ceiling through the top holes a third smaller tin was laid on the top and tilted to one side to allow ventilation. The tins fit into each other, take up little room in the portmanteau, and the paper lies flat. When in use the paper goes round the tins once and a-half, thus giving a dark and a light side to the lantern; and the light, while thoroughly safe for so-called "thirty times'" plates, is so abundant that the seconds hand of a watch can be easily seen at ten feet distance.



The bottom dish is slightly raised from the table to admit air at one side.

Mr. E. Phipps, in referring to development by hydrokinone, asked if the members present had tried the samples kindly presented by Mr. Banks at the last meeting. He had experimented with Mr. Banks's sample and with some he had purchased; the action was slow and steady, suggesting the almost forgotten luxury of the development of a dry collodion plate. He agreed with Mr. Banks, that it seemed almost impossible to fog a plate with the developer. In developing a much over-exposed plate he had increased the dose of soda to over fifty drops of a saturated solution per ounce, and the plate was in the developer forty minutes, still there was no fog. With the particular plates he was using he had found a difficulty in procuring

fficient intensity with the use of soda alone. He, therefore, developed ith soda, and, when the details were well out, intensified by the use of few drops of the usual mixture of ammonia and bromide. By this means ny amount of intensity could be obtained.

Mr. H. N. ATKINS had found it extremely slow in its action on all nder-exposed picture.

Mr. Wynne exhibited a sheet of Swan's ruby paper.

Mr. H. A. WHARMBY said he had used ruby paper of this kind over a gas ame, with perfect freedom from fog in the plates developed by this ght.

The CHAIRMAN called attention to a Scorah finder camera exhibited by Ir. Ryley, which was sold at 7s. 6d.

Mr. P. H. PHILLIPS thought that the simplest and best finder for the urpose consisted of a couple of sights on the camera.

The meeting, which was well attended, was then adjourned till the last 'hursday in August.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

'HIS Society met on the 6th July, when the Chairman, Dr. Vogel, explained that though, at the last meeting, it had been resolved that the ecess should begin at once and continue until the 21st September, cirumstances had arisen which rendered an extra general meeting necessary.

Four members were admitted, two of whom were former members redmitted. This lead to a discussion of the terms of re-admission of nembers, when it was decided that they be treated in exactly the same vay as new members, only that they do not pay entrance fees a second ime.

The death of Herr Philipp Remelé was announced, and the memory of he deceased was honoured in the usual way. A number of objects were hown and several minor topics discussed.

The CHAIRMAN introduced the business which was the real cause that led o the calling of the meeting. It appeared that after the last meeting, at vhich it was resolved by a majority to omit the Obernetter protocol from he report of the meeting of the Society, all the gentlemen who signed that locument and were members of the Society (except two) intimated their vithdrawal from membership, as did also some of their friends, acquainances, and assistants. This step involved the election of a number of new office-bearers, as six of those who had withdrawn were on the committee of nanagement. He (the Chairman) regretted the breach, but thought it est for the Society not to interfere between holders of processes and their icensees. It had held aloof in the same way when some of its members ook out licenses to work the Albert lichtdruck process, and were at first lissatisfied with its working, but their discontent had passed away, and he oped it would be the same in regard to the Obernetter process.

The result of the voting was that Dr. Kayser was elected Vice-President; Herr Schultz-Hencke, Assistant-Secretary; and Herren Graf, Haberlandt, Halwas, and Milster, members of committee. The new committee, including presidents and secretaries, now consists of four professional photographers, three scientific men, two artists, one dealer, and one amateur.

The Chairman bade good-bye before setting out on his voyage to America. During his absence the Society's organ, the *Photographische Mittheilungen*, will be edited by the Secretaries, Herr C. Quidde and Herr Schultz-Hencke.

An instantaneous shutter was exhibited, and shortly afterwards the neeting was re-adjourned until the 21st September.

Correspondence.

LENS ADAPTERS.

To the EDITORS.

GENTLEMEN,—In your report of the meeting of the London and Provincial Photographic Association, on the 19th instant, there is a confusion of parts which makes me express a diametrically-opposite opinion to that which I really gave.

In describing Mr. Warnerke's excellent method of having the sliding front of the camera made in ebonite, in which a screw was cut for the largest lens used on the camera, the flanges of all other lenses screwing into this, consequently the small, short-focus lenses did not project from the front, as was the case in the ordinary brass adapters, which screwed one into the other.—I am, yours, &c., F. W. HART.

8, *Kingsland Green, N., July* 28, 1883.

IMPROVEMENTS IN THE WOODBURYTYPE PROCESS.

To the EDITORS.

GENTLEMEN,—I write on behalf of my firm—Brown, Barnes, and Bell—in reply to a letter which appeared in your Journal, from Mr. George Smith, respecting our patented improvements in the method of working the Woodburytype process. I at first thought we would not take any notice of the letter written by Mr. Smith, inasmuch as we have not desired, nor do we desire, either that gentleman or anyone else to purchase from us or to deal with us in any other way in connection with the work covered by our patent. The Woodburytype process is not one which is likely to be worked very largely by the general body of photographers, and but few firms practise it; consequently I do not think this matter is one that ought to fill your columns in the way of controversy. However, as I find upon inquiry that Mr. Smith is a gentleman of large experience in the Woodburytype process, I consider that his letter is entitled to notice, and that it deserves a few words of comment.

I have found by experience that there are always three people who crop up to say something on the subject of a new discovery in photography:—First, we have the man who has done the same thing *twenty years ago;* next, we have the man who has half-a-dozen *other ways of doing it;* and then, we have the man who says it is *no use now that it is done.* Mr. Smith represents a fourth character in the drama, namely, the gentleman who says *we cannot do what we profess to do.*

Mr Smith's letter, "boiled down" (as the Americans put it), simply amounts to this—that he, in combination with other practical workers in the process, tried to produce Woodburytype moulds by rolling pressure and *failed.* Mr. Smith introduces the name of Mr. Woodbury, and asks if it is likely that that gentleman would have neglected to try so simple a process as rolling pressure for the production of his moulds. Mr. Smith also says that he, in connection with Messrs. Goupil and Co., tried to produce the same results, and failed. All this, coming from so high an authority as we have discovered Mr. Smith to be, is very satisfactory to us; as placing the value of our invention very much higher than was anticipated by us when effecting its security. Possibly Mr. Smith is not aware of the very special means that we, *and we alone,* possess in the way of *rolling machinery.* He also may not be aware that recently Mr. Woodbury himself paid us a visit, and that he has had examples of the results produced by our methods and has pronounced them perfect. Mr. Woodbury, when here, suggested several points which he fancied it would have been difficult to overcome; and we believe he is satisfied at the very simple means by which we get over one of the chief difficulties that seem to have stood in the way of success in the experiments made by Mr. Smith and the eminent authorities he alludes to. I have before me now a letter from Mr. Woodbury, in which he says that it is surprising that he and M. Roussillon, when they were experimenting at the works of Messrs. Goupil and Co., did not think of this simple idea, which is the key to the success of the whole matter.

Perhaps, looking at the commercial aspect of the question, Mr. Smith will remember that we completed our patent after having obtained provisional protection, and that it is very unlikely that, as a commercial firm, we should have parted with the money necessary to do this *without good reason.* With us photography is a business, and is not pursued for the sake of pleasure.

But, as a matter of fact, the Woodburytype process itself will very shortly be one of the processes of photography that have passed out of practice. We have, in an active state of completion, photographic productions capable of being printed in a type-printing press, which will render the Woodburytype process, for commercial purposes at least, very much "thinner" than it is at present. The real good that is in the Woodburytype processs (now that photolithography and phototypography are actualities) is that *the results resemble silver prints.* Beyond that there is not much value left in the system. Your readers will hear more of this anon.

I was at first disposed to treat the subject of Mr. Smith's letter as a matter of pleasantry, and I had thought of the good things that could be made out of the fact that, having "Smith" and "Brown" on the scene, it would be well to have a word or two about "Jones" and "Robinson." We all know the old story about "Smith, Brown, Jones, and Robinson," the four bad boys who went into the water, and of the disastrous consequences that ensued. I have not at hand my *Mavor's Spelling Book,* but I think I remember it was Smith who was responsible for the mischief. But it is not the season of the year for humours such as I sometimes indulge in in your Christmas ALMANAC, and I will not trouble you further than to say that the lesson to be learnt from this little controversy is that "*it is better not to prophesy unless you know,*" and that there are more things on earth—and probably a great many more in heaven—than are dreamt of, even in Mr. Smith's philosophy.—I am, yours, &c., RICHARD BROWN.

31, *Bold-street, Liverpool, July* 30, 1883.

EXCHANGE COLUMN.

I will give in exchange a Victoria camera, with four lenses, for a card lens and camera, by a good maker.—Address, E. GREGSON, 21, Commercial-road, Halifax.

I will exchange a good half-plate, bellows-body camera. lens, stops, and shutter, for a 12 × 10 modern camera.—Address, M. WESTHOLME, Mill Hill Park, London, W.

I will exchange Victoria camera, two lenses (new condition), 10 × 8 triplet, and pair stereo. lenses, for 10 × 8 doublet or rectilinear.—Address, H. J. T., 56, Bullingdon-road, Oxford.

What offers for Lancaster's *Le Meritoire* set, printing-frames, baths, and one dozen dry plates, all quarter-plate?—Address, A. CHAMBERS, 8, Gordon-road, West Hill, Hastings.

What offers in exchange for a Lerebours' 10 × 8 portrait lens? Wanted, a Ross's No. 8 portable symmetrical lens; difference adjusted.—Address, R., 41, Paul-street, Kingsdown, Bristol.

I will exchange Victoria camera, nine lenses; gem camera, twelve lenses; solar camera, nine-inch condenser (all equal to new), for anything to value.—Address, C. P. Gee, Weymouth.

I will exchange a vixen fox cub, five months old, tame, for a quarter-plate, bellows-body camera, double back, and view lens, by a good maker.—Address, W. Bush, 10, College-road, Clifton, Bristol.

I will exchange a splendid 10 × 12 camera and lens, rising front, bellows-body, folding tailboard, almost new, lens—half-plate portraits or views reversible, also a magic-lantern, three and a-half inch condensers, suitable for enlargements, paraffine or gas, for a pair of lanterns and slides, suitable for entertainments.—Address, Thomas L. M'Cann, 49, Greenvale-street, Glasgow.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

P. P. Q.—The picture in question is an ordinary collotype print, and is not from an engraved plate, as you surmise.

A. W. Van Oottrum.—Hare's changing-box is as light and satisfactory as any we know of. There are others in the market, though scarcely so portable.

Publisher.—The best advice we can give you is to make your wants known through our advertising columns, and we doubt not that you will obtain the pictures you require.

A. J. Warman.—For brown tones the acetate bath is preferable to the lime bath. You cannot improve upon the formula you are using. Possibly the paper is not suitable.

G. A. (Buxton).—Twenty grains to the ounce will certainly not be strong enough for sensitising the paper in question. Forty-five to sixty grains will be necessary to enable you to produce purple tones.

A. Z.—Your only chance will be with very rapid plates and a short-focus portrait lens worked with the full aperture. If you secure a good small picture it can afterwards be enlarged to the size you require.

J. A. Field.—The exaggerated perspective is due to your employing such a short-focus lens for taking the pictures. If you employ a longer-focus lens, on the same size of plate, you will obtain more satisfactory results.

Stratford.—The fault of the enlargement is that it has been made with a lens of too short a focus for the original negative; hence there is no sharpness except in the centre of the picture. The remedy in future is obvious.

S. Rose.—The Post Office will certainly not recompense you for any negatives broken during transmission through the post. Neither will that department be responsible for damage if you send them by the new parcels post. Your best plan is to pack them so securely that they cannot get injured.

Thos. Kent.—If you find a difficulty in getting the colour to "take" on your single transfer carbon prints, you can get over the difficulty by rubbing the surface with a little very fine cuttle-fish powder, or you can try washing the print with a very weak solution of prepared ox-gall. This will remove the "greasiness."

Amateur Collotypist.—Nearly every wholesale stationer could supply an enamelled paper suitable for collotype printing. Messrs. Spicer Brothers, New Bridge-street, Blackfriars, we know, supply a paper which answers the purpose very well indeed. Procure a few samples and prove which best suits your requirements.

Photogravure.—If your only difficulty is in depositing the copper you cannot do better than study a treatise on the electrotype process. We cannot, in this column, undertake to give a treatise on electrotyping—a process quite distinct from that of photography, and in which the general body of our readers take no interest whatever.

Dartmoor.—Permission is required to photograph in the royal parks. If you apply to the Ranger you will have no difficulty in obtaining the requisite authority. In those parks which are under the control of the Metropolitan Board of Works you will have to obtain the necessary permission from the Board to take views, but you will experience no difficulty in the matter.

W. A. K.—No special preparation is required for prints that have to be sent to Australia. There is no reason why they should fade on the voyage if they have been produced with ordinary care. If they have not, and they are exposed to moisture on the voyage, there will be great risk of their deterioration. After your experience, perhaps it may be advisable to secure the prints in an air-tight case in future.

Retouching.—There will be no difficulty in your learning retouching. Burrows and Colton's work would give you all the information as well as particulars of the materials required, but we fear it is out of print. Pumice powder will roughen the surface of the varnish, but we should advise you to employ one of the retouching mediums which do not require the surface of the varnish to be interfered with.

G. W. H.—There are retouching mediums sold which will enable you to retouch on the film without difficulty. A shilling bottle is said to be sufficient for a thousand negatives, so that you cannot complain of its being expensive. The stains on the prints have the appearance of being due to sulphuration, but for the fact that in one of them the stain extends over the mount, which looks as if something had been in contact with it, and thus caused the stains. Greater care will enable you to avoid them in future.

B. B. B.—It is quite possible that you may find a market for good view London; but the difficulty of obtaining such as will be saleable is m greater than we fancy you are aware of. We have known artists sp several weeks waiting before obtaining a satisfactory light in which take the pictures they required. Remember, the atmosphere in centre of London is seldom clear enough to permit first-class views t taken; there is usually too much haziness, unless there is very li distance in the scene.

Received.—A. Pringle; A. Conan Doyle, M.B.; W. W. Winter; Banks, &c.

Important Legal Decision.—We can this week merely direct att tion to the decision given in the appeal case of Nottage and Another Jackson. It will be found in aprevous page.

Municipal Honours for a Derby Photographer.—We are g to find that a well-known and highly-respected photographic arti Mr. W. W. Winter, has been elected as a town councillor for Litchu Ward, Derby, in succession to Sir Abraham Woodiwiss. The H F. Strutt, of Duffield, had also been nominated for the ward, b retired in favour of Mr. Winter, who was thus returned unopposed.

Photographic Club, Ashley's Hotel, Henrietta-street.—At t next meeting of this Club, to be held on Wednesday next, the 8 inst., the subject for discussion will be—*On the Development of Pla Having Received a Minimum Exposure.*——An outdoor meeting of t Club has been organised for the Bank Holiday, Monday next, 6th ins to proceed to Gomshall. Train leaves Charing Cross at 11.5 a.m., a London Bridge 11.18 a.m.

A Caution to Dealers in Photographic Chemicals.—At t Clerkenwell Police Court on Thursday, the 26th ult., Edward Knigl a vendor of chemicals, acids, &c., keeping a shop at No. 29, Perciv street, Clerkenwell, pleaded guilty to a summons charging him wi having sold a quantity of poison—viz., cyanide of potassium—to a pu chaser who was not known to him or introduced by any one known the seller. A second summons charged him with selling the poison a packet which was not labelled with the name and address of t vendor.—Mr. Barstow imposed a penalty of 50s. in the first summo and £5 in the second.

Death of Philipp Remelé.—The current number of the *Mittheilu gen* announces the death of the distinguished African traveller a photographer, Herr Philipp Remelé, author of a handbook of landsca photography by the wet process. His exact age was not known the editor of the *Mittheilungen*, but it is not supposed that he could more than forty-two years of age. He was a distinguished student chemistry when he took up photography, at first as an amateur merel He early devoted himself to the study of dry processes and to lan scape photography, making his first essays in taking views in t Hartz Mountains and Thüringian Forest. In 1873 he accompani Gerhardt Rohlf's expedition to the Lybian Desert and the Oasis Dachel, whence he brought many plates illustrative of Egyptian arcl tecture, landscape, and other Egyptological matters; being decorat with the Order of the Medjidie. Three years later he was select to accompany the German expedition to Morocco; and in 1880 went in the frigate "Bismark" to South America and Australi Since his return from the voyage to the antipodes he has lived Breslau, or at Cologne, where he died.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward

For the Week ending August 1, 1883.

These Observations are Taken at 8.30 a.m.

July	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
26	30·06	N	59	55	106	70	53	Overcast.
27	30·14	NE	59	55	109	67	53	Overcast.
28	30·12	NE	57	53	110	74	53	Cloudy.
30	29·61	SW	61	57	90	68	54	Overcast.
31	29·72	W	61	58	109	75	56	Overcast.
August 1	30·01	W	61	55	110	65	55	Bright & Clear.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1214. Vol. XXX.—AUGUST 10, 1883.

DROPPING TUBES *VERSUS* MEASURES.

In connection with the recent recommendations as to a uniform system of developing solutions, it is important, if the solutions themselves be "standardised," that the means of measurement be equally accurate. The employment of the "minim" measure has always been recommended in these columns for that purpose, and, where the quantities to be measured permit it, nothing can be better; that is to say, when the solution of bromide of ammonia or of pyro. are of such a strength that we will say half-a-drachm or perhaps a drachm of each is required. But when, in a more concentrated form, the solutions must be measured in quantities below thirty minims, the use of the ordinary minim measure in the developing-room becomes inconvenient, and possesses little more accuracy than mere guesswork.

In preference to the minim measure—which, whatever inconvenience may attend its use, undoubtedly gives absolute measurement where due care is taken—many operators employ "dropping tubes" of various forms, accepting the "drops" as in all cases equivalent to "minims." No practice could possibly be more misleading than this, and no results probably more hopelessly incorrect. In the first place: taking up haphazard a dozen dropping tubes and, testing them with plain water, the odds are very much against a single one dropping, even approximately, sixty drops to the drachm. But, even should one turn out to be nearly accurate where water only is the liquid in question, its results will be found quite different when anything (whether crystalline or colloid) be dissolved in the water, and the difference will be still greater when alcoholic solutions are used. Taking up casually, for the purpose of testing, a large number of dropping tubes "drawn" from ordinary glass tubing, and according to external appearance almost identical in every way, we found them to vary in their dropping powers between 48 and 135 drops to the drachm; while, some years ago, we remember testing a tube that had been long in use for alcoholic solution of pyro., when, to our astonishment, it was discovered that over three hundred of its drops of that solution were required to make up sixty minims.

These differences are at first sight sufficient to condemn the use of the dropping tube altogether; but we think that if a few minutes' care can be spent in testing the dropping tube it may prove quite as accurate and far more convenient than the minim measure. The first desirable step is to procure or make a series of tubes that will drop minims with tolerable accuracy where only a few—say under ten—are required. For this purpose one that will drop between fifty-five and sixty-five drops to the drachm is quite accurate enough for photographic purposes. After that it is a good plan to mark the tube with a file or diamond at the points 10, 15, 20, 30, &c., minims, when any slight inaccuracy in the dropping that might prove detrimental when the larger quantities are used will be entirely done away with.

Again: if it be desired to measure minute quantities with accuracy it is possible to so modify the strength of the solution that a *drop* may be equivalent to a *minim* of a solution of definite strength. Thus: suppose we wish to use a solution of bromide of potassium of forty-grain strength, but the dropping tube is inaccurate, giving only fifty drops to the drachm, we have then only to weaken the solution to thirty-three and one-third grains to the ounce, when calculation will show that *one drop* (from the tube) of the weaker solution will be equivalent to *one minim* of a forty-grain solution.

On paper this system may appear a very troublesome one, but in practice it is not, as in an hour anyone of ordinary intelligence and dexterity may construct several pretty accurately-graduated tubes at the cost of but a few pence. The pattern we adopt is one we have had in constant use for seventeen or eighteen years, and which was first introduced, so far as we are aware, by Mr. H. Houlgrave, of Seaforth, near Liverpool. It is explained in the annexed diagram (*fig.* 1), in which A A is a glass tube drawn to a point in the blow-pipe flame; B is a short length of rubber tubing tied tightly with silk to the open end of the glass tube and closed by a little plug of wood, C, made air-tight by saturating it with paraffine wax. *Fig.* 2 gives an enlarged section of the plug C, which has a notch cut all round it, into which the rubber tube is tightly pressed by means of a ligament of silk. The glass tube may be passed through a cork, D, and so form a complete stopper for its own bottle. A suitable size will be from six to seven inches in length from point to stopper, the tubing being about a-quarter of an inch internal diameter.

FIG. 1.

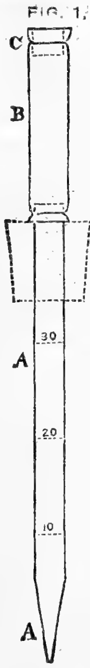


FIG. 2.

With regard to construction there is little difficulty. Having procured tubing of the right diameter, cut it into lengths of eight and a-half or nine inches. With a Bunsen burner—or, preferably, with a good-sized blow-pipe flame—heat the centre of the nine-inch length of tube until it becomes red-hot, twirling it round with the fingers meanwhile to promote uniform heating. When it is quite red-hot and begins to show signs of bending draw the ends steadily apart, when two pointed tubes will be produced. Break off the fine filament of glass that is left at each of the drawn points until an orifice of one thirty-second of an inch or thereabouts is left. This is too large; but if the point be inserted in the Bunsen flame it will fuse, and the aperture gradually diminish in size; so, by testing it is very easy to produce a point that will deliver with proximate accuracy minims, half-minims, or quarters. It is scarcely necessary to say that the tube must be allowed to become quite cold before testing it with water, and must be dried again before re-insertion in the flame.

To obtain the graduations for 10, 15, 20 or more minims, sling the tube, by means of a piece of silk, to one end of the beam of a scale of moderate accuracy and, having filled the aperture at the point with wax and counterbalanced the whole, *weigh* into it ten grains weight of pure or distilled water. Allow the latter to settle for a few moments and then proceed to mark the height with a file, afterwards completing the other graduations in the same manner. The graduation complete, blow out the shred of wax that closes the point and finish off by binding on the india-rubber tubing that is to be the means of drawing in and ejecting the solution. A tube of the

dimensions we have named will suffice for at least forty minims of solution; if more be required—sixty minims, for instance—a tube of larger diameter must be used. The whole may be made very elegant in form if carefully finished, and each tube costs no more than twopence.

To use it: squeeze the rubber top and draw in as much solution as the tube will hold; press the rubber gently until the fluid sinks to the desired mark and withdraw the pressure, when the required quantity of solution will rise in the tube and may be ejected by another pressure into the developing glass. When only two or three minims are wanted, they are dropped singly.

This will be found very much handier in the developing-room than the measure-glass—at least such has been our experience; and we feel assured that a single trial will convince those who have not yet made the essay.

THE COPYRIGHT QUESTION.

As we briefly announced last week, judgment has been given in the Court of Appeal in the case which has excited such considerable attention—not to say anxiety—in connection with the copyright question. The decision will certainly not be considered satisfactory by a large number of those who publish their pictures, inasmuch as it will render the copyright null and void in by far the larger proportion of the photographs now published, both portrait and landscape. As the suit proceeded we have given the particulars of it, from time to time, extending to now over nearly three months, and in another page we give full particulars of the judgment delivered on Thursday, the 2nd instant, by the Master of the Rolls.

The facts are simply these:—Messrs. Nottage and Kennard, trading as the London Stereoscopic Company, instructed one of their operators, Mr. Reynolds, to take a photograph of the team of Australian cricketers at Kennington Oval. The picture was afterwards registered in the names of the plaintiffs, and the defendant (Mr. Jackson) copied it. The latter was then sued in the Court of Queen's Bench for penalties for infringing the alleged copyright. Several points were raised for the defence, the chief one relied upon being that the plaintiffs, in whose names the picture was registered, were not the authors of the work, and were not, therefore, within the meaning of the act, entitled to the copyright, because that was vested in Mr. Reynolds, and in him only. The verdict of the judge, Mr. Justice Field, was in favour of the defendant, and against it the plaintiffs appealed, with the result we published last week, namely, that the appeal was dismissed with costs.

In delivering judgment, in which Lords Justices Cotton and Bowen concurred, the Master of the Rolls said that the matter turned upon the meaning of the word "author" in the Copyright Act, 1862. The plaintiffs had registered themselves as the authors as well as the proprietors, and if they were not the "authors" the copyright did not exist. The construction of the Act was a matter of the greatest difficulty on account of the strange phraseology employed, and it was subject for speculation whether the draughtsman had ever cleared his mind upon the effect of his words, so far as concerned photographs. The present case illustrated one of the difficulties; for, if the plaintiffs were right, then the copyright would continue—not for the life of one person, as intended by the Act, but for the survivor of them. It is now clear that, according to the present Act, a personal authorship is intended. That being so, it would be manifestly unjust—as the copyright only exists during the lifetime of the author and for seven years after his death—that it should be vested in a company; for then it would be claimed for it that it would endure until seven years after the death of the oldest survivor of the firm.

By the recent decision it is principally large firms, or those who carry on an extensive business, that will be affected, as in the majority of instances the pictures they publish are not taken by any member of the firm but by paid assistants; and, even if the pictures be taken by one of the principals, in most cases it is registered in the name of the firm, consequently the copyright, for this reason, is invalid. In the case of a photographer who takes his own pictures and registers them in his own name the copyright in them will not be affected in the least by the recent decision, and his title will, of course, still remain good. Until the present Act is amended—and the sooner it is so the better it will be for all parties, the pirates excepted—it is clear that those who publish photographs will have to proceed on a different principle than that hitherto pursued, in order to protect their pictures from piracy.

In all instances it will be necessary that the picture be registered in the name of the operator who actually takes the negative or, in the case of a portrait, who poses the sitter. It will then be necessary for the operator to assign the copyright to his employer; and for this assignment to be legal it must be executed in writing. This, it is manifest, will at times entail considerable inconvenience. It has been suggested that when an operator is engaged he shall sign an agreement to the effect that the copyright in all the pictures he may take shall be the property of his employer. Even if this be done, however, we have little doubt that it will still be imperative that he legally assign each individual picture as it is registered, in order to make the copyright secure. But this, of course, will only apply to pictures which may be taken in the future; for, so far as we can perceive, there is no means of making those now in existence and which have been registered in the names of those who really did not produce them, copyright.

As the matter now stands we can perceive several difficulties that may possibly arise. One is that many operators are now under engagements for definite terms, and in the written agreements there is of course no stipulation as to the assignment of copyright in their work, as at the time of entering into business arrangements such a contingency was not considered necessary. What if he now refuse to make an assignment? Can the employer compel him? We know that no right-minded operator would for a moment hesitate to assign; but we mention the circumstance as a possible incident that might arise as supervening on the recent decision, and, if such be the case, the inconvenience it may originate. This contingency may be met in future agreements by inserting a clause making it compulsory, under a heavy penalty, for the *employé* to complete the necessary assignment when requested.

Another inconvenience which may arise will be that—as the copyright exists during the lifetime of the author and for seven years after his death—of always being able to secure proof in after years as to the author's being still alive, or in the event of his death as to the date of his decease. It not unfrequently happens that when an operator leaves a situation he is never again seen or even heard of by his former employer. In delivering judgment the Master of the Rolls somewhat naïvely remarked that it will in future be to the advantage of such as employ operators to select only those who are likely to have long lives, so as to secure the fullest benefit from copyright, seeing that it endures during the life of an "author" and for seven years after his demise.

We trust ere long that the Copyright Act of 1862 will be amended, and that the recent decision will be then taken into consideration so as to remedy in a future bill the inconsistencies that now exist in the present Act of Parliament; and, further, for the safety of existing copyrights (or what have been presumed to be copyrights), we think it is imperative that the Act should be made retrospective.

BOILING EMULSIONS.

In an interesting article by Dr. Franz Stolze, which we publish this week, a somewhat novel method of boiling emulsion is proposed, though it is, as the author acknowledges, of limited applicability. Instead of heating the emulsion by immersing the flask in which it is contained in a vessel of boiling water, under which circumstances the emulsion never reaches boiling point, Dr. Stolze passes a current of steam—generated in a separate vessel—into the emulsion itself, which is thus stated to be brought to the point of ebullition, with the additional advantage that the particles are kept in constant motion, and so more uniformly acted upon by the heat. Apart from the fact that the steam condensed in the emulsion before the latter reaches the boiling-point would in most processes render the result worthless from over-dilution, we can scarcely see why any greater uniformity of action is secured by this process than by the old method when properly conducted.

In the course of a series of articles, published some months ago, we showed that, though the emulsion itself never actually reaches the boiling-point, it arrives in a certain time at a temperature which remains constant so long as the same conditions are observed—that is to say, so long as the water in the outer vessel is kept boiling. Besides this, with a view of trying the effect of actually boiling the emulsion, we adopted the bath of saturated solution of salt, instead of the water bath; but, though the emulsion so made in subsequent experiments received the extra advantage of the increased temperature, it was not appreciably quicker than one boiled for the same period in the ordinary way. If, then, a variation of four or five degrees Fahr. produce so little difference in sensitiveness, it does not seem probable that the unequal heating of the particles of silver bromide in the centre and at the sides of the flask can produce any very serious result, and, therefore, that the necessity for constant stirring is not so great as would at first appear.

We found in our experiments that, using flasks of similar dimensions and with similar volumes of emulsion—in fact, observing the same conditions throughout—the contents of the flask in a given time reached the maximum temperature of 207° to 208° Fahr., and there remained so long as the boiling continued; and, further, that the variation in temperature in different parts of the flask, provided the thermometer was not allowed to touch the glass, did not vary one degree. The glass sides of the flask would, of course, be themselves hotter than the contained liquid, or, rather, would receive more heat, which would be immediately imparted to the emulsion within, and so a constant circulation set up which would prevent any undue over-cooking of any portion of the bromide.

In fact, it is difficult to see how greater regularity of action is to be obtained than by the old process if it be properly conducted. Nor does it seem necessary or desirable that the emulsion itself should be submitted to actual boiling heat. On the other hand, Dr. Stolze's steam apparatus would be more troublesome to use, and is only applicable to one or two methods of emulsification.

In conclusion: we can scarcely think Dr. Stolze is serious in stating that the temperature of the salt bath is variable for the reasons he states. A saturated solution of salt, which is the proper one to use, cannot rise to a higher temperature at atmospheric pressure than 228° Fahr., and surely Dr. Stolze would not employ an unsaturated solution!

HALATION AND THE BACKING OF PLATES.

Notwithstanding the manifestly great improvements in the manufacture of dry plates, a great portion—indeed, we unhesitatingly say, the majority—of the gelatine plates in the market, as, indeed, those made for home consumption, will not, under all circumstances and conditions of light, give plates free from halation. In many cases the halation is present, but unnoticed to any but the most acute observer specially looking for its traces. In others it is fairly visible, though it may not to any great extent mar the beauty of the picture; while in others, again, its presence is patent to everyone, the effects it produces being utterly inimical to high-class results.

The conditions under which it is likely to occur should be familiar to all, for "to be forewarned is to be forearmed." They are, firstly, a plate liable to the effect; and, secondly, a strongly-luminous object in front of the lens. The second condition is governed by the acting aperture of the lens. If the absolute luminosity of any part of the image is by stopping down reduced to such an extent that no light passes through the film, or is dispersed by it, on to the back of the plate, it is obvious there can be no reflection back again on to the front, and so no halation from this, we need not say the main, cause.

From these premisses it may be predicated that where there is no bright object in the view—such as clouds or white buildings, &c.—there will be no halation, but that the evil will be at its maximum when there are clouded skies in views, or white objects in the immediate vicinity of black or dark spaces in portraits or views. Who is there with any store of negatives that has not among them some hopelessly-ruined effects, through the destruction of the purity of the shadows, for instance, in tree trunks, or boughs, or foliage, where they happen to pass athwart a bright cloud in the far distance? Or a portrait with a widow's snow-white weeds resting on a background of black dress, or a gentleman with white shirt front, where the white has not appeared actually to "run" into the black, and, less obviously, where the delicate half-tones of the face have not been swallowed up by a universal reflection, or been rendered tame and flat from the same less visible and less understood cause?

There is, however, as many of our readers are aware, a remedy potent in its effects in all but a small minority of cases with the most offending of plates in this class. It consists simply in "backing" them in a suitable manner; that is to say, in placing upon the back of the plates some substance or preparation which absorbs the light that would under ordinary conditions be reflected from the back. This, as was explained many years ago, is done by substituting a non-reflecting material for the air, which, of course, ordinarily is in contact with the back of the plate, reflection taking place to a greater or less extent according as the substance immediately behind the plate is more or less different from it in its refractive index. Where the substance is a solid that reflects no active rays, all that is necessary is to apply it and drive the air away from between it and the glass.

Formerly this was done by such substances as umber, lampblack, and other pigments made into a paste and applied wet, so as to be in optical contact—as the term, meaning expelling the air, has run. If, however, upon drying, the particles of pigment were not imbedded in a substance little differing from glass in its refractive index they were useless, and a layer of air was to be found next to the glass, and so all good effect of the pigment was lost. When, however, a film of some such material as glue, or glycerine, or even molasses, was left behind the film acted almost as though it were the glass itself with the pigment imbedded in it, and so preventing reflections.

Pigment so employed is an almost perfect backing to the extent that its particles cannot reflect active rays. As a matter of fact, however, pigment is little employed, as it is apt to be ineffective if used alone, or if used with a gelatinous agent it is difficult to remove; and, finally, glycerine and its *confrères* are messy and sticky, and apt to get into the working parts of the camera. It is probable that the most effective backing possible is asphaltum dissolved in turpentine, as it is an excellent non-reflector, is not liable to chip off, and adheres with complete optical contact to the glass. Its difficulties as against pigment are the unpleasant smell of the solvents and the far greater difficulty in removing it, as it is evident that in the majority of cases it should be removed before development.

For temporary use nothing is so ready, as we have before pointed out, as a piece of pigment tissue squeegeed on to the back of the plate, or a piece of black india-rubber cloth, or even American oilcloth wetted with glycerine squeegeed on. The majority of cases, however, where backing is likely to be resorted to—for the present, at anyrate—will be landscapes, when it is evident that no temporary expedient will suffice. *En passant*, we would say that we do not doubt the time will come when the advantages of backing for portrait work will be far more appreciated than it now is.

Something will be required that can be readily put on and equally quickly taken off—something that will be quite efficacious to warrant the trouble being worth the taking, and that will be as useful in a year as in a week. We think all these requirements are fulfilled in a coloured collodion backing, and nothing better can be had, as colouring agents, than the mixture of aurine and roseine recommended by Captain Abney, provided it is not used so strong as to create strongly-actinic reflections on its own account—a possible contingency. The form we have used with success runs as follows:—

Aurine	20 grains.
Roseine	15 „
Collodion	1 pint.

The mixture runs as easily as uncoloured collodion. Plates backed with it may safely be used to depict such a subject as a leafless tree with a background of light clouds—about as difficult a test as it is possible to devise.

There are certain precautions in its use which it will be well to name. In the first instance, we may say that though any old collodion will answer as a solvent, its use in a small room is almost impossible on account of the pungent vapours it exhales. Then, again, though the collodion has so bright a colour in daylight it is next to invisible in the dark room, and it thus becomes possible while collodionising the back to allow it to run over the front of the film without notice being taken of the fact. A close scrutiny should be given to every plate to see that such an accident has not occurred. Also, we must closely caution the experimenter to allow a full half-day to elapse after coating before placing the plates in the slides. If this be not done the slight amount of moisture left is apt to evaporate and condense again in all kinds of awkward places—the front of the plate, the back of the slide, &c.—to the certain bringing about of evil.

Lastly: we would speak of the removing the collodion before development. It is quite possible to develope a plate and watch its progress with the collodion still remaining on, as it offers very little obstruction to the light of the dark room; but in practice it will be found that pieces of the film are apt to get loosened and to attach themselves to the next plate put in the solution, if it be used for more than one plate. The best plan to adopt is to remove the collodion before development. The plate should be well flooded with water on its face first, and then the collodion washed off—in a piece if possible. If it be attempted to remove it by rubbing there will be great loss of time, as many collodions adhere most tenaciously; but if a slight break—say by scratching with a knife or even the finger nail—be made the water can be directed to the spot and the film made to unroll or peel off with little difficulty. Any portion left in the corners would be productive of no ill effect.

It is most important that no piece of wetted collodion should be allowed to touch the film before it is well soaked with water, for it would then so adhere that no rubbing could remove it, and it would prevent the action of hypo. to a great extent, so that the film would there be unfixed. Should such a contingency occur, and it would not always be visible before the plate was brought into daylight, it will be best removed by repeatedly wetting with methylated spirit, and continuous rubbing with the finger or a pledget of cotton. The colour is then disseminated and may be wiped off. A little ether and alcohol will now, if needed, remove the film of collodion, and then the spot can be re-fixed by applying a drop or two of hypo. to the spot.

We have been led into treating this subject at far greater length than we intended; but if by showing the theory, the advantages, and the ease of application of a backing to plates we may have induced a larger number of photographers to take up the practice our labour will not have been in vain.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XV.—Lenses for Special Purposes. Enlarging and Copying. Instantaneous, Landscape, and Group Lenses.

All that has been said in the preceding chapter concerning the projection of rays which do not fall upon any given spot of a transparency in parallel directions, applies with equal force to the production of enlargements of the collodion transfer class when these are produced in the usual manner; that is, by illumination from the sky, a mirror, or a luminous or white backing of any description, by which a given point of the negative is illuminated by rays coming from more than one direction.

In *practice* the illumination of a negative, when employed in producing a collodion transfer, differs essentially from that of a transparency when illuminated by a large flame and employed for projection on a large screen. In one the light is transmitted through a condenser from an artificial source; in the other nothing of an optical character intervenes between the sky (the source of light) and the negative. Notwithstanding this difference the *principle* is the same in both cases; that is to say, it is the function of the enlarging lens, or objective, to gather rays from the *cliché* to be enlarged, no matter from what direction such rays come, and bring them to a focus upon the screen at the anterior conjugate, whether this represent the screen of the lantern exhibitor or the sensitive plate of the enlarger.

There is, however, this important distinction between the lens employed in producing an enlarged image that is to be photographed and that which is only to serve the purpose of being looked at. In the former the chemical and visual foci must be coincident; in the latter this is altogether immaterial. Indeed, so long as the luminous rays are capable of being brought to a sharp focus it is a matter of indifference what becomes of those of greater refrangibility, known as the "chemical rays." But, again: in an enlarging lens a large angular aperture, although desirable, is not absolutely necessary, because all the advantages accruing from aperture can be obtained by giving an increased exposure. A small aperture and a long exposure are, indeed, convertible terms in enlarging practice; but for luminous projections, in which all depends upon the effect produced on the eye of the observer, this is by no means the case. Illumination must be obtained at any cost, and it must not be secured at the expense of definition.

For an enlarging objective with the solar camera in which the source of light partakes more of the nature of a point than what we have been considering, the construction of the objective may partake of a far wider range and be of a more diversified character than any of the others. We have seen images similar in dimensions produced from a test negative in which the objective was composed respectively of a portrait lens, a "rapid" combination, and an achromatised meniscus. It was not only a difficult matter to adjudicate upon the respective merits of these pictures, but experts present at the time and having before them examples produced by each system of objective were found to have arrived at varying conclusions respecting their relative merits. In conversation with the late Dr. van Monckhoven, who had bestowed much attention upon this subject, that gentleman gave it as his opinion that the best of all objectives for the solar camera would yet prove to be a single achromatic. Previous to that time he had, in his work on *Photographic Optics*, in 1866, in the portion in which he describes his enlarging solar camera, spoken of its objective as having the "external form of Ramsden's eyepieces placed on pocket telescopes, but constructed on the principles of M. Petzval's doublet." That the doctor had altered his opinions subsequently to writing this is apparent from the fact that to none of the objectives manufactured by him at a later period does this description apply, and we have seen several. Woodward, of Baltimore, who has constructed more solar cameras than any other, now makes the objectives of his best "solars" of three achromatic lenses, the front and back being similar to those of the ordinary portrait combination, but having the focus shortened by the insertion of a third meniscus achromatic lens between them.

For securing instantaneous stereoscopic pictures of a well-lighted outdoor scene the great majority of subjects will be amenable to the action of a single lens of about six inches focus. This admits of the employment of a diaphragm sufficiently large to permit the usual class of subjects, including seaside groups, boats, &c., to be taken in a quasi-instantaneous manner. But if the very best effects as regards rapidity of exposure are desired, it then becomes necessary to employ a pair of portrait combinations, used without any diaphragm. Of these the finest effects will probably be obtained with a back focus of from five and a-half to six and a-half inches, as this gives a more uniformly-lighted picture than when an objective of short focus, such as three and three-quarter inches back focus, is employed, as was frequently the case in those days when instantaneous stereoscopic photography was prevalent.

For indoor groups and scenes it is probable that the regular stereographic portrait combination of short focus cannot be surpassed, or even equalled, for general utility. Its small diameter and short focus gives it a great penetrative range, while its large "angular aperture" enables it to be worked with great rapidity. Although on this account we advise its employment in preference to any other in a room in which it is desired that a scene or group be taken with a short exposure, we are strongly of opinion that for outdoor purposes it is not to be commended, unless the subject to be taken be at no considerable distance from the camera.

Ordinary landscapes in which architectural subjects do not form a chief feature are best taken with a landscape lens—that is, a single achromatic. This class gives bold, crisp definition, that brilliancy of the image being due to the simplicity of the form; for, as we have shown in a previous chapter, the presence of a second lens in a photographic objective causes the formation of flare, which, when not confined to one central spot, becomes diffused over the negative, thus leading to a want of vigour in the shadows. This class of lens, when employed for pictures of medium dimensions in which the included subject is of a somewhat small angle, is capable of being used with a stop sufficiently large to permit good negatives being obtained with an exposure of a fractional part of a second.

When a group is to be taken, either in a studio or in a dull light out of doors, one of the "rapid" class of lenses with an intensity of from $\frac{f}{7}$ to $\frac{f}{13}$, according to circumstances, will be found to be the most useful. This lens also forms the best objective for large portraits in the studio, which it produces of more harmonious quality than a large portrait lens could possibly do.

In the copying of a portrait it is probable that photographers will invariably use the portrait lens they commonly employ. This class of work falls quite within its scope; but, as the majority of operators first focus the picture and then insert a small stop to work with, we caution them that several otherwise good and useful portrait lenses, as well as some specially constructed for copying, have their focus altered by the insertion of a smaller stop to work with than that by which the focussing was effected. This is not always the case; but, as it is sometimes so, it is a wise precaution to use the full aperture of the lens for making the general arrangements and having the focussing effected, and then, after inserting the working stop, to take a final look at the image on the ground glass and ascertain the state of its sharpness by means of a magnifying-glass, observing whether by slightly turning the pinion the definition is not capable of being improved. Observe this: that when the copy is required to be larger, or on a larger scale, than the original it is necessary that the lens be turned "end for end" so as to have its back lens nearest to the picture to be copied.

When the subject to be copied is a map or chart it is absolutely necessary that a non-distorting objective be employed. A lens of the "rapid" class is most advantageous for this kind of work.

If the class of work required to be reproduced on a scale of magnification be flies or insects of moderately-large dimensions, a quick-acting locket lens will answer the purpose better than a properly-constructed microscopic objective of the same focus, as the former has its chemical and visual foci coincident, whereas the latter has not.

Architectural work can be produced equally with "rapid" as with wide-angle lenses, provided these be of a non-distorting class. Distortion, as here meant, implies the curving of lines near the margin of the picture which are straight in the original.

We note Mr. W. K. Burton's remarks with regard to the ten-per-cent. developing solutions recommended in a leading article last week, and beg to assure him that we were far from wishing to deprive him of any credit that may be due to him in the matter. Truth to tell, we could not say who was the first to make the suggestion; but "ten-per-cent. solutions" have been in such common use for a long time that we had imagined the expression was as familiar as "three-grain pyro." Our mention of the "ten-per-cent." solutions was made only as an improvement in the matter of uniformity upon Mr. C. Beckett Lloyd's suggestion, the point of which rests in the ability it gives to measure out *absolute* quantities of the ingredients to suit any formula. We may say that at least one commercial plate-maker adopted the "ten-per-cent." system in his instructions upwards of two years ago.

We learn from the *Scientific American* that a claim is made on behalf of Dr. T. R. French, of Brooklyn, of priority in the matter of photographing the vocal organs. In May, 1882, he laid before the American Laryngological Society photographs of the larynx in various states of health and disease. These were taken by sunlight with the aid of a small hand attachment to the ordinary laryngoscopic mirror.

Here is an incident that occurred the other day, and, as it may happen in any studio, it is worth making a note of:—Principal to apprentice, who has been lubricating the gear of the camera-stand and the castors of sundry pieces of furniture—"What have you been putting on the camera-stand?"—"Oil, sir." "Where did you get it from?"—"A bottle on the shelf, sir." The bottle is brought, and is found to be duly labelled "Linseed Oil!" The state of that camera-stand after the lapse of a week or two may be more easily imagined than described, if it were not taken to pieces and well cleaned.

One of the first and most famous of the electric lights—the "Jablochkoff candle"—has recently had its capabilities enhanced by the use of selenium, which our readers are aware has its electric conducting powers greatly altered by light. It has been stated that the steady elevation of the point of luminosity was the object of the inventor; but the peculiar construction of the "candle" renders this very unlikely, and other statements to the effect that the selenium is used as a regulator to keep the luminosity uniform and steady are more likely to be correct.

When once a scientific error has been accepted as truth its disproof has to be persistently reiterated before correct ideas can be substituted. The statement, for example, that alcohol kept in a bladder tends to become stronger from evaporation of its water through the membrane has long found a place in text-books, and is repeated in the latest edition of that well-known valuable work, Ganot's *Physics;* yet it has some time since been shown that the facts upon which the theory and practice have been based all tend in an exactly opposite direction.

We extract the following interesting paragraph, upon the behaviour of two well-known chemicals of photographic interest, from a paper by Professor Bloxam, of King's College:—"If a particle of precipitated silver cyanide be examined by the microscope with a quarter-inch objective it appears as an amorphous mass; but if a drop of ammonia be placed upon it, and very gently warmed, it will form distinct needle-like crystals. Silver chloride treated in the same way gives very minute octahedra. In a mixture of silver cyanide and silver chloride both constituents may be identified in this way."

Both iodine and bromine have histories as interesting as their properties, and few substances in the whole range of the elements require so large quantities of raw material to be operated upon to produce a given weight. In one way or another they seem to be born of the sea, and it is stated that the waters of the Dead Sea contain notable quantities of bromine. Strange to say, it is asserted that the water some hundreds of feet below the surface contains four or five times as much of the valuable chemical as that from the surface.

According to M. E. Lourmel iodine in the form of vapour displays a remarkable green fluorescence, though hitherto fluorescence has only been observed with liquid and solid substances. Sunlight concentrated by a lens is thrown on a glass globe containing moderately-dense vapour of iodine, and the emerging beam is filtered through green glass. If blue glass be used the fluorescence will be very feeble, while if red be substituted no effect is observed. The fluorescence is seen in the red, orange, yellow, and green. The same writer shows that iodine vapour does not absorb the ultra-violet rays.

We suppose it is a fact that the Wellington statue is, after all, to be put in the melting-pot. The model of the huge monstrosity of the statuary's art set up in profile in the most likely place, after the fashion of the experiments tried with Cleopatra's Needle, was

seen to be quite "too utter" a failure, and we or the next generation may look for a new statue. By-the-bye, it would be interesting to know if any photographs of the model were taken. Nothing would better show the effect likely to be produced.

It is announced that the great meteorological observatory on Ben Nevis is to be commenced early this month, the sum of four thousand five hundred pounds having already been subscribed in sums from one penny upwards. Meteorology and photography are closely connected, and we have no doubt that photographic operations will be in use when the station is placed in working order.

What can be the reason that electrical exhibitions are always behindhand upon the opening day? Every one will remember the ludicrous absence of electrical appliances upon the opening day of the Crystal Palace Electrical Exhibition, and so on all through the chapter. The same thing happens on the continent. The Vienna exhibition ought to have opened on the 1st instant, but the committee announce that it is to be deferred till the 16th of the current month.

The possessors of big telescopes may possibly have another peep at the great comet of 1882. The greatest intensity of light is at the end of August, when the comet rises sufficiently early before the sun to render it possible to observe it. We doubt, though, if it will radiate sufficient light to permit its being photographed.

It is rumoured that the holders of the patent of Swan's and Edison's lamps are about to join interests, so that the right to the principle of the incandescent thread of carbon form of lamp may be vested in a single company.

A new form of carbon arc lamp is described—the invention of Mr. Varley. In it the poles, instead of being of solid carbon, are composed of a multitude of fine carbon filaments, the result being that the space between the two poles becomes heavily charged with carbonaceous matter and so decreases the resistance, at the same time that it induces increased luminosity. The carbons are made of pieces of rope soaked in paraffine or ozokerite, and carbonised in a crucible which is kept constantly filled with a hydrocarbon atmosphere.

The value of the pigeon post, it is well known, was so recognised during the siege of Paris that thousands of microscopic photographs were taken as the readiest way of reducing the weight the little messengers had to carry. As most people know, the combined effect of the enemy's guns, accident, and the ravages of birds of prey necessitated reduplication of the messages to a very considerable extent. Those who have charge of such aërial posts might take a lesson from the Chinese to prevent the occurrence of a catastrophe from the latter cause. The inhabitants of the Celestial land employ a whistling machine, made by fastening together about half-a-score of small bamboo tubes, and attaching it to the bird's tail. The rush of air produces a shrill sound and frightens away birds of prey.

A new drop shutter actuated by electricity is described in *La Nature*. It consists of a flat box, to one side of which is screwed the lens, while to the other is fitted a short, wide copper tube, fitting closely upon another similar tube which occupies the ordinary place of the lens on the camera. The shutter is contained in the box, and, after being raised to the upper part of the box by giving the whole machine a half turn, is kept *in situ* by a small electro-magnet set in action by a pocket bichromate battery "the size of a small *bon-bon* box." The pressure of a button stops the current, and so causes the action of the magnet to cease, releasing the shutter, which falls by its own weight, or it may be heightened in speed by a spring. Further: the aperture of the shutter is capable of being increased or diminished by a couple of slides held by screws. There are undoubted conveniences attaching to the use of electricity for making the exposure, but it is doubtful whether such means will ever come into general use for outdoor photography.

NOTES ON MAKING PYROXYLINE.

One of the greatest difficulties to be encountered in proceeding to make a collodion, whether it be for use with the bath or as an emulsion, is found in procuring or making a suitable pyroxyline. A few years ago, when the collodion process was universal amongst photographers, there was not much difficulty in obtaining a soluble cotton of very good quality, and which would answer most purposes for which it was required. Since the advent of gelatine, however, the demand for it has so far fallen off that great difficulty is experienced in obtaining any that is at all fit to use. Photography and Fenianism would seem to have no affinity for each other; but on this point they have come into direct antagonism, as the recent Explosives Act has still further tended to cut off the supply. I know an instance in which a well-known firm of wholesale chemists were unable to procure any from their regular source, the makers saying that until they had obtained a definite opinion as to how they would stand affected by the new Act they would be unable to supply any more. Railway companies refuse to carry it, and steamship companies also decline to allow it to form any portion of a steamer's freight; so that, altogether, the question of pyroxyline is one of considerable difficulty at the present time if we depend upon the dealers for a supply. Fortunately, however, a little practice will enable anyone to make a supply for his own use without much trouble, or the outlay of much cash in apparatus or material.

Before proceeding to give practical details of successful methods of making a soluble variety of gun-cotton it would be well to briefly glance at the chemical principles involved in the operation, in order that a better understanding may be arrived at as to what is to be done to secure the best results. There are so many varieties of pyroxyline, each differing materially in solubility, structure, and other properties from each other, although made by apparently similar formulæ, that the beginner is apt to be sorely puzzled at his want of success.

Pyroxyline is what is termed a "substitution product" of cotton or cellulose; that is to say, a certain number of atoms of hydrogen are abstracted from the cellulose and replaced by the same number of atoms of peroxide of nitrogen (NO_2) derived from the nitric acid. There is a considerable difference of opinion as to the exact amount of substitution which is capable of taking place. A few years ago, M. Duchochois published in The British Journal of Photography an elaborate account of his investigations of the various forms of pyroxyline, and claimed to have proved that nitration proceeded as high as the penta-nitrate, or five atoms of hydrogen replaced by five atoms of nitrous oxide. However, Professor Abel, who is considered the highest authority on gun-cottons, states as the result of repeated analyses that the tri-nitro-cellulose is the highest form, in which three atoms of hydrogen are displaced, and that there are three distinct degrees of nitration produced, according to the strength of the acids employed, the time of their action, and the temperature maintained. It will be readily understood that the strongest acids act the most powerfully, and produce the highest form of nitration in the shortest time. Since there is no apparent change which can be detected during the process, it becomes absolutely necessary to have a knowledge of these important points—namely, temperature and specific gravity—in order that the time may be properly regulated.

Cellulose may be understood as existing in a state of purity in cotton wool, linen, or paper. It has the formula $C_6\,H_{10}\,O_5$. In the change which takes place during the progress of making pyroxyline or nitro-cellulose the carbon and oxygen remain unchanged, the hydrogen only being displaced by the action of nitric acid. Now this displacement does not occur all at once, but proceeds gradually. The usual practice is to employ mixed sulphuric and nitric acids of known strength and at about 140° to 160° of temperature, allowing the action to proceed a certain time according to the result required. For a soluble cotton about ten or twelve minutes is necessary. If this time be exceeded the hydrogen displacement goes on and an explosive cotton is formed which is insoluble in mixed ether and alcohol; whilst if too little time be allowed, or the temperature be not maintained, an insoluble variety is also obtained.

First: there is formed the lowest or mono-nitrate, $C_6\,H_9\,(NO_2)\,O_5$, in which one atom of hydrogen is displaced, and which is only soluble with great difficulty or not at all; then, as the process proceeds, the di-nitrate, $C_6\,H_8\,(NO_2)_2\,O_5$, is formed, which is soluble in ether and alcohol; afterwards the tri-nitrate, $C_6\,H_7\,(NO_2)_3\,O_5$, or explosive gun-cotton, is produced, which is quite insoluble in ether and alcohol, and so is useless in photography. It is probable that no sample is ever made which consists entirely of one form or

egree of nitration, but a mixture of two or of all three is generally btained; and this is especially so where the material used is either hick, as in blotting-paper or linen, or in the case of cotton wool, which has not been sufficiently divided into loose tufts before mmersion. Here the action of the acids is unequal, because the xternal portions are sufficiently nitrated before the internal parts ave been altered. There is thus produced a pyroxyline which is nly partially soluble—part of it remaining as an insoluble sediment, and another portion swelling into a glutinous mass of fibres which will refuse to dissolve. If a collodion be made with such a pyroxyline it will be impossible to obtain a film clean and free from pots; and, even if allowed to settle and the clear portion decanted, t will most probably be rotten and possess no power of adhesion to he plate.

To make a successful pyroxyline, then, it is of the utmost importance to have as much uniformity of action as possible through he entire mass of cellulose, in order that insoluble products of either over- or under-nitration may be avoided. This is accomplished by pulling out the cotton into small, loose tufts, which the acids can readily penetrate, and by getting the whole quantity in as rapidly as possible, so as not to allow much time to elapse between the first and last addition. The physical character of the ilm is chiefly affected by the temperature and difference in strength of acids employed. What is known as high-temperature pyroxyline—or that which is made at about 150° to 170°—gives a short or powdery film, and requires seven or eight grains to the ounce of olvents to produce a creamy film; whilst a low temperature conduces to give a tough and skinny film.

For ordinary purposes there is no better formula than that which was published many years ago by the Rev. T. F. Hardwich, and which I may here reproduce for the benefit of those who cannot refer to it:—

Sulphuric acid, sp. gr. 1·845	18 ounces.
Nitric acid, sp. gr. 1·457	6 „
Water	$5\frac{1}{4}$ „

Mix in an earthenware basin, and immerse a thermometer. The temperature will rise probably to 160°. Have ready, pulled out into small, loose tufts, not larger than a walnut, 300 grains of cotton. When the temperature has fallen to 140°, immerse the cotton with a glass rod piece by piece, as rapidly as possible, taking care to squeeze out all air-bubbles which may be entangled in it. The temperature should be maintained as near 140° as possible by means of a hot-water bath. After ten minutes have elapsed, during which the cotton should have an occasional stir, lift the whole pyroxyline out by means of two strips of glass, rapidly plunge it into a large quantity of water, and give a vigorous swill round to wash out the acids as rapidly as possible to prevent solution taking place. After several hours' washing in running water immerse in very dilute ammonia to remove the last trace of acid, and again wash thoroughly, when it should be squeezed in a linen cloth, to get rid of as much water as possible, and spread out to dry. This makes a pyroxyline readily soluble in ether and alcohol, leaving scarcely any sediment behind, and which flows easily over the glass plate without becoming glutinous, as many samples do. It is very suitable for collodions for use with the bath, and also for emulsions where the full quantity of pyroxyline is employed.

When used dilute, however, it has not, in emulsion, the suspending power of a pyroxyline made at a lower temperature. The difference of ten or twenty degrees makes a great alteration in its physical character. Although equally soluble, it is a much longer time before perfect solution takes place; and it has a more glutinous character, especially if, as was pointed out by the Editors in a leading article in a recent issue, a large proportion of sulphuric acid be employed. But with a temperature of 120° to 130° a longer time will have to be allowed for nitration to be completed. As a rule, the lower the temperature the longer the time required. Also, when varying the material from which the pyroxyline is made, the thicker and coarser it is the lower the temperature, and the action of the acids must be prolonged in proportion.

The most successful pyroxyline I have prepared, and which possesses the greatest suspending power when used in small quantities per ounce of solvents, is one made from linen of a fine quality. As the method of preparing it might be of service to many of my readers who may have occasion to manufacture their own, I will endeavour to make it as clear as possible in the short space at my disposal.

For convenience in nitrating the linen should be as fine as possible, though this is by no means necessary. It should first be well washed in a dilute alkali to free it from any resinous or other foreign ingredient, and then thoroughly dried. If coarse and thick in texture, it is a great assistance in the after-processes if it be boiled a short time in very dilute nitric acid—about one ounce of acid to fifty ounces of water—and then dried. Have now ready a deep porcelain dish as large as convenient, and cut the linen into squares, such as will lie easily in it, leaving an inch or so of margin. Take fourteen ounces of saltpetre, powdered and dried in the oven, and place in the dish; add twenty-eight fluid ounces of commercial sulphuric acid, and stir well with a stout glass rod until the whole of the nitrate of potash is dissolved. The dish should then be covered with a sheet of glass to confine the acid fumes as much as possible. When cooled down to the ordinary temperature of the air—say, 45° to 50°, a few degrees making no difference—add four ounces of nitric acid, again stir, and immerse the squares of linen (or as many of them as the acids will well cover), replace the sheet of glass, and set aside for some hours. I cannot give any definite time, as this varies so much with the texture of the linen, the strength of the acid, and the temperature of the room; but, as a guide, it is as well to place in the acids at the same time as the rest a few small pieces, about an inch square, as test pieces. After the lapse of five or six hours remove one of these test pieces and rapidly wash and dry it. If you now cut it in half, and ignite one-half of it, it will probably be found to leave a considerable amount of black ash behind, and combustion will be slow. This will show that the time has been insufficient to nitrate the whole substance, and some time longer must be allowed to complete the operation.

If, on a second trial, combustion is more perfect and no ash left, or only very little, try the remaining half of the test piece in a small quantity of either and alcohol, putting it into the alcohol first and then adding the ether. Solution will be slow, the linen pyroxyline first swelling, then losing its white appearance, and becoming transparent, but, if sufficiently nitrated, ultimately dissolving completely, leaving no sediment behind. When this occurs, remove the whole batch from the acids and wash well as usual. A very wide margin in time is allowed, as it often takes from twenty-four to forty-eight hours to complete the nitration by the acids; but this action is so gradual that the results are very uniform, and but little difficulty will be experienced in making it of good quality. There is no danger of over-nitrating if the temperature be not raised too high. The remaining acid need not be thrown away, but a fresh lot of linen squares immersed in it to make a second batch of pyroxyline, though it would be better to make up to the original bulk of solution by the addition of fresh material.

The principal cause of failure to be guarded against is the weakening of the acids. If the operation be conducted in a damp room or during wet weather, leaving the dish uncovered for some length of time, the powerful attraction which sulphuric acid possesses for water will cause it to absorb a large quantity of it, and the result will be the disappearance of the linen by solution. To avoid this keep the dish always covered as closely as possible.

The resulting pyroxyline is peculiarly tough and glutinous, yet so soluble as to dissolve in three parts of spirit to one of ether. For emulsion purposes one grain will suspend as much as five grains of cotton, whilst the finest possible state of division in the silver bromide is readily attained. It possesses also, in an eminent degree, all the qualities necessary for a washed emulsion, as recently pointed out by the Editors. Instead of linen, a pure form of paper known as "*papier Joseph*" may be substituted, or even thin tissue-paper, and excellent results produced. So rapidly soluble is a pyroxyline made by this method from thin *papier Joseph* that a small piece dropped into a Winchester of mixed solvents will frequently be completely dissolved before reaching the bottom of the bottle, leaving not a trace of sediment.

EDWIN BANKS.

A SYSTEM OF STANDARD DEVELOPING SOLUTIONS.—DEPTH OF FOCUS.

I HAVE read with special interest the article by the Editors on *A System of Standard Developing Solutions*, because I consider the subject one of special interest; and, more particularly, because the system which they now propose is precisely the one that I first suggested in THE BRITISH JOURNAL OF PHOTOGRAPHY more than two years ago, and which I have continually advocated there and elsewhere ever since. The standard solutions that are now proposed are, to take the very words which I used in a communication made in June, 1881—one of the first I had the honour to make to THE BRITISH JOURNAL OF PHOTOGRAPHY—"a ten-per-cent." solution of each of the three constituents of the developer.

I was pleased to see Mr. C. Beckett Lloyd's communication a fortnight ago, as I saw that, if he had not hit on the exact system

of the ten-per-cent. solutions, he had hit on something somewhat similar and nearly as good, nor did I expect that he would acknowledge the working of anyone before him in the same direction. Indeed, I have always been opposed to the idea that anyone should be prevented from publishing a good thing simply because someone else has done the same before; but, on the contrary, I have held that the very fact that some piece of knowledge or useful practice is not known by all interested is a sufficient reason for its being continually and incessantly published until it is known. Nor do I claim to be the first to have proposed the "system of standard solutions." So far as I know no one did so before I did, but I can scarcely believe that the alkaline developer was in use for years before so simple an idea struck anyone. All this, however, is the more reason why the Editors should not give the whole of what little credit is due for so simple a suggestion as the use of a solution of fixed percentage of each of the three constituents of the developer to the very last advocate for that system, and especially as he introduces very unnecessary complications in his solutions.

The idea of using three ten-per-cent. solutions first suggested itself to me when I was carrying out experiments on developers, which were detailed in your pages a little over two years ago. I found three solutions so much more convenient than the so-called "stock solution" which I had been using before, that I adopted them for general development purposes.

Twice since that time, when Mr. G. W. Webster had made communications in your columns advising the use of the two ordinary stock solutions (one of pyrogallic acid and the other of ammonia and a soluble bromide) with two more solutions (one of ammonia and the other of bromide), for use in case of emergency, I have attempted to demonstrate the superiority of the system which I have for so long advocated.

I now once more suggest to all who use the alkaline developer, and more especially to all who use various makes of plates, that this method of using a ten-per-cent. solution of pyrogallic acid, another of ammonia, and another of a soluble bromide is by far the most scientific and convenient which they can adopt. I think if once they give it a fair trial they will use no other.

Diffusion of Focus or Spherical Aberration as a Means of Producing so-called "Depth of Focus."

Mr. W. E. Debenham, in his last communication, touched on the subject of a lens in which the introduction of a certain amount of diffusion of focus or spherical aberration was used as a means of increasing the depth of focus. I presume Mr. Debenham referred to Mr. Dallmeyer's patent portrait lens, in which spherical aberration is introduced by separating to a certain amount the lenses forming the back combination.

Mr. Debenham cited the well-known article in which the late Mr. Grubb appeared to prove that spherical aberration does not increase depth of focus. I am well aware that in the sense in which Mr. Grubb and Mr. Debenham view the matter they are correct. They are right in this much—that the introduction of spherical aberration in a lens cannot make the representation of any plane of the image sharper than it was before. This would appear to demonstrate conclusively that there is no increase of depth of focus; but in considering this matter we must consider also that "depth of focus" is itself not a scientifically-correct term. There is, strictly speaking, *no* depth of focus under any circumstance, even that of the shortest possible focus lens and the smallest possible stop. Nothing is represented by a photographic lens as absolutely sharp, and, moreover, no one plane is shown quite as sharp as another.

What, then, is meant by depth of focus? We must seek for a definition. The best definition that I can think of for depth of focus, taking the above into consideration, is *the quality in a lens which enables it to represent planes at different distances without any perceptible difference of definition.* Now, if we take this as the definition of depth of focus we will find that the introduction of spherical aberration *does* increase the quality we are considering. In the case of a large head taken with full aperture of a good portrait lens of the ordinary type there is a marked want of depth of focus; but why is this? Chiefly because one plane is in a wirey definition and all others appear *by contrast with this* out of focus. Let us destroy somewhat the intense definition of the one plane and we lose at once the defect which was before termed "want of depth of focus." Have we actually increased the depth of focus or not? According to the meaning in which Mr. Debenham takes it, of course not; yet in truth I think we have.

Whether it is better to gain depth of focus by giving up absolute definition in any plane or not is a different question. For my own part I conceive it is. Certainly, if we can gain absolute definition everywhere, this would seem the best of all; but better than intense definition in one plane, and definition which by contrast with this is exceedingly bad in others, would appear to me to be moderate definition throughout our subject.

It will be distinctly understood that as these remarks are suggested by the consideration of a certain lens intended for portraiture, they apply only to portrait work. In landscape work the matter is different. Here depth of focus can as a rule be had simply by the use of a small stop; also, the same can be had in portraiture with moderate sizes. But the time has not yet come when, in the case of very large heads, we can sufficiently stop down our lenses to have the depth of focus which we should desire. W. K. Burton.

ON MEN AND THINGS.

Since my last notes were written several discussions have taken place on the optical and optico-mechanical phases of photography; and, as is generally the case, no very decided opinion has been arrived at. In one case, however, an attempt to introduce a new theory, or to establish a false principle, failed very signally. I allude to the argument that a shutter working immediately behind the lens allows as much light to pass as another which works immediately in front of the plate. One would scarcely have thought it necessary to discuss *that* point, and I cannot but admire the promoter of the new theory for his courage.

* * *

The question of focussing, arising from the discussion on enlarging, at a meeting of the South London Photographic Society, was also an interesting one, and elicited several remarks which ought to prove useful. The necessity for testing the identity of position of the focussing-glass and the plates in the dark slides was never greater than at the present day; nor at any time during many years past do I recollect experiencing so much trouble as I did a short time since in procuring a piece of ground glass upon which I *could* focus, to replace a broken screen. Before we go into the use of magnifiers, simple or compound, that will enable us to get the markings on leaves at thirty feet distance, &c., I think we should "go for" the camera-makers, and see that they make the higher grades of focussing possible, if not easy.

* * *

Opticians are not altogether free from blame in some of the cases where complaints of difficulty in focussing have been heard. The lenses of more than one maker of repute years ago were notoriously over-corrected, while many of the productions of less famous opticians, both ancient and modern, rejoice in a style of correction which is, to say the least of it, irregular. If a lens will not "work to focus," as the expression goes—that is, if its chemical and visual foci are not coincident—what is the use of resorting to elaborate methods of obtaining microscopic sharpness on the focussing-screen? In the old days of non-achromatic lenses such a course was intelligible; for if the correct *visual* focus were not obtained it would have been impossible to make the necessary allowance in order to arrive at the *chemical* focus. Where, however, the two foci are supposed to agree and don't, the better plan would, perhaps, be to focus carelessly on the chance of accidentally hitting the right mark.

* * *

I listened to a statement a few weeks ago to the effect that "the portrait lens was well known to be the best for giving fine definition." It struck me at the time that, though a clothes brush might be well known as the best instrument for removing dust from one's garments, a blacking brush has its uses in connection with the boots, while even the hat brush, the paint brush, and the still more useful paste brush are not devoid of points which recommend them. So no one doubts the special applicability of the portrait lens to its proper purpose; but I scarcely think that anyone who had in view the production of the best possible result as regards definition would employ a portrait lens for landscape purposes, even for instantaneous pictures. It would, I venture to think, be found preferable to sacrifice something of rapidity for improved definition.

* * *

The question as to the best lens to employ and the best angle to include in a picture are not such as can be very well discussed in a general way, and it is not very surprising that no definite conclusion was arrived at by the members of the Photographic Club. Many valuable suggestions were made by the different speakers, but the actual questions would have been more completely and quickly answered if the members had confined themselves to *one particular picture or subject;* for I imagine every subject requires such treatment in the matter of focal length of lens employed and

gle of view included as best suits its particular requirements, and lay down any fixed rule would be as reasonable as to attempt to nt a picture and "endow it with artistic merit" by *machinery*.

ARGUS.

(To be continued.)

TRANSATLANTIC JOTTINGS.

)ON'T be a clam," says the American *Journal of Photography*—a m which further on we learn is applied to those who are not bscribing to that journal. This, as the above-named bivalve is a licate viand, sounds rather cannibalistic; but we, perhaps, need t be troubled with regard to our own subscribers, which means nost the whole body photographic.

The above paper evidently has an eye to business. There is in its ges a long letter from an American M.D., the burden of which —"Buy a camera and you will improve your health." Even a ysician, it says, "can add to his study the pleasure of the study nature in a way both instructive and inducive to health, and, at e same time, adorn his house with many gems of scenery." We onder if the doctor with so much leisure on his hands is to be vied or pitied?

A note on the naming of stops, by the editor of the *Photographic imes* (New York), is interesting reading, but we perceive that, in e first place, he entirely ignores the recommendations of the hotographic Society of Great Britain as to the method of numberg—a recommendation that is worthy of being followed in prinple by any photographer, whatever particular application he likes make of it. Further: the editor's own knowledge of the subject, hich is well known, has caused him to lay insufficient emphasis on e necessity of squaring the fraction representing the focus divided y the aperture, to enable a just estimate of the relative rapidities be formed.

We do not think any one will contradict his assertion that "the eveloping-room is frequently made so much smaller than is desirble that the consequence is it is almost unbearable in hot weather." ut why a special paragraph to make this announcement?

On page 372 of the *Photographic Times* for last month is an illusration of a capital little contrivance, which consists of a corrugated etal case for holding and protecting bottles for chemicals intended be carried about. Case and cover are alike, and it would seem to e a most useful little addition to the travelling-photographer's kit.

The name of America seems to have been an "open sesame!" to he manufacturers of dry plates in this country; for not content, in he June number, with opening out the innermost details of one rge factory and getting into what may be termed a hot (one-sided) iscussion as to his statements thereat, the special correspondent of he same journal last month gives equally full details of another aker's establishment conducted in an entirely different manner, ut in which he saw in use a machine far outstripping in capabilities he one on which was founded his much-derided statement as to its owers of delivery, this other mechanical plate-coater having a ower of turning out 2,500 plates per hour, and he learnt that over wo tons of plates was the weekly turn-out. Familiar as are our eaders with the consumption of dry plates, we imagine this informaion—which, be it observed, refers to only one of several manuactories—will rather astonish them.

Attention is called to Mr. B. J. Edwards's method of adding sulhate of iron to the alum and acid solution for clearing, the new olution possessing the double power of clearing the negative in a etter manner than the simple alum and acid alone, while, when inensification is necessary, requiring nothing beyond the addition of few drops of silver solution to convert it into an excellent ntensifier. A great future is predicted for the solution.

In Mr. Kurtz's new electric studio, described in the *Photographic Times*, it appears that he still adopts his patent turn-table, which, s some of our readers may remember, consists of a big, circular urn-table, upon which is placed the sitter, who is caused to evolve by means of a long pole applied to the table when requisite. t seems a very strange contrivance, yet we are told it answers so dmirably for electric-light work—the camera being made to revolve long with the sitter, and so the effect of the strong light being oftened—that it is shortly to be exploited in Europe. M. Klary, whose name will be familiar with regard to another a secret process f lighting, is stated to be on his way to America to see the machine nd purchase the rights for France and other countries.

Among articles of interest—we leave it to our readers to say whether we are to link instruction to interest—is one headed "A Mite." The mite is a new developer consisting of the now common soda developer, with the addition of *thirty* grains of sulphite of soda to each grain of pyro.!

Journalism in America has certainly its startling aspects. We commence our "Jottings" for this month with a notice of the dire clam-threat of one photographic organ, and we close them with details referring to a wonderful statement in another. A writer, in a communication to the New York *Photographic Times*, states that less than twelve months ago he knew nothing of the art, and was "perfectly ignorant of everything connected with photography—could not even focus." Now he is so clever, through reading the *Times* and a handbook, that he is taking *cartes* at four dollars a dozen, and cabinets at seven dollars. As these prices almost reach London charges, there is evidently here a genius or an inestimable proof of the value of the technical press.

THE BOILING OF EMULSION.

THAT the action of the boiling of an emulsion cannot be perfectly replaced by the ammoniacal method is recognised by most authorities. Since so much stress is laid upon this circumstance one would think that the greatest importance would be attached to perfecting the boiling method; but in this direction almost nothing has been done since the boiling method has replaced prolonged digestion at a moderate temperature. One has even been contented to warm the emulsion to a temperature of about 98° in a water-bath heated to boiling, for it does not usually rise higher. The cause of this is not doubtful. The warming of the solution only takes place through the sides of the vessel containing it—that is to say, by conduction—so that it would take a very long time, even should the vessel be completely sunk in the boiling water, to raise the heat of its contents to 100° also.

Even frequent stirring of the emulsion by means of a contrivance inserted in the emulsion bottle for that purpose does little to help matters. Since the transmission of heat through glass or porcelain walls is an extremely-slow process, and since a continuous giving off of heat takes place above, the proper boiling-point cannot be attained in the fluid. It is, at the same time, evident that the emulsion must always be somewhat unequally warmed, since no one stirs an emulsion continually the whole time it is being cooked, and thus the particles nearest the sides of the vessel always become ripe sooner than the others. It would be different if actual boiling took place in the emulsion, to which it would communicate a continual movement. This consideration has latterly led to attempts being made to raising the boiling-point of the water-bath, and thereby also the temperature of the emulsion, so that the latter might reach the real boiling-point. For this purpose, instead of mere water, it has been proposed to use a solution of common salt or a mixture of glycerine and water.

Both methods have certain defects, which seem in some measure to adhere to all such expedients, and make them appear not altogether suitable. Apart from the chance of traces of the bath getting into the emulsion when not very carefully handled, which with these substances might not do so much harm, there is the drawback of their temperature not being constant, since, as, in consequence of boiling, the proportion of water contained in the bath is always decreasing, the boiling-point is continually rising, so that this way of heating the emulsion would not be an equal one. Besides, as part of the glycerine evaporates along with the water, a glycerine and water bath becomes expensive, and as the salt bath attacks metal vessels severely it will find even less acceptance than the other method, so one must look around for some other way of heating the emulsion.

Now, it seems to me that the most suitable way—especially for the Burton method, in which it does not matter how much the emulsion may be diluted—is to cook by directly-introduced steam. The physical experiment is well known in which water is brought to the boiling point in a bottle, and the steam developed is led by a glass tube down nearly to the bottom of a second vessel filled with water. The moment the steam enters the water it condenses and gives off its heat to the latter, which is thereby gradually heated, and, when it has taken up about a fifth of its own volume, begins to boil. Thus from the commencement an undulatory motion is imparted to the fluid, and, as one may prove by throwing in some carpenters' shavings, maintained in motion throughout, so that every moment fresh particles are brought into contact with the boiling steam. Here one has also the security that the temperature of the carrier of the heat (the steam) is constant, and there is no fear of its imparting impurities by its admixture with the emulsion.

Only one precaution must be observed. If the flame under the bottle be suddenly extinguished, the steam above the water will condense in a short time and a vacuum would arise if the external pressure of the atmosphere did not drive the water out of the second vessel in a steady stream through the glass tube into the bottle. To prevent

this, air must be allowed access to the vacuum. This is most easily done by inserting a funnel, the neck of which shall almost reach the bottom of the boiling bottle, into the cork through which the tube, which leads off the steam, passes. Whenever the space above the fluid cools, air enters the water in bubbles through the funnel and restores the equality of the external and internal pressure.

Exactly the same apparatus can be used for boiling the emulsion. I use as a reservoir for the latter a bottle of double the capacity of that used for generating the steam, and place it in a thickly-wadded bag of four folds of black cotton, which is firmly closed by a string at the top, round the tube which introduces the steam. This tube I also surround with a light-tight wadding, which not only prevents the access of light but also hinders the steam from cooling. In the large wash-bottle as much emulsion is mixed by Burton's method as exactly half fills it. As soon as the whole apparatus is set up and connected, the water with which the smaller bottle is filled is brought to the boil, and when the emulsion in the bottle in the bag begins to boil also it makes it known by the steam it gives off, and it is then sufficient to keep the water in the little steam kettle always at boiling-point to be certain that the emulsion also remains at boiling-point and in continual motion; besides on going near the bag, one can distinctly hear the boiling going on within it.

With the proportions of water and emulsion given above one may conveniently boil from five to seven hours, but when it goes the length of eight or nine hours the water in the steam kettle will be all used up, being completely transferred to the emulsion, which will then have about twice the bulk that it had at first.

Now, though this method of boiling emulsion is easily carried out by anyone who knows anything of making experiments in physics, it has still one drawback—that the glass vessels are so easily broken, especially the bottle which is placed immediately over the flame. It is, therefore, a great satisfaction to know that Herr G. Braun, whom photographers have already to thank for so many excellent contrivances, has undertaken to make a compact apparatus on this principle, which shall be at once solid and easily handled, and at the same time combine all the advantages of the "steamer." In this way it is to be hoped that an emulsion of much more equal organisation than hitherto may be prepared with certainty, and so that a number of hitherto loud complaints may be silenced.
—*Wochenblatt.* F. Stolze, Ph.D.

ON THE PREPARATION OF GELATINO-BROMIDE PLATES.

[A communication to the Leeds Photographic Society.]

I propose tonight to give a practical illustration, as far as I can, of the making of gelatine dry plates. The art of photography is an extremely-fascinating one; and it is very pleasant, after a holiday, to bring back mementoes of the occasion in the shape of photographic views, on contemplating which the mind wanders back to the subject of the picture and mentally enjoys the holidays over again.

Much more satisfactory is it to know that the entire picture is the result of your own work than that it is taken with a purchased plate, where part of the credit goes to the maker of the plate. It is also far less expensive; for whilst a dozen half plates will cost on the average about four shillings a dozen, home-made plates will only cost one and threepence, which means a considerable item of saving if many plates are exposed.

Now, I am aware that a good many amateurs seem to think that it is an extremely difficult affair to prepare a gelatine dry plate, and they will look aghast at the very word "emulsion" as being a dreadful something whose vagaries, as Lord Dundreary would say, "no fellah can understand." Now this is not the case at all. Gelatine emulsion is, in reality, very easy to prepare, and it is only when extreme rapidity is desired that any very great difficulty is encountered. If the amateur would be content with a slower class of plate—say four or five times as quick as wet collodion, whatever that may be—he will find such a plate easy to prepare. He may also be sure of getting ample density in the high lights, and with shadows almost like bare glass. For general landscape purposes such a plate will give far nicer results than a very rapid one, as the exposure is much more under control; and, if by any chance he may have considerably over-exposed, he may by careful development get a good picture without that great tendency to flatness which seems to be inherent in a very rapid plate.

The first material we have to deal with in preparing plates is gelatine. There are several kinds in the market suitable for emulsion purposes, and they may be divided into two general classes, namely, "hard" and "soft" gelatines. Now, if we get a gelatine which is too soft and prepare our emulsion with it the plates will frill; whilst, on the contrary, if the gelatine be too hard the picture will not develope readily, as the film will be so hard and horny that the developer will not be able to enter the film, and the operation of development will be unnecessarily long. A mixture of the two kinds will be found to give good results—about half and half—to be modified somewhat according to the weather. For instance: if in summer, when the weather is hot, I should probably use three-fourths hard gelatine and one-fourth of the softer kind. As a type of the softer kind of gelatine I may take Nelson's No. 1. I believe this is almost universally used to emulsify with owing t[o] great purity and uniformity of composition; but it is too soft to [be] used entirely. Amongst the harder gelatines, of which there are m[any] in the market, I may mention Heinrich's, Simeon's, Coignet's "[gold] medal," and Swinburne's isinglass.

Readers of The British Journal of Photography will, no dou[bt], notice the small amount of silver which is contained in each ounc[e of] emulsion. Most of the writers in that publication, including th[e] pioneers of photography, Captain Abney, Colonel Stuart Wort[ley], Dr. Eder, the late Dr. van Monckhoven, W. K. Burton, and oth[ers], usually recommend twenty grains of silver nitrate per ounce [of] emulsion; but, as I can get ample density with eleven grains, I do [not] see the advisability of helping to enrich my fixing bath with the ot[her] nine grains. We will begin with the proportions for five ounces [of] emulsion, which will coat about fifteen or sixteen half plates:—

No. 1.

I take—Bromide of ammonium .... 35 grains.
Nelson's gelatine.......................... 25 ,,
Water .... $2\frac{1}{2}$ ounces.

In a test tube or beaker I put—

No. 2.

Nitrate of silver.............................. 55 grains.
Water .... $2\frac{1}{2}$ ounces.

I have tried all of those mentioned, but prefer Heinrich's, as it giv[es] a tough, clear film, and is not too repellent to the developer. Sw[in]burne's is also good, but the film is not nearly so clear as with Heinrich['s]. Coignet's I cannot recommend at all, as there seems to be some forei[gn] matter (probably grease) which causes "pits" in the film when t[he] gelatine sets, and which show, when dried and developed, as spots o[f] different density from the surrounding parts of the negative.

The formula I use is the one originally published by Mr. Char[les] Bennett, with the exception that the emulsion is boiled instead [of] being "cooked" at a lower temperature for some days. The proportio[ns] of the different salts in each ounce of emulsion are—

Bromide of ammonium .... 7 grains.
Nitrate of silver .... 11 ,,
Gelatine .... 20 ,,

The first beaker with the gelatine and ammonium bromide I allow [to] soak for about ten minutes, and then dissolve and heat nearly to boilin[g] point. Then I raise the silver nitrate solution to the same temperatu[re] and run it through a funnel, drawn to a small point, into the gelatine a[nd] bromide solution, stirring constantly all the time. When all the silv[er] solution has passed through we shall have an emulsion in which t[he] bromide of silver is very finely divided. If a very slow emulsion [is] required it may be used as it is, after adding the full complement [of] gelatine, and washing out the nitrate of ammonia, which is formed [by] double decomposition during the emulsification.

If such an emulsion were required it would have been preferable [to] have added all the gelatine at first instead of adding it afterwards; b[ut] the result would be slow, and apt to give hard pictures. So I shou[ld] recommend the amateur to boil for a short time. I replace t[he] beaker in the boiling vessel and boil for about an hour, lifting the li[d] off and stirring at intervals of twenty minutes or so. Then cool unt[il] it can be held comfortably in the hand, add the remainder of the gela[]tine, and place it on one side to set. I generally leave mine all night. In the morning I place it in the syringe, and squeeze it into a solutio[n] of bichromate of potash, which is made by adding one ounce of [a] saturated solution of bichromate to one pint of water. I allow it t[o] remain about an hour. There is no necessity for being exact here; three or four hours would do no harm. I then put it into a hair siev[e] and allow a stream of water to flow over it for about an hour. Th[e] emulsion may then be considered sufficiently washed, and can b[e] placed on one side to drain. I generally leave mine to drain about si[x] hours. If not drained sufficiently it will measure more than five ounces and will be too thin; therefore it is better to drain too much than to[o] little, as water can be added to it if necessary. When sufficientl[y] drained melt and add five drachms of good methylated spirit; the[n] filter and coat the plates, measuring the quantity required for eac[h] plate, and spreading it to the edges with a glass rod. These are place[d] upon a level surface to set. After having set thoroughly they may b[e] transferred to the drying-box. G. H. Rodwell.

ALLEGED INFRINGEMENT OF COPYRIGHT.

Court of Appeal, August 2, 1883.

Before the Master of the Rolls and Lords Justices Cotton and Bowen.

Nottage and Another *v.* Jackson.

As briefly stated in our last week's issue, judgment was given in this case. The plaintiffs are the London Stereoscopic Company, and they sued th[e] defendant for the alleged infringement of their copyright in a photograp[h] of the Australian Cricket Team. The defendant disputed the plaintiffs' title, on the ground that they were not the registered "authors" under th[e] Copyright Act, and that the "author" was the artist who took the negativ[e] at Kennington Oval. Mr. Justice Field decided that the plaintiffs had n[o] title as "authors," the facts being that the plaintiffs sent an artist, wit[h]

tants, to photograph the team at Kennington Oval, where the negative taken. The photograph was then printed at the plaintiffs' establish- t in the usual way, and the plaintiffs registered their names as pro- tors and authors under the Copyright Act, 25 and 26 Vict., cap. 68. r. Petheram, Q.C., and Mr. Shortt now argued the appeal for the ntiffs; Mr. Crump appeared for the defendant.

he MASTER OF THE ROLLS said that the plaintiffs directed a skilled ant in their employment to go to the Kennington Oval, and there take hotograph of the Australian cricketers. He did this, and the photo- ph was completed. The plaintiffs registered the negative under the , and entered themselves, not only as the proprietors of the copyright, also as the authors of the work. If they were wrong in entering them- es as the authors, the registration was void. The question is—What he meaning in the Act of the "author" of a photograph? The ques- involves more than the mere name of the person, because the copy- it is to continue during the life of the author. If the wrong name as hor is entered, the wrong life is put in, and the duration of the copy- it is affected. I had great difficulty in construing the Act, because ple who draw Acts of Parliament will use language which nobody else s. Who ever speaks of the author of a painting? Of course one knows t the author of a painting must be the artist who draws it. But who he author of a photograph? Photographers think that those who em- y the person to do it are the authors, because the person employed is iere servant of the employer. I cannot tell whether the draftsman of Act meant this or not. But the question is full of difficulty. If two sons are entered as authors, for whose life is the copyright to last—for life of the longest liver? Then they may not live within 200 miles the shop where the business is carried on; they may go there once a ır. They may have a dozen studios; they may superintend the making the photographs in one place, and not in the others. In this very case is not pretended that either of the paintiffs went to the Oval. No ıbt the idea of a photograph of the Australian cricketers occurred one of the plaintiffs, and he put it into the head of the other. But the n who went to the Oval had to arrange the group, to put in the plate, l to adjust the lenses. But even he did not do everything; pro- bly another man got the plate ready, and after all it was the sun which w the picture. I wonder whether the gentleman who drew the Act r cleared his mind on the subject. I have found it difficult to clear my n mind, and the only thing I can do is to see who, in relation to a photo- ıph, stands in the position most like to that of the author in relation to ainting or drawing. I think that the person who superintended the angement, who actually placed the people in position, who gave the lers, was the effective cause of the picture being produced. It must be question of evidence in each particular case who that person is. The urt is not called on to say who it is in the present case. I suppose it the man who went to the Oval to take the photograph. It certainly not either of the plaintiffs. The registration is, therefore, wrong, and copyright does not exist, and the defendant is entitled to judg- nt. With some difficulty I have come to this conclusion. The result l be that the copyright in a photograph, if a proper registration be de, will last during the life of some person who is probably never ended by the Act; and the great photographers must superintend the rk themselves, or when they select an artist they must consider, not ly his skill, but the state of his health.

LORD JUSTICE COTTON: I think the author of the work in question ould be entered. The objection was held that Nottage and Kennard had tered themselves as the authors. The Act is very imperfectly drawn; does not give any definition stating who is the author. I consider it photographer who produces the work. It is said there is a difference tween a painting and a photograph; is there any essential difference? e author of a painting does not make his colours, his brushes, or his ıvas; and we know that many photographers do not make their own tes, their cameras, &c. In this case it is clear to me that Reynolds the author of the work. The plaintiffs certainly cannot say they are. onsider the registration was defective and the copyright void.

LORD JUSTICE BOWEN: I am of the same opinion. The question is— e the plaintiffs the authors? Who is the author? Certainly not the man o finds the apparatus for the photographer; certainly not the man who ances the expedition. Could it be said that if an artist were sent abroad take the sun at the expense of the country that the British Government re the authors? It is the man who produces the work, not the financier. e copyright is given to the author for life, and that cannot be Nottage d Kennard. Supposing it a joint-stock company, when would the thorship end? I consider Reynolds is the author of the work in estion, and that the opinion of the Court below was right.

Judgment was then entered for the defendant with costs.

Mr. SHORTT, for the plaintiffs, raised the question as to the amended adings with respect to the costs, which their Lordships overruled. A ond question raised by him to the effect that, as the judgment affected a y large number of photographers, would their Lordships say if an ignment by the operator to his employer was necessary? This their rdships declined to answer, leaving it to Counsel for their own argu- nt.

PHOTOGRAPHIC *CAUSE CÉLÈBRE* IN THE ISLE OF MAN.

important case, McLanachan and Hobson *v.* Wane, occupied four days the last week in July in the insular court, and, from the nature of the e, and the popularity of the principals in the action, much interest ached to these legal proceedings. The matter is clearly summed up in eading article in the *Isle of Man Examiner*, which we here "annex":— e action tried before Deemster Drinkwater during four days last week, which Messrs. McLanachan and Hobson sought to obtain damages from r. Wane, the well-known photographer, excited considerable interest. the removal of Mr. Wane to Edinburgh he sold his business to the plaintiffs, who paid him £700 for the goodwill, the important photographic gallery, which is said to be unexcelled for its fittings and conveniences by any similar building in the kingdom, and twenty thousand negatives, constantly in use for orders from England. Prior to the purchase by the plaintiffs, the defendant sent a letter to Mr. McLanachan stating that his income for a number of years had been from £1,200 to £1,600 per annum; but that owing to his being in Edinburgh during one or two of the last years the business had fallen off. After the completion of the purchase, and after carrying on the business between one and two years, the action was brought against Mr. Wane for false representation—that he had not taken the amount stated in any one year. This charge, which seriously impugned the honesty and business credibility of Mr. Wane, could only be answered by the investigation of a long and carefully-conducted trial, to which he at once responded. It was shown to the evident satisfaction of the jury that every facility had been afforded the purchasers to investigate Mr. Wane's books, and that the opportunity had been embraced by a professional accountant, a relative of Mr. McLanachan, and brought by him from London for the purpose. Mr. McLanachan had also carefully gone over the books himself, and had signed a memorandum to the effect that he had done so, and that he was perfectly satisfied with the investigation. In addition to these repeated inspections the books were left with Mr. McLanachan—excellent proof that there was no thought in Mr. Wane's mind of the existence of the slightest discrepancy between the statement of his Douglas business and the facts which were provided by reference to his books. Notwithstanding, Messrs. McLanachan and Hobson commenced an action for the recovery of damages on account of false representation. Not to have responded to the action would have proved Mr. Wane to have culpably misrepresented his business, and that the £700 he received was far in excess of its actual value. This was the issue to be tried by an intelligent jury of business men, who for four long summer days patiently listened to every detail for and against the plaintiff's plaint. Everything that could be said in favour of the plaintiffs was said, but the overwhelming evidence of the fact that Mr. Wane had understated his business rather than overstated it, was convincing, and did not admit of a doubt. The Deemster, in the course of a clear summing-up, showed the jury the impossibility of coming to any other conclusion than that Mr. Wane had honestly handed over to the plaintiffs a business for an amount which was far below its value. A speedily-returned verdict by the jury in Mr. Wane's favour was evidence that the jurymen had arrived at the same conclusion.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3,800.—"Process for Preparing and Painting Photographic Prints or Drawings so as to Resemble Oil Paintings on Canvas, to be called 'Caspar's Kartaline.'" ALBERTA M. F. CASPAR.—*Dated August* 3, 1883.

No. 3,837.—"Adjustable Chair for Photographic Purposes. W. R. LAKE; communicated by W. S. Liscomb.—*Dated August* 7, 1883.

PATENT SEALED.

No. 843.—"Improvements in Apparatus for Holding Dry Plates or Films Before, During, and After Exposure, and for Changing Them in the Photographic Camera." THOMAS SAMUELS.—*Dated February* 15, 1883.

NOTICE TO PROCEED.

No. 1,650.—"Improvements in Photographic Shutters for Instantaneous Photography." RICHARD REYNOLDS and FREDERICK W. BRANSON, Leeds. —*Dated April* 2, 1883.

PATENTS GRANTED IN AMERICA.

No. 281-020.—"A Linearscope." ALONZO CHAPPEL, Brooklyn, N. Y.—*Application filed November* 18, 1882.

No. 281-002.—"Apparatus for Separating Nitrogen from Atmospheric Air. JOHN F. BENNETT, Pitsburgh, Pa.—*Application filed September* 6, 1882.

Contemporary Press.

DETECTIVE PHOTOGRAPHY.

[SCRANTON REPUBLICAN.]

FOR several years Mr. D. N. Carvalho, the New York photographer, has made a speciality of the delicate use of photography which is brought into play more and more in connection with criminal cases in which disputed handwriting, forgeries, counterfeit money, &c., are features. The results now achieved are the outcome of years of experiment, and the photographic expert becomes in the end an expert in handwriting. Mr. Carvalho's gallery of records is an interesting illustration of what perseverance and ingenuity, aided by photography, can do toward solving apparently hopeless mysteries. To a reporter, who visited his studio, he said:—

"We can do a great many things to bring the truth to light by the aid of photography. There is scarcely a case nowadays in which it is not brought into play if disputed handwriting is concerned. Of course the most famous case of late years was the Morey letter case. There is a photograph of the Morey letter up there in a corner. It yet remains a mystery, but we are certain that Garfield did not write it. I first found by photography that the envelope had been tampered with by the following process:—Cutting the envelope open, so as to get a single thickness of paper, I put it between two sheets of plate glass, and placed it where the

sun passed through it, the camera being placed on the shady side. Although no half-erased writing could be detected on the envelope with the naked eye or a glass, the difference in the thickness of the paper where erasures had been made showed plainly, as the light came through more clearly, and the erased words, which gave rise to so much discussion, were discovered.

"Below the Morey letter is a photograph of the signature of Alonzo C. Yates. Yates, you may remember, was a rich Philadelphia clothier, who, late in life, married a cook in the Astor House, and died, leaving a million or so to the wife. The daughters by a first wife disputed the signature to the will. I was employed by John D. Townsend to show the genuineness of the signature. We got thirty or forty genuine signatures of Yates admitted by both sides, and showed that a man never writes his name the same way twice. Then I took the signature of the will and another admitted by both sides, and enlarged them until each was nine feet four inches long. The peculiarities of the writing became so apparent when shown upon that enormous scale—the signatures were so evidently by the same person—that the contestants gave up the case.

"There is a portrait of Theophilus Youngs. He married a clairvoyant many years ago in Boston and disappeared. His widow pretended to recognise his body in one that was found in the bay soon after, and he was given up as dead. Some years after his father died, and the widow put in a claim for a share of the property. The contestants, by whom I was employed, contended that Youngs was yet alive, and eventually produced him in court. The alleged widow refused to recognise him, and I was called upon to prove he was the man. The widow produced a photograph which she said was one of the pictures of Youngs, her husband. A good many years had passed, and although the likeness was a strong one, there was enough difference in the appearance of Youngs and the photograph to make a jury hesitate. I put Youngs in the same position in which he was taken in the picture the genuineness of which was admitted, and made a photograph of the same size. Then the likeness became more apparent, and exact measurements showed the two faces to measure the same in all respects. For instance: the distance between the mouth and the eye, which is seldom the same in two persons, was exactly equal. Then one picture was made transparent and superimposed over the other, and the two faces matched perfectly. The jury decided that the claimant was not an impostor.

"In the case of Hall, the head clerk of the Newark Treasurer's office, everything depended upon showing that he changed a figure 5 into a figure 3. He ran away to Canada, and was brought back upon a charge of forgery. His counsel claimed that the figure had not been changed, and that if the mark of an eraser was found, and that the figure 5 had been changed, it was caused by the accidental slip of an ink eraser used in the margin. I made photographs of the page, and by means of a stereopticon threw a picture of that particular figure upon a screen ten feet high. Upon that scale several interesting things came out. It was seen very plainly that the figure had been altered from a 5 to a 3, but the erasure had been made with a different material from the erasure in the margin. We tried a rubber ink eraser, and the result was the same as seen in the margin. Then we tried a steel penknife, and the result enlarged a thousand times was the same as seen over the figure 3. This disposed of the 'accident' theory, and Hall was convicted.

"I was employed in the Cadet Whittaker case, and worked for weeks at the famous letter of warning—a few words scribbled on a piece of paper, which Whittaker was suspected of writing. All the cadets were called upon to give specimens of their handwriting, and the writing of No. 27 was declared by the experts to be that of the note of warning. I believed that it was not, and, taking the specimen of No. 27's writing upon which he was suspected, I duplicated the note of warning, cutting the same letters out of 27's specimen, and placing them together as nearly as possible in the order of the famous note. It was a work of tremendous labour, but when done it showed the innocence of No. 27. It was suspected that the scrap of paper upon which the note of warning was written was torn from a letter sheet which Whittaker sent to his mother, but that theory was disposed of upon enlarging the two edges to the size at which a fine cambric needle looks like a crowbar. Then it was seen that the two edges had never been together. The verdict in the Whittaker case was finally reversed upon the ground that the court had come to a decision from the examination of lithographs of the note of warning, which I proved by comparison with a photograph were incorrect. Whittaker, by the way, is teaching school now in the northern part of this State. He made speeches for Cleveland in his neighbourhood during the election campaign last autumn."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 14......	Newcastle-on-Tyne	College of Science.
,, 16......	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 2nd instant, Mr. W. E. Debenham occupied the chair.

Mr. F. J. Shippey, an American gentleman, exhibited specimens of photographs coloured by a particular process. He said that the method was so easy that an hour's practice was sufficient for learning it. The colours were in the nature of a stain, which was laid on, diluted with water, after the print had been sponged and treated with saliva. In answer to a question, he (Mr. Shippey) said that the colour could, if desired, be removed with alcohol.

The Chairman observed that, some years since, aniline dyes were reco mended for tinting photographs with, and from the description given Mr. Shippey, and owing to the fact that the colours he used were solul in alcohol, it seemed probable that these pictures were tinted with such dy If so, there was a great disadvantage in the rapidity with which anili colours faded when exposed to light, although the effect when quite fr might be pleasing and easy to produce. As to the objection raised by member that aniline dyes were difficult to work with on account of th leaving a hard edge if the brush were stopped: that might, probably, overcome by using the colour very dilute and repeating the washes, and the addition of some thickening substance, such as gum, to the water which they were diffused.

A question was read—"Why does a plate always dry round the edg first?"

Mr. A. L. Henderson thought that it was because at the edges mo surface was exposed than elsewhere, the side as well as the top of t coating giving out aqueous vapour. The part of the plate last to dry co tained more crystallisable salts than that first dried.

The Chairman suggested that it was because any current of air passi over the plate was, except at the edges, charged with the moisture from t contiguous surface of the emulsion.

Mr. C. E. Cooke showed a coated plate and some negatives taken by M J. B. B. Wellington with an emulsion which that gentleman had ma from the following formula. The emulsion was not washed, but there w no crystallisation, the quantity of gelatine being sufficient to prevent th and to allow of great economy of silver, forty-five plates $6\frac{1}{2} \times 4\frac{3}{4}$ havi been coated with emulsion made from only fifty grains of silver nitrate:—

Nitrate of silver	50 grains.
Water	4 ounces.
Gelatine	10 grains.
Bromide of potassium	40 grains.
Water	5 ounces.
Gelatine	10 grains.
Iodide of potassium	$1\frac{1}{4}$ grain.
Water	1 ounce.

The emulsion was boiled for forty-five minutes, and 200 grains of Heinrich gelatine added afterwards. The plates were somewhat slow, the exposu given to the negatives produced—outdoor subjects—having been twel seconds with a lens stopped down to $\frac{f}{32}$, or No. 16 on the uniform standar

Mr. Henderson expressed an opinion that if still more gelatine had bee added the emulsion would have been more rapid.

A letter was read from a German photographer who had been workin Mr. Henderson's emulsion process successfully, but who inquired why wit it he could not obtain the perfectly glossy surface that he got when usin purchased emulsion. It was remarked by some of the members that glossy surface was of no advantage, and that, indeed, a matt surface w generally preferred.

The Chairman suggested that probably the purchased emulsion was mad upon a more economical principle—something nearer to that used by M Wellington, the specimens of which they had been looking at. These plate were, indeed, perfectly glossy, and in that, and in the red, transparen character of the film, reminded one of the gelatine plates that were first sen out.

In reply to a question as to whether anyone present had had any exp rience of hydrokinone as a developer,

Mr. A. Cowan said that he had found it to act exactly like pyro. It ha been claimed that it could be used without a restrainer. So could pyro., only the smallest quantity of ammonia were used with it; but if more tha that were employed both pyro. and hydrokinone required restraining.

Mr. Henderson said that a solution of hydrokinone in water blackene very rapidly.

Mr. Cowan replied that, as with pyro., he addition of a little citric aci keeps it good.

Correspondence.

August Meeting of the Photographic Society of France:— A New and Convenient Lantern for Amateur Travellers.— A Red Flame, by M. Scola.—A New and Novel Automat Camera, by Professor Stebbing.—A Claim for Priority.— Practical Demonstration, by M. Hutinet, of his New Pos tive Printing Paper.

The usual monthly meeting of the Photographic Society of Franc was held on Friday evening last, the 3rd instant,—M. Bardy in th chair.

M. Enjalbert presented a very convenient lantern for travellin photographers. The lantern is so made that it can be folded u like a book; the top and bottom, being square, when the lantern opened, fit in so that great solidity is obtained. A very ingenio system of ventilation is adopted. The light employed is that of a wa candle held in a brass tube with a spiral spring, as in carriage lantern The bottom of the brass tube is made to fit into a candlestick, which very convenient when at an hotel.

M. Scola made a very interesting communication to the Societ upon a means of developing gelatino-bromide plates in full ligh without the aid of a lantern. He counsels the use of a coloured ligh —red in preference to all others. All the readers of The Britis Journal of Photography remember that in its pages a "dodge" ha been spoken of analogous to the idea of M. Scola—that of placing

tle wire basket containing sodium chloride over the flame of a insen burner, or of a spirit lamp. The flame becomes yellow, erefore non-actinic in a great measure, and permits slow plates to be veloped by its light. A modification of this "dodge" was tried—at of dissolving sodium chloride in alcohol. Better results were otained as regards the light, but the calcination of the salts upon the ick soon caused the light to go out, therefore the idea was abandoned. well-known parlour recreation is carried out on the same plan. A ift of cotton is saturated with spirits of wine, sprinkled with table lt, and then set on fire; immediately the faces of all the company ike a ghastly and death-like appearance, much to the amusement the youngster who made the experiment. M. Scola has been cperimenting upon other salts by having remarked that, in pyrotechnic xhibitions or displays, rockets, squibs, &c., give a most brilliant red ght. This colour is obtained more generally from strontium. After iany experiments he found that the bromate of strontium was the best be employed, as this salt did not fill up the wick and extinguish he light. Perchlorate of strontium can also be used with success. I. Scola then put upon the table an ordinary spirit lamp, which, eing lighted, gave a beautiful red glare all over the room. He (M. cola) informed the members that as bromate of strontium was not ery soluble in alcohol a little water must be used to get the solution s concentrated as possible. Now, whether this idea will prove to be he *ne plus ultra* of what we require for our laboratories remains to be een.

The Chairman was of opinion that M. Scola's lamp emitted white ays as well as red ones, basing his opinion upon the combustion f the carbon and the wick. It has been proved (he said) that if a nonochrome yellow could be obtained perfectly pure the most rapid lates would not be acted upon, no matter what quantity of the light vas employed; therefore, if a pure red could be had, how much more mmunity from fog would be secured. When shall we have this so-ong-desired light in a practical manner? That is the question.

Professor Stebbing presented to the Society his new automatic amera. In doing so he said:—"The object of my presentation this vening is a little apparatus, very portable, intended for the use of the *avant* as well as the amateur and student. It will prove a great boon o the latter, as it will save him the trouble—not to say the difficulty—f focussing for every view he takes. Our learned and much-regretted olleague, M. Bertch, perceived this and invented his automatic camera. I am, in fact, indebted to him in a great measure for my own. His apparatus did not render the service to photography that was anticipated, for two reasons—its high price and the length of exposure for the image. Had such rapid plates been then at hand as we can procure at present the instrument would have proved very successful. With my new automatic camera a fraction of a second suffices for the exposure, and by the modification I have introduced of having rollers upon which can be wound sufficient film or sensitised paper, fifty or sixty proofs can be made without opening the camera. Dry plates can also be employed. The size chosen is $2\frac{1}{8} \times 2\frac{7}{8}$ for dry plates, and $2\frac{1}{4} \times 2\frac{7}{8}$ for films."

In form the apparatus resembles a stereoscope, bearing a lens of four inches focus, made by one of our opticians. On the top is fixed an instrument called a "finder." By placing the eye to the round hole one can see all the landscape as reflected by the lens upon the sensitive material in the interior. On each side of the "finder" are two knobs attached to the rollers, to which the film or sensitised surface is fixed. A ratchet catch is so placed that at every turn of the cylinder or roller a noise is made to warn the operator that another piece of film is ready for exposure. The film in moving from one roller to the other passes before a sheet of plate glass, but without touching it, so as to avoid scratches or line marks in the finished negative. It is on the back surface of this glass plate that the focus of the lens has been accurately adjusted. In order that the sensitised surface should have perfect contact with the surface of this glass when required, a movable board covered with black cloth has been so adjusted behind that by turning a screw the board advances and pushes the film against the glass plate during exposure; when this is terminated, and to permit the film to be changed, the board is withdrawn by means of the before-mentioned screw. On one side of the board are placed two sharp points, which make holes in the film to enable it to be cut up into small pieces for the convenience of development.

In order to expose either film or sensitised paper the material is cut into bands of one or two yards in length by two and a-half inches wide. The end of the band is put into the slit of the left-hand roller and fastened by the mechanical means provided. It is then wound upon this roller, and the other end is attached to the right-hand roller by the same means. The back of the camera is now put in and all is ready for work. When the landscape is chosen the screw in the back of the camera is turned to the left. This pushes the sensitised surface against the glass and ensures complete sharpness. For another exposure the screw is reversed, and the right-hand roller can be turned until the "click" is heard. The sensitised material being now pressed against the glass is ready for another exposure, and so on until the band is completely used. To employ dry plates it suffices to take out of the camera the frame bearing the glass and introduce the dark slide holding the plate into its place. The little negatives are so sharp that they will bear to be enlarged if required.

By desire, as M. Hutinet had an enlarging apparatus in the room, three small negatives made in the new camera were enlarged 34 × 29 centimetres (about $13\frac{1}{2} \times 11\frac{1}{2}$ inches), to the entire satisfaction of the members.

M. Adam sent a washing-basket similar to the one described in my last communication, claiming his right to the invention (if invention there be) over M. Jonte, who had patented his. The Society took note of his claim.

M. Hutinet then gave a practical demonstration of the value of his gelatino-bromide paper for enlargements. The apparatus was lighted up with gas (ordinary coal gas). A sheet of sensitised paper was put upon the easel, a negative placed in the camera, all the lights turned down in the room, and the gas turned up *in* the apparatus. An exposure of forty seconds was given for one and forty-five for the other. The two were developed together in a large tray, with excellent results, giving satisfaction to all present. The following is the formula he employed:—

No. 1.

Boiling distilled water	30 ounces.
Neutral oxalate of potash	9 ,,

Dissolve, and when cool filter.

No. 2.

Distilled water	10 ounces.
Protosulphate of iron	3 ,,
Sulphurous acid	1 drop.

No. 3.

Distilled water	10 ounces.
Citric acid	5 ,,

Dissolve, and filter.

To make the developing solution—

Take of No. 1	15 parts.
2	5 ,,
3	1 part.

Sufficient of this solution was poured into a tray and the exposed silver-bromide paper proofs were immersed rapidly, avoiding bubbles. The images soon appeared, and were hastened now and then by the introduction of a little new solution. When the development was found to be sufficient, the solution was replaced by several changes of water. The fixing bath was as follows:—

No. 1.

Water	8 ounces.
Hypo	2 ,,

No. 2.

Warm water	2 ounces.
Alum	$\frac{1}{2}$ ounce.

The two solutions are mixed and filtered; the proof must remain in about fifteen minutes. It is then put for two minutes into a new solution of hypo:—

Water	10 ounces.
Hypo	2 ,,

The proofs are now well washed in two or three waters, and then transferred to an alum bath for a-quarter of an hour:—

Hot water	35 ounces.
Alum	$3\frac{1}{2}$,,

They are washed for three or four hours, renewing the water every half-hour.

M. Hutinet invited me to pay a visit to his establishment, and to take a negative with me. I did so the following day (Saturday). I arrived at three o'clock in the afternoon. A full-sized enlargement of Madame Stebbing was made in sixty seconds and developed in the manner just stated. At eight o'clock Madame Stebbing was surprised at receiving a specimen proof (life-size) mounted on cardboard, retouched, burnished, and finished up in a first-rate manner. My residence is an hour's ride from M. Hutinet's establishment. I need not comment upon this fact. The readers of THE BRITISH JOURNAL OF PHOTOGRAPHY can now see a large and plentiful pecuniary harvest to be reaped by enlargements coming into fashion. E. STEBBING, *Prof.*

25, *Rue des Apennins, Paris.*

STANDARD DEVELOPING SOLUTIONS.

To the EDITORS.

GENTLEMEN,—Thank you for your article on *A System of Standard Developing Solutions.* I had intended drawing your attention to the obvious defect in Mr. C. Beckett Lloyd's proposal. Nothing surely can be simpler than a ten-per-cent. solution of the three standard elements in the alkaline developer. Only in one respect do I feel a little loss in dealing with the ingredients; that is, when such an extraneous element as the sulphite of soda is introduced, and how far it may affect the ordinary constitution of the developer, as I understand it has a decided restraining power. Such, at least, has been my experience of it in a small quantity I had from the Platinotype Company ready mixed with the pyro.

I have used an approximation to the ten-per-cent. standard for some months, having seen it in a former ALMANAC. Nothing now remains but for the makers to give the constituents of their developers in simple

terms. The only apparent object of many of the present formulæ appears to be how far the proportion of the elementary constituents may be hidden by a complicated way of stating them. I trust the present movement will end in breaking down this labyrinth, and that for the future it will not be necessary to get at the simple elements in a developer only by performing an arithmetical operation to which a quadratic equation is simplicity itself.

Thanking you on behalf of the self-taught amateur class of photographers,—I am, yours, &c., J. BATE.

August 6, 1883.

EXCHANGE COLUMN.

I will exchange a splendid dark tent, on three wheels, for anything useful for photography, camera and lens preferred; difference in price adjusted.—Address, J. LEACH, Dolgelly.

I will exchange a Cadett's patent instantaneous shutter, with tubing and ball complete, which cost 42s., for a whole-plate portait lens; or offers.—Address, D. S. JONES, photographer, Matlock.

Wanted, landscape backgrounds, strong headrests, and 10 × 12 portable camera, in exchange for other photographic apparatus or English concertina.—Address, J. B. SMITHSON, Leyburn, *viâ* Bedale.

I will exchange a pair of Newton's dissolving lanterns, lamps, also oxyhydrogen fittings, everything of the best, for a lens by Ross or Dallmeyer.—Address, F. T. SMITH, 91, High-street, Gosport.

I will exchange a large show case, size, 24 × 20, with plate glass front, lock, &c., for a good, plain background in perfect condition.—Address, with photograph, J. A. W., The Studio, Wellington-road, Dewsbury.

I will exchange two good bicycles, in thoroughly good order, fifty-two and forty-eight inch, for a whole-plate camera and lens; will give money, or anything useful in photography.—Address, J. S. WALKER, 48, Wellington-street, Woolwich, Kent.

I will exchange a very superior 8 × 5 mahogany tourist's camera, brass bound, swing back, three double backs and one single, and extra front for two pictures on one plate; the backs slide in hinged case at the back and fold up small, with leather cover, strap, &c., for anything useful in photography.—Address, W. E. SLATER, 282, Albany-road, Camberwell, S.E.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Messrs. Mackintosh and Co., Kelso, N.B.—*Photograph of Mr. Usher and Mr. Penny (The Cronies).*

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Photograph of Grand Stand and Racecourse at Goodwood, Showing Horses Passing the Winning Post.*

G. H. P.—Not at present. Perhaps shortly.

A. B. J.—Better not waste time in trying to reduce over-printed prints. There is no very satisfactory way by which it can be accomplished.

G. SPENCER.—There is no reason why you should not enjoy your pipe while you are developing the plates. The fumes of the "fragrant weed" will do no injury whatever.

H. WARREN.—There is nothing to prevent your sending the negatives by the new parcels post. The local postmaster is in error, or, what is more probable, you have misunderstood him.

J. LENS.—We have had no experience with the instruments named, but we have no doubt they are good value for the amount mentioned. You must remember they are sold at a very low price.

J. B. MAGUIRE.—Very good pictures can be taken with the apparatus. We have seen some quite as good as if they had been taken in daylight. As with daylight, judgment is required in using any form of artificial light.

H. O. H.—Notwithstanding the short exposure you have given it is pretty clear that you have over-exposed the plates. Your only remedy is either to employ citrate of soda in the developer or to use a very large proportion of bromide as a restrainer.

W. W.—Does the maker of the plates expressly say that the negatives are not to be fixed after reducing them with the perchloride of iron, or is it only your surmise? If the former, then we do not see the *rationale* of the process. We think you must be in error.

AMATEUR ASSAYIST.—You will find a series of articles on the collection and reduction of residues in our volume for 1874. Several articles on the subject have appeared since in our ALMANACS. Refer to the volume named and you will get all the information you desire.

W. J.—Hydrokinone and sulphate of quinine are two totally different things. If you have employed the latter there is little wonder that you have failed to bring out your pictures. Get the right article and try again. Messrs. Hopkin and Williams will supply the correct thing.

LUX.—We imagine the negative had been intensified with mercury before you attempted to reduce it. If this be the case it will quite account for the stains. If the negative had not been so intensified we can see no reason why it should have stained in the manner stated in your communication. The method is a very useful one, and we advise you to give it another trial, but with a plate that has not been subjected to the action of mercury.

S. J. T.—What you term the "unpleasant bloom" on the surface of the carbon prints enclosed is simply due to their not having been washed after they were taken from the alum bath; hence the salt has crystallised out as the prints dried. If you touch the surface with the tongue you will taste the alum quite distinctly.

A. WOODWARD.—The "curious appearance" of the prints is due to the cracking of the albumen. This trouble is most liable to occur when using very highly-albumenised paper, particularly if the prints are allowed to curl up as they dry. The best plan we have found for avoiding the evil is to dry the prints between blotting-paper, so that they cannot curl up. If they are allowed to roll up as they get dry they are almost sure (with some papers) to crack when unrolled for mounting.

RALPH complains that the black varnish on some glass positives made many years back has cracked, and on trying to remove it with both turpentine and benzole it proves quite insoluble.——This often happens, and it arises in this way:—The basis of the black varnish is asphaltum, and this material is sensitive to light, its action being to render the asphaltum insoluble in the solvents that previously dissolved it. On this property depends the bitumen process. The varnish may, however, be removed; but it will be necessary to scrape it off with a palette knife.

BETA.—All will depend upon the quality of the lens. All things being equal, that with the longest focus should cover the larger picture; but in the case of an inferior instrument this may not apply. Without knowing the focal length of the fronts of the combinations we cannot, of course, give any idea of the size of picture they will take. As the province of the back lens of a portrait combination is to correct the errors of the front we do not think you will gain much by changing the components of two combinations. The back lens of a portrait lens will not answer for landscape purposes.

RECEIVED.—E. Debenham; W. J. Stillman; Royal Cornwall Polytechnic Society's annual report.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, to be held on Wednesday next, the 15th inst., the subjects for discussion will be—*Adjourned Discussion on the Development of Plates Having Received a Minimum Exposure;* also, *What is the Cause of Scum or Striæ on the Surface of Gelatine Plates, and What is the Best Preventive of this Effect?*——On Wednesday, the 22nd instant, the discussion will be on *Copyright.* Visitors are invited to take part.

PHOTOGRAPHERS' "WANDERING MEETING."—The twelfth excursion meeting of the German Photographic Society will take place on the 22nd, 23rd, and 24th instant, at Coblentz. The meeting is to be combined with an exhibition. Visitors are cordially invited. Persons intending to take part in the excursion meeting are requested to intimate the same to Herr Herrmann Koch, Villa Vichy, Bad-Ems. Special excursion tickets will be issued by many German railways. Programmes of the proceedings may be obtained of the *Deutsche Photographischen-Zeitung.*

BALLOON PHOTOGRAPHY.—As we mentioned last week, Mr. Cecil V. Shadbolt made two ascents in the "Sunbeam," on Monday and Tuesday, accompanied by a friend. They had two splendid "voyages," safely descending at Northfleet and Farningham (Kent) respectively. In photographic work the enterprising aëronaut made several exposures, but has not had time yet to develope, owing to having to leave home hurriedly for Rotterdam. Mr. Shadbolt states that the light and time of day were inauspicious, but adds sanguinely—"We must take these as they come, and hope for success."

LONDON GAZETTE, *Friday, August* 3, 1883.

PARTNERSHIP DISSOLVED.

RICHARD TIMPERLEY AND HENRY THOMAS TIMPERLEY, Over Darwen, Lancashire, printers, booksellers, stationers, and photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending August 8, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

August	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
2	30·21	W	61	56	107	74	54	Overcast.
3	30·24	N	64	59	111	75	57	Hazy.
4	30·26	SW	59	58	100	75	57	Overcast.
6	29·93	WSW	64	62	101	72	60	Cloudy.
7	29·97	NW	61	57	112	72	55	Hazy.
8	29·93	W	60	54	80	61	53	Cloudy.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1215. Vol. XXX.—AUGUST 17, 1883.

"DEPTH OF FOCUS."

In our last issue, Mr. W. K. Burton, in his article on spherical aberration, treats upon a well-worn subject—namely, that of the so-called "depth of focus." The question has often been raised before, in connection with a lens possessing a considerable degree of spherical aberration, whether it has the property of rendering objects situated at different distances both before and behind the one actually focussed upon with greater distinctness than does another in which the aberration is more perfectly corrected.

As Mr. W. E. Debenham pointed out, a few weeks since, the fallacy of this idea was demonstrated in our pages, several years ago, by the late Mr. Thomas Grubb. And all who have read the series of articles now appearing in our columns, or those which have previously appeared, will perfectly understand that there is no such thing as depth of focus in the true sense of the term. Still, there is evidently considerable misconception on the point, for one is continually hearing that the lenses by such or such a maker give great depth of focus, and many photographers we know pride themselves on the possession of lenses which will render objects in different planes with equal distinctness, particularly portrait combinations. Several terms have at different periods been suggested for taking the place of "depth of focus"—which, of course, is a misnomer—such as "depth of definition," "diffusion of focus," "depth of defining power," &c.

Mr. Burton, in his article, gives an explicit definition of what is generally understood in practice by the term depth of focus, by describing it as "a quality in the lens which enables it to represent planes at different distances without any perceptible variation in the definition." If we accept this as a correct rendering of the term, we must then see that spherical aberration will confer this property, for then we shall have a picture in which no portion is absolutely crisp, as all parts will be more or less wanting in sharpness. In such a case the lens may be racked out or in some little distance without materially affecting the definition of the image. It is not our present intention to go into this matter again, theoretically, but to treat it from an entirely practical point of view. A simple experiment will, however, prove that the introduction of spherical aberration into a perfectly-corrected lens will not confer upon it the property of defining on different planes with greater distinctness than it possessed before.

Let us arrange a number of books—say seven—step fashion, on a table, so that there is a distance of a couple of inches or so between the backs of each. Now with a portrait lens, in which the components of the back combination are capable of being separated for the purpose of introducing spherical aberration at will, let the middle book be focussed as accurately as possible, using a magnifier for the purpose, and then take a negative with the full aperture. The components must be screwed quite home, so that the lens is employed in its most perfect form. Now, let the components of the back lens be unscrewed a turn or two, and the same book as before be focussed as sharply as the altered conditions will permit, taking a second negative also with the full opening of the lens, and then compare the two. At first sight, the latter negative will appear to have the books situated before and behind the one focussed upon more sharply defined than the corresponding ones in the first negative, although the centre book—the one focussed upon—will appear far less sharp. But a closer examination will show that this is not the case, and that, in reality, the books in different planes to the centre one are undoubtedly sharper in the first negative than in the second. To prove this, the images of each corresponding book in the two negatives must be carefully examined with a magnifier regardless of the one upon which the focus was adjusted, which, for the purpose of observation, may as well—or better—be obliterated in each case. This experiment will prove conclusively that no depth of focus is conferred by the introduction of spherical aberration, and that it is only by destroying the intense sharpness of the image at one point it appears sharper throughout.

We have on several occasions dwelt upon the value of lenses with spherical aberration for certain purposes—as, for example, when rapid exposures are imperative and a moderately-large angle has to be included, stops being inadmissible, as when taking instantaneous views, groups, &c. Under such circumstances, although no portion of the picture is obtained absolutely sharp, no one part in particular appears conspicuously out of focus—owing to its being in juxtaposition with another which is microscopically defined—as it would be when employing a perfectly-corrected lens with large angular aperture. In a word, an imperfect optical instrument may at times, and under certain circumstances, practically prove a useful photographic tool.

It must not for a moment be understood that we are advocating the employment of imperfectly-corrected lenses, for such is far from being the case; as we are of opinion that, if at all attainable, photographs, as a rule, should be as sharp and as crisply defined as possible. Who, for a moment, would question that a *carte*, cabinet, or even a panel portrait should not be as sharp as it is practicable to make it, or that a landscape could be too sharply defined. But, as we have explained in former articles, there are instances—as, for example, when stops are inadmissible—when extreme or microscopic definition in one small portion of the picture may well be sacrificed in order to obtain a picture which, although far from being really sharp anywhere, is not conspicuously out of focus at any particular spot, caused by its being in close proximity to another which is crisply—sometimes painfully—defined. Mr. Burton specially alludes to the advantage of the property which he defines as "depth of focus" in the case of large heads taken with a portrait combination when stops cannot be employed sufficiently small to ensure good definition in all planes. With this we agree, provided that it is not carried too far.

If the lens be perfectly—or as perfectly as possible—corrected for spherical aberration we shall, in taking a large plate with the full aperture, obtain one small plane only crisply defined, while another, merely a trifling distance more forward or backward, will be completely out of focus—the result being that that portion which is in

actual focus is painfully sharp, while the others are, by comparsion, very objectionably blurred. In such a case few will deny that, if by destroying such extreme sharpness over one small area we can obtain a picture possessing general harmony, an advantage will be gained. We are now, of course, assuming that the same end cannot be gained by stopping down the lens, owing to the long exposure which is entailed by the reduction of the aperture.

ON THE USE OF GAS.

It will be readily understood that gas for heating rather than illuminating purposes is the subject we would expound; for, although Mr. Laws has shown in a very able manner what can be done in the latter direction, it is, nevertheless, quite evident that any capability it may specially possess for employment photographically lies entirely in the future. For heating purposes, who is not familiar with it? Yet, on the other hand, in how many instances is the knowledge of the mode of getting the best value out of the material most imperfect. Naturally the consideration of the powers of gas in this direction divides itself under two heads—the heating of large masses of air, apartments, and the like; and the application of heat to objects, such as chemical utensils, furnaces, flasks, dishes, and so forth. The former branch being perhaps the simpler, we will deal with it first.

There are few studios where gas has not at one time or another been used for heating an apartment, but fewer still where gas, having been once made use of, is still employed as a heating agent. "It is too costly" has been always the cry—a cry, however, which is not uniformly just, on account of the conditions of economy not having been understood either in the production of the heat or its distribution when once produced. With regard to the burners employed: though there is an infinite variety of patterns, it may be said at once that, so long as they burn clearly and steadily without flare or smoke, there is nothing to choose among them as to the amount of heat obtained from the consumption of a given amount of gas. This is a fact that cannot be too strongly presented; yet it is one very commonly ignored, judging from the variety of burners manufactured, each new one being asserted by its inventor to give off a greater amount of heat than any of its predecessors. "Gas" is a complicated substance certainly, being a mixture of a large number of different gases, and more exactly spoken of under the particular title of "coal-gas;" but, whatever the number of constituents, they are all subject to one law. When they combine with oxygen in undergoing combustion the amount of that gas used up by a given quantity of coal-gas is always the same and is easily calculable; and the heat liberated or made sensible in the act never varies to the slightest extent with any given make of gas. This being well understood, it is plain that the chief point to decide in the choice or construction of a stove is not how to produce the heat, but how to utilise it; and a stove is more or less useful as it spreads abroad the heat produced without waste.

The heat is so distributed by the stove in two modes—radiation and convection—which will be understood when we say that the first is the way in which an ordinary coal fire gives off heat to a room, while the second is more akin to the heating of a room by pouring heated air into it. From this it will not be difficult to understand that an ordinary gas burner, such as is commonly employed for lighting purposes, is capable of heating a room by both modes of action. If anyone hold his hand a slight distance below a gas flame he will be aware of a slight sensation of warmth from radiation, while if he were to place it above the flame at the same distance there would be the same amount of heat by radiation *plus* that from the highly-heated products of combustion.

It may further be said here that such a burner will send as much heat into a room as the best-constructed stove ever devised; but the heat would be rather one-sided—it would be confined in too limited a space. Further: it would turn into the atmosphere of the room all the products of combustion, which is a great point—in fact, a most important point—in any gas stove, yet how little is it thought of when the gas is set alight for purely illuminating purposes!

No gas stove that pours the noxious gases produced during combustion into any living apartment should be employed for more than a very limited period; but our readers may rest assured that in getting rid of these products some heat is wasted, for the stove does not exist that, passing them into the outer air, does not thus lose some of the heat generated. The products of combustion include, besides the harmful gases alluded to, a quantity of water, and, when a large amount of gas is burnt in a room, the presence of the water is quickly perceived, all cool objects rapidly becoming covered with it. It will, therefore, be clearly seen that a stove should be selected which turns its waste matter into the outer air, and that stove will in all probability be the best that does so with least loss of heat.

In choosing a stove, therefore, though any special peculiarities must claim attention, that one should be chosen which has the least chance of sending the heat away, and which is best capable of imparting its heat to a large body of air. Light currents of air in the room would then have a better chance of disseminating the heated air by convection, while radiation would also play its part. We have seen some huge, heavy gas stoves with a large chamber enclosed by thick sides and a wide exit chimney near the top or at the sides. Such a stove is the kind *not* to select, and the points governing the construction of one that could be recommended would be—firstly, a large surface area for the heated products of combustion to impinge against and give up their heat, to be in turn given up to the atmosphere, a requirement which is, and can be, met in various ingenious ways; and, secondly, a chimney so arranged as to carry off the combustion products at the latest possible period after their production.

There is no stove in the market that does this effectually, though, as we have said, their powers differ considerably in this respect. We have seen the nearest approach to perfection in this way at the establishment of a well-known contributor to our pages (he, too, has given up the use of gas for heating rooms); but it was, in a sense, too near perfection—so much of the heat was taken from the gases before they left the apparatus, the narrow chimney giving no heat upon placing a hand upon it, that the aqueous vapour was precipitated, and, though provision was made to prevent its lodging anywhere in the stove, it yet ultimately ate its way through the thin sides of the stove and so destroyed it. We merely name this particular example of a gas-heating apparatus to bring before our readers the principles involved. There are many kinds of stoves manufactured—some of them excellent, some the reverse; but if our remarks have been apprehended it will not be difficult for our readers to form a true judgment of their merits.

In our next we purpose dwelling upon gas-heating apparatus of the other class we have indicated.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XVI.—Diffusion of Focus.

The term "diffusion of focus" is another name for spherical aberration. Some imagine that portrait lenses possessing this property have an advantage, not shared by others, of equalising the definition of varying planes; this, however, is an error, for there is no equalising of such different planes. But there is this advantage: that, whereas with a spherically-corrected lens, when employed with a large aperture, one plane of the face—the eye, for example—is rendered microscopically sharp, the other planes—such as the ears and nose—are indistinctly delineated from being out of focus, in a "diffusion" lens these various planes *appear* to possess a greater equality of definition, owing to the destruction of that excessive sharpness of one plane by which the others, by comparison, were degraded.

We are not now speaking of that depth of focus (which, we have shown, cannot exist from the strictly optical point of view) or depth of definition which arises from reducing the working aperture of a lens, but of that quality of non-optical definition arising from spherical aberration in the objective. Now, while we like a lens that shall "cut sharp as a razor," we also like the power, when

occasion demands, of making a picture that shall not be quite so sharp. This is a very natural want felt by every photographer who does not consider the acme of perfection to lie in definition. Mr. Fox Talbot found the need of such a power even when using paper negatives, and recommended the separation of the negative from the sensitive paper by the interposition of a sheet of thin paper or gelatine as a means of obtaining this requirement. Others have suggested putting the sensitive plate a little out of focus; but an objection to this is found in the fact that if the face of the sitter be out of focus some other portion will be sharp, and Charybdis is no better than Scylla. If a lens have a moderately large aperture, and is not only properly achromatised but aplanatic, it is impossible to escape this extra-sharp definition of one plane. Every possessor of a large telescope is well aware that if it be focussed sharply upon an object situated at a distance of a mile an object only half-a-mile away is altogether out of focus; and so it is with photographic enses within a more limited range. In order to remove this property some means must be utilised by which the lens can be rendered non-aplanatic.

The term "aplanatic," we here pause to say, was first employed by a Scotch *savant*, Dr. Blair, who in 1791 made use of it to signify certain points of superiority in lenses which he had constructed. Its application since that time has been narrowed down to signify freedom from spherical, in contradistinction to chromatic, aberration.

The first account upon record of any lens in which the aplanatism could be modified at will, so as to secure either sharpness or "diffusion," was given in April, 1864, in the course of a paper read before the Photographic Society of Scotland by Mr. J. Traill Taylor. When exhibiting a lens which he, as an amateur, had constructed for his own use, he directed special attention to the fact that by a slight re-arrangement of the lenses, operated by a projecting button working in a slot in the mount, the fine, crisp definition given by the lens in its original state was eliminated, and that in the altered condition it gave a picture *generally* sharp all over the plate, but particularly sharp nowhere. "The lens," he said, "suddenly becomes possessed of a new property, which is the much-disputed one of depth of focus, or, more strictly, depth of definition, covering a large flat field without any stop whatever." This, it is believed, is the first exhibition of any lens for which such a property was claimed, and special attention was at the time directed to the advisability of securing a lowered degree of sharpness in this mode rather than by the common method of putting the subject a little out of focus. It is fortunate that lenses both by home and foreign makers are now easily procurable in which by a separation of the back lenses the focus may be blunted in any desired degree.

When, at a recent series of discussions on lenses, at the London Photographic Club, the chairman took occasion to attribute a certain degree of blame to the manufacturers of lenses—especially those of the "rapid" and "portable" class of compounds—for curtailing their usefulness by limiting the aperture in the fixed stop to that point at which optical crispness terminated, the representative of a large manufacturing firm who was present good-humouredly hurled a jocular anathema at the chairman in question, whose first act, he said, upon obtaining one of their lenses was invariably to put it in the turning lathe and open out the fixed stop to the diameter of the lenses. This is precisely the course we are now about briefly to advocate, and its reasonableness will stand or fall by the soundness of the reasons adduced.

When a lens of the description specified gives, with its fixed diaphragm, *black* definition—by which we mean the rendering of a piece of printed matter in an unmistakably sharp, black manner without greyness or fuzziness—it may be considered as being optically perfect; but as every lens will do this when it is stopped down to a sufficient degree, the question for consideration is—What price do we pay for this, or what do we suffer in the way of cutting off the illumination? The larger the aperture of the lens that does this the better is such lens; and in making a selection of a "rapid" objective this is one of the points to which we always pay special attention, for some will not define "black" unless the fixed stop be very small. Let us suppose that we have got an objective the diameter of the lenses of which is two inches, the fixed stop between the two being one and a-quarter inch. If with such a working aperture it gave black definition, we would, without hesitation, have this fixed stop opened up to such an extent as upon trial would merge the black definition of the lines into grey, occasioned by the overlapping rays caused by the introduction of spherical aberration. It might be necessary, in order to have this accomplished, that the fixed aperture be increased to such an extent as almost to show light round the margin of the movable diaphragms, and two such lenses in our possession have been opened out to that extent. The advantages secured are—first, the ability to take a photograph with a far briefer exposure than was previous possible; and, secondly, the ability to take a portrait in which, while the sharpness is still of excellent degree, it is chastened or softened by the modicum of aberration so introduced.

Now the gain thus secured has been obtained without any loss whatever; for, if the razor-edge definition of the objective in its original state be required at any time, it can be immediately secured by the insertion of a diaphragm, by which, so far as light and crispness of definition are concerned, the lens is returned to its first state. We are informed that opticians would with pleasure send out their lenses with the fixed stop enlarged in the way and to the extent here suggested were it not there are many inexperienced photographers who could not use aright such a power were it conferred upon them, and who, misunderstanding the reason for the increased aperture, would be apt to decry the lens as being deficient in definition. While we sympathise with the opticians in the force of this objection, we recommend the propriety of the course suggested to those who, being already in possession of objectives of the class to which we now refer, are at liberty to alter them in their brass work as they see proper. To tamper with the glasses themselves would be highly irrational, the ability to do so being assumed.

Some of the mechanical means employed in the production of portraits in which extreme sharpness has no place are rather amusing. Among these we may refer to a system not long ago patented by one of the most eminent photographers of New York City, which consists in placing between the camera and the sitter a gridiron arrangement containing several gas jets, by which ascending currents of air of varying densities from the flames disturb the sharpness of the definition and produce an alleged greater harmony. The pictorial results are designated "vibrotypes." A similar effect is obtained by having a trembling camera-stand, or by attaching a string from the camera to the floor and causing it to vibrate during exposure.

The method employed by M. Claudet was much more philosophical. It consisted in moving the lens in and out of the camera, within certain limits, during the *séance*, so that whereas at the commencement of the exposure the nose may have been sharply in focus and the eyes or ears out of focus, or *vice versâ*, at the conclusion these conditions were changed, the nose being then out and the ears in focus. The focus was thus distributed over the entire plane of the face. M. Claudet made a specialty of very large portraits, which necessitated the employment of portrait lenses of large dimensions; and there is no doubt that by the means just indicated he secured equalised definition over various planes.

Into the art aspect of diffusion of focus we have avoided entering, our intention having been confined to considering the question from the optical point of view.

The value of a single achromatic lens of plano-convex or meniscus form in producing "diffused" portraits is well known. It must be worked with a stop much larger than would be employed in landscape work. Portraits of large dimensions and great technical excellence have often been obtained by such agency.

In the early days of photography many literary jokes were made at its expense, and an anecdote related in a foreign journal, by M. Kœuffer, would seem like a similar attempt at wit were it not for its complete seriousness. He narrates that a chemist sent a bottle

of medicine to the house of a customer at about eight o'clock in the evening, the medicine to be used at bedtime. In a little beyond an hour it exploded with great violence, shattering a number of articles in its vicinity, the unfortunate patient being knocked out of his chair by the shock. The *dénouement* is rich. There had been an error; the medicine had gone to the photographer and the photographer's bottle to the patient, the contents being a "*preparation of a very sensitive kind.*" It is a new property of sensitive preparations to be liable to explosion, we should say.

The same writer—it must be premised these extracts are from a journal interested in medicine—states that, among other things, hypophosphite of soda, which, our readers may remember, was recommended some little time ago for use in developing, is liable to explosion if violently struck, while oxide of silver made up as a medicine in pilular form has exploded in the waistcoat pocket of a patient! Photographers will have to be careful.

Boracic acid has been recommended for many purposes in photographic operations, though we are not aware that it enjoys any extended use. Whenever anyone wishes, before making use of it, to reduce it to powder he very soon finds out the difficulty of so doing, and will generally produce but indifferent results. It is stated, however, that, if the acid be placed in a mortar made hot and a few drops of glycerine be added, the powdering may be readily and perfectly effected.

Cotton-wool is usually recommended for filtering purposes, possibly on account of its being so readily obtainable; but we most decidedly give the preference to tow, which is far handier and less liable to clog in the neck of the funnel. This material has, however, found little favour with photographers, possibly on account of a fear of its not being pure. Recently a process of purifying this fibre has been published, and as it seems likely to effect the object we have made a note of it. The tow is treated first with a solution of caustic soda, then with hypochlorite of soda, and lastly with hydrochloric acid. The effect is said to be to render it very absorbent and almost chemically pure.

Sulphantimoniate of soda, or Schlippe's salt, so useful in certain cases for intensifying negatives, is stated to be a valuable re-agent for testing the various alkalöids, such as morphia, strychnia, &c.

Few photographers who have had any experience with laboratory work, boiling in glass vessels, and so forth, have not had occasion to deplore the loss of a glass vessel during boiling operations; but a foreign experimentalist has proposed a method of reducing this liability to breakage to a minimum. He makes a mixture of kieselghur (infusorial earth, somewhat like tripoli, which no doubt would answer equally well) and of soluble silicate of soda, or water-glass. The two ingredients are mixed as a semi-liquid paste, and the mixture applied so as to form a coating from half to three-quarters of an inch thick, which is then allowed to dry slowly. We are inclined to think this ought to make a most useful aid to the employment of such vessels as glass flasks, beakers, &c.

We are evidently a long way from being put in complete possession of the facts about the last eclipse expedition. It may be remembered that the vexed question of the intra-mercurial planet was said to be settled by the absence of any planet where, if anywhere, this one should be seen. It now, however, appears that something like a remarkable red star was seen near the sun. M. Trouvelot (who accompanied M. Janssen) and Professor Swift, of the Observatory of Rochester, having compared notes, are said to have considered that this star is an intra-mercurial planet. Are there no photographs that would decide the question?

Everyone is aware that there are vibrations of light which are quite invisible to ordinary eyesight, but yet whose existence is proved by their photographic action. Similarly with sound; and M. M. E. Pauchon has been studying the limit separating audible from inaudible vibrations. He finds the point to be at about seventy-two thousands per minute.

LIGHTING THE STUDIO.

Of paramount and vital importance is the successful lighting of the model. Let a portrait be ever so well posed, and faultlessly manipulated to boot, the result is artistically valueless if the lighting be bad.

Lighting may be divided into two classes or styles, namely, "general" and "particular." By "general" lighting of the subject I mean, of course, the broad effects of light and shade to be carried out in the whole composition; and by "particular" lighting the introduction of *reflected* light into certain of the shadows and the modification of the high or principal light at certain points.

It is perfectly indispensable that the artist should possess the means of bringing to his aid all or any of these effects, and it is, in my opinion, possible to obtain these conditions in almost any studio, however built or situated. This may appear a bold statement, but I believe I can make it good; and I may add that all here written in this connection is the result of actual experience and experiment.

To begin with: most studios are lighted, "not wisely, but too well"—a great deal over-lighted in fact; hence the tame and spiritless, or hard, crude, and unfinished productions sometimes put forward as works of art. To counteract this excess of light in some measure strong shadows are introduced, and there is either a harsh, unpleasing effect or a result which may not inaptly be described as "stale, flat, and unprofitable."

I will not say the *best* effect of lighting, but certainly a very harmonious and agreeable one, is obtained by obscuring nearly the whole of the glass except a small piece near to and somewhat above the sitter's head. The shaded side of the studio must, of course, be entirely opaque, though equally, of course, it must be curtained, papered, or painted white. This style of lighting will be found agreeable to the sight, entirely obviating the unpleasant, and often painful, effect upon the eyes of a brilliant flood of light. It will be noticed, also, that a beautiful scale of tones is obtainable, ranging from the deepest allowable shadows through the delicate half-tones up to the *one* point of bright high light.

It will, perhaps, be objected that this system of illumination lengthens the exposure. The effect in this direction is, however, slight; but in these days of rapid gelatine plates it is not a question of serious importance, and should not weigh for one moment against the priceless advantage of true modelling and harmonious gradation of tone. I have seen this method adopted in an exaggerated degree by shutting out all the light, save one square near the sitter, with opaque blinds. The result was not happy, the shadows being short and abrupt as well as over-strong.

Another method of lighting which I have used occasionally, and which I am aware is practised habitually at this moment by at least one highly-accomplished operator, is to obscure the whole of the glass. In this case the shaded side of the studio is covered with dark grey, and the needful reflected light is obtained by a white-covered movable screen. Very agreeable effects are produced by this means, but the exposure is, undoubtedly, lengthened considerably—not sufficiently to militate against the result in the case of adults, but rather seriously so where children are concerned.

The system I would recommend is one which enables the operator to use either plan at his discretion, and this is accomplished by keeping a small space of clear glass close to the sitter, which may be closed by means of a movable sash of obscured glass. In this case the darker side of the studio must be provided with a double set of blinds—one white and the other dark grey. The operator will then possess every resource of lighting, and may vary his effects to suit his sitter. To do so, of course, requires time and consideration, but it is certain that a few moments of reflection and preparation are well repaid in the result, which, when so secured, will in the long run gain the approval of true critics and connoisseurs.

The public is ever becoming more and more alive to the capabilities of photography, and it is for the practitioner not only to satisfy the just requirements of the patron, but to show in his pictures all that union of art-feeling and conscientious manipulation which should mark the earnest and cultivated efforts of a thoughtful and artistic mind.

Edwin Debenham.

WITH THE ECLIPSE EXPEDITION.

On the morning of the 26th of May I started with a large party of officers and scientists for the shore, under the care of a midshipman

with bare feet. He had been superintending the operation of holystoning, and, not wishing to delay our departure an instant, did not stop to rectify this omission in his toilet. Soon after we reached the wharf the horses arrived. I was very doubtful about my equestrian powers, as the only ride of any importance I had taken before was a ride from Boulac to Cairo on a donkey, so I asked for the quietest horse. One was brought to me which I was told was very quiet—indeed, ladies had ridden him; but scarcely had I mounted when the brute started off at a furious gallop, and my endeavours to pull him up resulted in my having an experience of buck-jumping. Very glad did I feel when a native came up to the rescue, and on the arrival of the party I changed horses with a midshipman who, to use his own words, "thought he could stick on." My new mount would only walk, and after a short time I found that my comrades were all out of sight. Soon I came to a sugar mill, and here I presume my charger had been in the habit of stopping while his master held a conversation, for by no endeavours could I get him to go on. At last I dismounted and led the animal.

After a short time I came upon the guide, who was giving the latest information at a house by the roadside. He gave me his whip and I started again. Soon after we left the roads—which, by-the-bye, were very well made—and entered on a grassy moorland with sugar plantations on each side. I went across this moderately fast, catching up, before it ended, Mr. C. Ray Woods and three others of our party. At the end of this moor there was a little rough riding, and I passed Mr. Woods. We then came to a magnificent fern forest, and, although the road was very uneven, I was so enchanted by the beauty of the foliage that I almost forgot to guide my "mount." At times the undergrowth was so thick that no trace of the path could be seen, and I had to trust to my horse to lead me through. I should have liked to have exposed some plates here, but as I only had six I was very desirous of keeping them for Kilanea.

After travelling for over an hour we reached the end of this forest, and came out on a very uneven moor. Here we had a magnificent view in the far distance. On our right were Mona Loa and Mona Kea—two very high mountains, the highest having its summit streaked with snow; while on our left we could see the blue sea. When I had gone about a mile the road became better, and I found Mr. Woods was not with us. The guide told me he was close behind. I thought, however, I heard a cry of distress, so I rode back to find him leading his horse. He told me he was afraid the animal would not be able to go much farther. I then rode on after the guide to get another horse sent back; but before I came up with him he turned into a second forest, and a gentleman belonging to another party entered ahead of me, so I could not speak to him until we got into the open. The road became much worse on leaving this wood, and the next few miles was an incessant scramble up and down hillocks of slippery lava. At length "Half-way House" came in sight, and right glad were we to dismount. Very soon the guide arrived with the pack horse, and ere long we had the provisions on the table. We were debating about sending back for Mr. Woods when he came in sight, walking along at a swinging pace. He told us that at last the animal became too exhausted to move, and that he had tied him to a tree.

After an hour's rest we started, giving Mr. Woods the pack horse and distributing the baggage amongst the party. For the first two miles the road was rough but interesting. A forest some distance away on our right had a great many dead trees along its edge, and as they were bleached white they almost looked like cliffs. After a time the road narrowed and was bordered by small trees, while on each side the greater part of the vegetation had been killed and bleached by the fumes emanating from the ground. This part of the journey was very wearisome. After about five miles the country improved and became almost English in its character, one wood near the end of the journey affording a great contrast to the fern forest 2,000 feet below. It contained a great number of fine trees. While travelling through it we came across a milestone that told us there was only one mile more to do; so, although we were all very tired, we whipped up our horses and dashed away to get to our journey's end. When I got out of the wood I found myself on a level, grassy plateau, with Mona Loa in front of me. About two hundred yards away on the right was a large paddock, and beyond that a white house with outbuildings. Immediately behind the house rose a hill, and between the hill and the house were rising immense volumes of steam. On my left I saw that the ground sank quickly, and about two miles off I saw a cone from which steam was issuing in clouds.

Volcano House is a long, single-storied structure of wood, with a verandah running along its front, on to which the greater part of the rooms opened. I was located here, and was able to look out on the volcano. Dinner was soon ready for us, and I was quite surprised at the good cheer Mr. Jordan, our host, set before us. We had boiled beef, roast beef, beans, taro (a native dish), sweet potatoes, and some very good bread, and as we were very hungry we did not complain about the beef being tough.

After dinner we walked across to have a peep at the volcano. We stood on the edge of a precipice. The cone that I had noticed, belching forth its column of smoke, was visible against the glare, while the smoke above glowed most brilliantly in the light of the fires below and took most fantastic shapes. It put me in mind of the cool prominences that are visible frequently on the limb of the sun. Below and apparently at the foot of the cone gleamed a number of small fires which looked like blacksmiths' forges. These were due—so we were told—to a lava flow. We sat on the edge of the precipice for a long time watching these spots of light break out and old ones disappear.

We then returned to the sitting-room and spent some time looking over the accounts former visitors had given of their experiences in the visitors' book. Our host joined us, and from him we learned that there was a bath on the property, so a party of us started for it. I happened, with Mr. Woods, to be somewhat behind the others. On the way to it we passed through volumes of steam so dense that we could scarcely see the lantern, although it was never more than 100 yards away. When we came to the bath house we found a wooden erection with a box inside it built over a fissure through which a jet of steam came. The patient got inside the box, just leaving his head out, and after he had been "cooked" enough jumped out and had a bucket of ice-cold water thrown over him. The floor of this house was covered with sulphur crystals. On our way back we missed the track and got among some crevasses which blocked our way, so we had to try back and on our next start hit the right road. During the night I woke several times to look out at the beautiful, ever-changing column of steam visible through my doorway.

Next morning I was astir early and found the volcano. It looked very different to what it did during the night. From the edge of the precipice on which Volcano House is built I looked down on to a ledge of rock some 300 or 400 feet below, which was covered with vegetation; then the precipice went down again for about the same distance. From the foot of the cliff what seemed to be a level, black plain stretched out until it came to the cone from which the steam was issuing, and on the right of this cone I saw it stretch on to the horizon. This black lava plain was bounded on the right by a vertical wall varying from three to about eight hundred feet high, running nearly at right angles to the precipice I was standing on; while on the left another wall ran out nearly parallel to the one on the right, but not as precipitous. Between where I stood and the wall on the right the ground sank very quickly to an extinct crater, in which stood the bath I had visited on the previous evening. I then walked down towards the bath and found that just off the ill-defined path there were deep crevasses, into which it would have been easy to fall. At the top of the hill these holes were surrounded by luxuriant vegetation; but when I reached the bed of the crater I found true fumaroles, through which steam laden with sulphur vapour was issuing. I spent a long time here examining the beautiful sulphur crystals which were clinging about the rocks at the mouth of these holes.

On my return to the house I met the gentleman the King had sent to us two days before. He told me that His Majesty was in great distress, as his sister-in-law, the Princess Ruth, had just died, and the King was very anxious to go back to Honolulu at once, and wanted to know whether Captain Carpenter would take him up on the "Hartford." A little while after the captain appeared and gave his consent, so after breakfast we saw our friend start off with his reply.

A party now began to prepare for a descent into the crater. I was going with them, but before starting I exposed two plates from the top of the precipice. We each took a stout stake and then set off down a zigzag footpath after the guide. The descent was very sudden, and, with the exception of one or two places where there were large holes in the path, fairly easy. As soon as we reached the foot of the precipice we noticed a great change in the character of the rock. The cliff was of a sandy nature, while the lava was a black, vitreous mass. There was no shading of the one into the other, but a sudden change. The guide then struck off in the direction of the cone, while we followed after in single file. Soon it began to grow warm; a little further we noticed the hot lava in the cracks about a foot down, and then we observed the lava flowing out of a crack a little way away. The wind came down strongly charged with sulphurous fumes, and at last we turned back nearly suffocated.

We had to retrace our steps to the foot of the hill, and then started off again, keeping away towards the left, and kept to windward of this lava flow. When we had got past the flow we turned and walked along in front of the advancing lava, till we came to some higher ground along which the track ran. The walk for some time was pleasant—that is, there were no sulphur fumes; but after a little time we drew near the cone and met a current of air entering the crater through a crack in the walls. Here we suffered a good deal. Soon our guide started to climb a small hill on our left; we followed, and were extremely astonished when we reached the top.

We stood on the edge of another precipice about two hundred feet high. At the bottom was a lake about twelve hundred feet long by three or four hundred feet wide. The walls at the far end were higher than those on our side, while towards our right the walls sank till they were about fifty feet high. In front of us was a cavern, and into this and up the sides of the wall waves of molten lava were beating. The rest of the lake was covered by a black scum. We sat down and watched for a few moments. A crack ran across the film, hot lava welled through it; it cracked again, and other hot lava appeared. A large bubble began to form; it grew bigger, it burst, and in a few seconds a boiling pool was formed, fifty feet or more in diameter, from which the lava was thrown high into the air. The agitation in this pool would cause the lava around to break up into cakes, some of them of immense size—some at least twenty or thirty feet long by eight or ten feet wide. They would float into it, be tossed about now on edge, now high in air, and in a very few seconds would be melted.

In one part of this lake was a mass of rock capable of resisting the action of the lava, forming a kind of lagoon. Sometimes into this basin a glittering river would be flowing, and at other times a large whirlpool would be formed outside the channel. Occasionally a long line of boiling lava, extending from this rock to where we were, would form, and the cool lava from the other end would flow down on it, driving the boiling river before it, until it broke up against the foot of the cliffs. Then, perhaps, would come a period of quiescence, with boiling going on only in the inner lagoon, or else only a line of red round the foot of the cliffs. Then a pool would form, and then others, until possibly fifteen would be boiling at once. We stayed there for about two hours watching this beautiful, fascinating, awful phenomenon, and then at last tore ourselves away to return for our dinner.

As soon as I had eaten my dinner I started out—first strapping my camera to my shoulders—as guide to a large party, the guide having to stay behind to make bread. As I went down the precipice I noticed another expedition attempting to cross where we got in the morning, and saw that they were in difficulties. At the foot of the cliff I found some others who were waiting for us. We got along all right till we came to the foot of the hills enclosing the lake. Here I lost the track and got amongst some rotten lava, where we had a few falls. When we reached the top we found the lake in a condition of great activity. Mr. Woods and myself both exposed plates. When the lake became less active we hunted for Pele's hair. This is a substance something like spun glass. It is formed by the wind blowing away the fine filament of lava produced when masses are shot out from the lake.

We had returned to our seats when we were joined by the other people from Volcano House, including four ladies. We watched the lake for some time; but as it was very quiet just then, a large party started off to visit the other and larger lake in the hopes of seeing something better. I was, however, so fascinated by the lake I had been watching that I remained. While they were away a most energetic outburst took place. I again saw the sparkling river, the whirlpool, and at one time I counted twenty-eight pools boiling furiously. A boiling river was formed from the rock in the lake to the foot of the cliff we were standing on, and in its turn it was overwhelmed by the cold lava and driven to the foot of the walls; then, to our surprise, the lava, both hot and cold, seemed to be pouring down a funnel immediately below us. We shifted our position and at last concluded that the appearance was only an optical phenomenon, as we could not see any place for it to run out of. Our friends returned just too late to see this magnificent display. They told us that the other lake was much larger and the lava in it apparently more active; but it was not so good for observation, as the containing walls were much deeper and great volumes of smoke were emitted. The lake I had been watching scarcely gave off any smoke.

We stayed on the brink of this lake till nightfall, when the scene was so beautiful that I cannot do justice to it. The dark floor appeared of a slightly-reddish tint speckled over with brilliant little dots. Every crack was marked by a white-hot line, bounded on each side by an aurora-like fringe, which shaded away from the brilliant white streak into darkness through orange and red, producing a most beautiful effect, while these cracks crossed and recrossed each other in every direction. New ones would form and flash across the lake in the twinkling of an eye. The containing walls became almost crimson in the ruddy glow of the fires breaking against their feet.

At last it grew late, so we decided to start for the hotel. As we rose to do so another outburst broke out, and those who had not seen a good display determined to stay a little longer. As I left I noticed the lava again appeared to be flowing under the precipice. We followed the guide in single file, and had gone about one-third of the distance to the foot of the crater wall, when we noticed a sudden glare. We turned round and saw that a little blue jet of burning sulphur gas had grown into a column of flame, and the cloud over the lake was glowing brilliantly. This increase of light in the sky was very welcome to us, as we had come to a bad bit of road with very deep and wide crevasses in it; these we crossed in safety, and then came in sight of the lava flow. This looked so fearful in the darkness that the ladies with us uttered exclamations of alarm. For one or two square miles the ground appeared to be covered with innumerable little fires, which seemed joined together in many places by lines of blood. It was very beautiful.

We stopped in front of the flow to make some lava coins. To do this a stick was plunged into the fluid mass and a ball of lava withdrawn; then, as soon as it became black, a coin was laid on the lava and driven in by pressing with the stick. I made one or two, but they broke before I reached the summit. While we were doing this we were joined by those we left behind. They told us that a violent explosion took place, some of the molten material being thrown as high in the air as where they were standing. They then started after us. Coming down the hill side they observed at one place the ground was hot; five minutes after, when they reached the foot of the hill, the ground above opened and a stream of lava ran down after them. They at once made for higher ground and came on after us. This, of course, explained the appearance we had noticed of the lava flowing into the hill side.

The new-comers started coining, but, while doing so, the lava began to move, so we thought it wise to do the same. We walked for some time in front of the flow, and then as soon as we arrived at a cool place struck off across it. It was much worse crossing at night than by day, as the fires in the cracks were so brilliant that they made the danger seem much greater. Our guide, too, lost his way, and we had to retrace our steps for a short distance. We then had to climb the walls of the crater, and were very glad when we reached Volcano House, where Mr. Jordan had a good meal waiting for us.

Next day we started on our return journey early in the morning. Shortly after the start my horse fell while going at a gallop and threw me over his head, and afterwards I found to my great sorrow that my camera and plates were broken.

We arrived safely in Hilo late in the afternoon, and were glad to go on board the "Hartford." Next day we sailed for Honolulu, with the King and his retinue on board. We were well received at Honolulu, and it was with great regrets we left the little town three days later for San Francisco. We stopped in that port three or four days, and then came down the coast to Panama. Crossing the isthmus we observed that a great deal of work had been done on the canal in the interval between then and our previous trip across. Three weeks later we reached England, glad to get home, and thoroughly content with what we had seen, although not with what we had done.

H. A. Lawrance, F.C.S.

SPHERICAL ABERRATION AND FOCUSSING.

In your issue of the 10th instant Mr. W. K. Burton admits the accuracy of the statements contained in my article on *Spherical Aberration* in The British Journal of Photography of the preceding week, but says that there appears to him to be a discrepancy between them and the statements contained in a paper of mine which appeared in your columns some months ago.

Such a courteous and fair-dealing disputant as Mr. Burton would not, I am sure, bring a charge of inconsistency that he did not believe to be fully borne out by the facts; and I can only suppose that he was writing where he had not access to the file of The British Journal of Photography containing that article of mine which he considers not in agreement with the statements he approves in my more recent paper, and that he speaks according to the general

fect left on his mind concerning the previous article, and without aving referred to it. This seems more probable as he not only mits to *quote* the statement which he calls in question but does not ive the date of the paper in which it appeared.

Mr. Burton quotes from my article of July 27th:—"Aplanatic neans without spherical aberration; the various cemented lenses, owever, to which this title has been given, are none of them really planatic," and he goes on to state with perfect correctness that "in ny lens which is not absolutely free from spherical aberration the esult of the insertion of a stop *must* be to alter the focal length."

Now, so far from ever having contested such a statement, I—in he previous article referred to, which will be found in the number f THE BRITISH JOURNAL OF PHOTOGRAPHY for December 22nd of ast year—gave an instance of a lens in which the spherical berration was so great, that the insertion of the stop caused a isplacement of focus, equal to the difference between the visual nd chemical foci of a lens which was all of one kind of glass, vithout negative elements, uncorrected for chromatic aberration.

The conclusions at which I arrived in the paper on *Focussing nd Spherical Aberration*, which Mr. Burton now calls in question, vere as follow:—

"The question, then, becomes—How far does spherical aberration xist in the lenses used by photographers? Is it present to such an xtent that there is any necessity for focussing with the diaphragm ctually to be employed for the exposure, rather than with the benefit f the increased light obtained by the use of a larger aperture? With a vell-corrected portrait lens, as already stated, there is no such necessity r advantage. With a single view lens of the old form, when made vith an exceptionally-large aperture, there would be an advantage. With the doublets now in such general use the correction is so far good hat it is probable the photographer will generally obtain a truer focus y the help of the light which a large aperture will give him, than by he insertion previous to focussing of the diaphragm to be used for the xposure." * * * * "It is, of course, understood that only good standard lenses are referred to. After the single view lens with large perture already referred to, the quick-acting doublets are, perhaps—wing to their large aperture—the most open to question; but in any ase the small difference between the adjustments of focus for various-sized openings lies very much more between the full and a medium perture than between the latter and a very small one, so that it would suffice to use the medium aperture for focussing, and then put in as small a stop as may be fancied for the exposure. In the particular instances in which spherical aberration exists to a disturbing extent this mode of proceeding will probably result in the majority of cases in a truer result than would be obtained by using a very small stop for focussing, owing to the difficulty of doing this accurately when so much light is cut away, and of deciding precisely the point at which to stop racking."

It will be seen that the alteration of focus in non-aplanatic lenses, by the insertion of a stop was not only admitted but affirmed, although it was asserted (and I am still of the same opinion) that with "good standard lenses" a better focus would, probably, *generally* be obtained by focussing with a large or medium-sized aperture, rather than with a very small one, although it might be intended to use such a small diaphragm for the actual exposure.

The experiment which Mr. Burton mentions as having been made by Mr. Cobb, Mr. Cowan, and himself, does not invalidate my conclusion. Focussing a sheet of printed matter is not a thing occurring so frequently, in the list of photographic requirements, as to afford an instance of what would be included in what I refer to as "the majority of cases." The distinct outline of the type, and the strong contrast of the black letters and the white paper, allow of an accurate focus being obtained even when the light is very much reduced by a small aperture; and for this special purpose it would, no doubt, be better not to use so large an aperture as $\frac{f}{4}$ for the focussing. Whether, if the stop intended to be employed for the exposure were a *very* small one, it would be better to use the same size of stop for focussing, or, as suggested in my paper, to use one of intermediate size, just sufficiently large to enable the photographer to see distinctly, is still open to question.

In photographing in the ordinary course, one does not find that the natural objects occurring in different parts of the scene will all present characteristics so clearly and strongly defined, as the type on a printed sheet; and an object without strongly-contrasting outlines and markings will, when in shade and when using a small stop, appear to vary so little in definition with small differences of focal adjustment, that it may be impossible to decide exactly the point at which to stop when focussing. If, now, the lens be one not possessing spherical aberration in a marked degree it will be better—to say nothing of the comfort of the operator and the absence of strain upon his eyesight—to use, for focussing, an aperture admitting sufficient light for him to feel that there is a definite point at which the image appears sharpest, and then to insert the small diaphragm for the exposure. The instance just given is, it will be admitted, more entitled to be classed among "ordinary cases" than the photographing of printed matter, which is a speciality.

In your last issue Mr. Burton takes up the subject of diffusion of focus, and whilst admitting that the late Mr. Thomas Grubb and I were right in contending that increased sharpness cannot be obtained in the out-of-focus planes of an image by sacrificing the definition at the actual focus, he gives a new definition to the expression "depth of focus." He puts it that it is "*the quality of the lens which enables it to represent planes at different distances without any perceptible difference of definition.*" It may be said at once that there is no such quality in any lens except as it may be conferred by a small stop, but Mr. Burton's meaning doubtless is not without *any perceptible* difference of definition, but without such a striking difference of definition as usual; and he goes on to explain that he considers "depth of focus" to be obtained by destroying the sharpness at the proper focus, because then, although the other planes may be rather worse defined than before, there is no sharp definition anywhere with which their want of sharpness can be contrasted. Now, if this had been all that was claimed for the introduction of spherical aberration, it is probable that Mr. Grubb, and certainly I, would not have thought it worth while to discuss the matter. It was, however, claimed that, by giving up absolute definition in one plane, better definition would be obtained in the planes not in focus. Mr. Burton is at one with us in stating that such a claim cannot be upheld.

"Diffusion" of any thing or quality implies that it is more widely spread than it previously was, or that that which was concentrated at one place is distributed so as to increase its amount where it was deficient. How, then, can that be said to be diffused which exists over no larger a space, and everywhere in less amount, than it did before? Mr. Burton's new definition of depth of focus involves this—that a lens with which, throughout the whole image, there is no part so well-defined as the corresponding part of an image given by another lens, has yet the greater "depth of focus" of the two. I am not prepared to admit the accuracy of such a definition of the expression. As to the argument that, seeing that in certain cases absolute sharpness cannot be obtained, it is better to sacrifice some sharpness everywhere in order that there may be no sharp place with which the rest will contrast, that is a matter rather of taste than for scientific discussion, and I leave it.

Mr. Burton introduces (not quite completely) a saying of mine as to theory and practice. I may return to this on a future occasion.

WILLIAM E. DEBENHAM.

PHOTOGRAPHIC INDUSTRIES.

LANTERN TRANSPARENCIES.

TIME was, and that only very recently, when French skill and French manufacturing enterprise controlled the trade of the world in photographic transparencies, especially those of the class adapted for public exhibition by the agency of the lantern. An albumen transparency by Ferrier and Soulier, or their successors, was a synonym for the highest efforts of photographic art, and it was not every photographer or lantern exhibitor who could afford many of these productions. But as this country has now taken the lead in the art of lighting and projecting by means of the lantern, it is in the nature of the "eternal fitness of things" that it, too, should take the highest position in regard to the manufacture of slides for the lantern.

It is no secret that Mr. Frederick York, of Notting Hill, London, has, during the last twelve or thirteen years, been gradually progressing upwards in the race for pre-eminence in the production of lantern transparencies, until at last he has the proud satisfaction of knowing that he occupies the chief position among all the producers of the world, there not being a dealer's catalogue published in any of the five divisions of the globe which does not extensively recognise the transparent art-productions of Notting Hill, the catalogue of which has every year increased in bulk until at the present time it includes works from ten thousand negatives, the number being daily augmented by fresh additions; for cameras are kept busy in various parts of the world to provide fresh subjects for a rapidly-growing business.

It is well known that many of the slides prepared to illustrate tales, poems, or lecturettes are taken—not from drawings, but from *life;* and it may prove interesting to describe what, in this direction, was

being enacted at the time when, acceding to a courteous request from Mr. York, we visited his establishment.

Stepping by request into the garden behind the offices we there witnessed a scene which made us imagine for the moment that we were in an outdoor theatre. The scene represented the interior of a cottage by the seashore, through an open window of which could be seen the ocean lashed into a state of foam by the winds. On a couch lay a woman afflicted with illness, and watching by the bedside was her husband—a sailor. Three other seamen were present clad with life-belts securely fastened round them, and having on the ordinary habiliments of those about to embark in the life-boat to save the crew of a ship in distress. They urge upon the husband, also one of the crew, the necessity that exists for his accompanying them; but he hesitates on account of the illness of his wife, who, however, joins her entreaties to theirs, the result being that the husband aids in manning the life-boat and saves his own son, who was one of the crew of the wrecked ship. Of course the joy of embracing her son conduces to the speedy and complete recovery of the now happy mother. Such was the scene which was being photographed for the lantern at the time of our visit. The poem which was being illustrated is entitled *The Life Boat*, by G. R. Sims, and it will be placed in the lantern market as a "reading," with eight illustrations.

In determining upon these illustrations from life the poem is carefully read over, and the salient points, or those which will make effective pictures, noted. The nature of the composition of each scene is then decided on, and the requisite accessories, dresses, and general surroundings manufactured or procured, while models are engaged and taught the parts they have to enact. It will be seen from this that the preparation of a set of illustrations of this description from life is one which taxes the skill of the photographer as an artist to no small extent, while it entails a considerable outlay in obtaining accessories, dresses, and models. On the occasion referred to Mr. York, Jun., was the operator-in-chief, and a brief account of the surroundings will not fail to prove acceptable to our readers.

Erected at a suitable distance in front of the scenic stage is a small house, termed the "optical box," of sufficient dimensions to contain the camera-stand and two persons. Through a square aperture in front the camera lens looks out upon the scene and takes all in—nothing more, nothing less. There is no adjustment of the camera required; for, its position and also the focussing having been carefully pre-arranged, everything is now *en permanence*, so that the scene occupies precisely the same portion of every plate, and everything upon the stage is invariably in focus. By this means there is never any time lost in adjustments. If a ground glass be used at all it is only for the purpose of enabling the effect to be distinctly perceived, although, as we saw the operation performed, this was judged of by Mr. York standing outside this operating-room and giving such directions to the actors as, in his opinion, conduced to securing the best effect.

Of the great advantage of such an arrangement for shielding the plate from all stray light nothing need be said. The camera standing in a room from which light is excluded, save from the square aperture in front, no necessity exists for resorting to extra precautions for excluding light when the slide is being drawn out, as is so necessary under other circumstances. A similar system of excluding extraneous light from the camera is adopted in a few studios throughout the world, but their numbers are exceedingly limited. In the latter case a framework moving on castors and draped with black velvet or similar material is necessary. Those who have access to Hunt's *Photography* of thirty years ago will find an engraving of such a studio appliance.

Mr York uses Mawdsley's rapid plates and takes two pictures on each, only one lens being employed on a front which slides horizontally. The lens (one of the "rapid" class) is diaphragm'd down to the degree requisite to give sharpness to every thing on the stage, harmony in perspective being secured by having the lens of longer focus than is necessary for covering the plate, and by which the camera is placed at a considerable distance from the stage. The negatives are taken on gelatine plates, the developing being effected in an operating-room situated in another portion of the garden.

The printing of the transparency is done by the wet collodion process and the camera; and, from long experience, Mr. York is enabled to prepare his collodion and chemicals to give him precisely the qualities required in a lantern transparency, namely, absolute purity in the whites with vigorous shadows which are not opaque, but so transparent as to permit of the light piercing through them. These, with soft demi-tints and a fine tone, constitute the requirements of a first-class transparency, and it is probably owing to the invariable presence of these qualities in Mr. York's slides that he has been able to build up his extensive business in the preparatio[n] of lantern transparencies. To ensure durability a preparation of salt of platinum is employed as the toning agent.

Whenever a "run" on any special subject is anticipated prepara[tions] tions are made in ample time to have the market supplied withou[t] any delay. Thus, for example, the recent occurrences in Egypt create[d] a demand for lecture sets of that country, so that at a very smal[l] outlay an enterprising lecturer can supply himself with a well digested descriptive lecture illustrated by the choicest of photo graphic productions.

The superiority of English artists and English lantern-slid[e] manufacturers over those of some other parts of the world wa[s] incidentally illustrated at the time of our visit. A gentlema[n] present had a set of what was said to be the newest Egyptia[n] slides, recently taken by an American photo.-tourist in the Orient and for which some degree of superiority had been claimed. The[se] when compared with Mr. York's magnificent set of similar subject[s] from the negatives of Mr. Frank Good showed how difficult it i[s] for the mere *dilettanti* to cope with experts in negative-making an[d] transparency-printing like Good and York. The fact that Mr. York is exporting large numbers of his slides to America warrant[s] us in expecting that the standard of the American transparency will be raised to their level. But unless superior negatives are obtained it is hopeless to expect good transparencies. Mr. York's negatives are taken with a special view to their being utilised for producing lantern pictures. Technical perfection is essentially necessary in a transparency negative.

Mr. York directed our attention to the fact that, although the majority of his slides were mounted with circular apertures in the mat—which is, optically, the best shape—he now, in order to suit the requirements of a few who prefer square, dome, or cushion-shaped apertures, photographs the glasses up to the margin, so that anyone who chooses can remount them with mats to suit his own requirements. This, we think, is a step in the right direction, as many prefer uniformity in their entire set of slides.

The quality of the glass employed in the production of transparencies must be perfect; for any defects, however slight, are sure to show in an offensive manner when magnified upon the screen. To ensure this it is carefully selected at the glass works.

The variety of subjects may be deduced from the fact that the latest issue of Mr. York's catalogue consists of 110 closely-printed pages.

Great credit is due to Mr. York for having raised the status of the lantern transparency so high. It never fails to afford positive pleasure to the connoisseur to examine them on the screen. Their tones, sharpness, gradation, and composition are all that can be desired by the most fastidious, evincing a complete mastery over the technics of their production.

ANOTHER STYLE OF COLOURED ENLARGEMENTS.

In the cheap coloured club enlargements the great difficulty is to preserve the likeness, although, from the fact that only three or four shillings each are paid to the printer, the greatest wonder is, perhaps, that any likeness at all is kept.

Now, if these pictures, instead of being coloured upon the front, were coloured from the back, not only would better and more artistic results be attained, but there would be scarcely any chance of even altering the likeness. That this is true can be proved by the immense success the process called "crystoleum" or "chromo-photography" has attained.

But for cheap work, and work that has a chance of a little longer life than a crystoleum picture—which speedily turns even a sicklier yellow than a plain photograph—this method of cementing a paper picture to glass and going through all the messy operations needed will not do, so I will turn my attention to, and ring still another change upon, our old friend a collodion transparency made upon flat glass, either as a temporary or permanent support or upon convex glass as a permanent support. The pictures made upon a temporary support are backed up with *papier mineral* and, after colouring, transferred either to cardboard or to plain canvas upon a suitable stretcher.

The collodion image may be made in the usual way in the enlarging camera by the wet process, using the collodion less strongly iodised than usual, and a silver bath not stronger than twenty grains to the ounce. Develope with pyrogallic acid, and, after fixing and thoroughly washing, tone with gold or platinum. Where it is intended that the picture is to be coloured upon the glass the plate ought to be prepared with an albumen substratum, and, after

ning the image and thoroughly washing, dry and coat with a fine matt varnish, after which, when dry, the picture is ready for colouring.

If the coloured picture has to be transferred to cardboard or canvas, the plate upon which the enlargement is made must be thoroughly-well cleaned and polished with French chalk (not wax on any account). The picture is then made, and, after toning and washing, is flooded with a warm solution of—

Gelatine	2	ounces.
Water	10	„
Ten-grain solution of chrome alum	2	„

Now cover the plate with a sheet of *papier mineral*, and apply a soft squeegee carefully, so as to get absolute contact between the *papier mineral* and the collodion image; then place away to dry, when it is ready for colouring.

If the picture be required upon a convex glass collodion emulsion will be best. Any of the old well-known formulæ may be used, preference being given to one containing a good proportion of chloride; but in any case let there be at least one-third more of plain collodion than if the emulsion were for negatives, as in this process it is requisite to get an image which, whilst being full of detail, is so extremely thin that if backed up with white paper would be very faint.

The pictures being ready for colouring, place them upon a retouching-desk and paint with ordinary oil colours, laid on with good sable brushes, hogs-hair being a trifle too harsh for the work.

For the eyes paint the pupil in black, the iris in the colour desired, mixing with white. For the white of the eyes mix a little blue with zinc white; the eyebrows and lashes brown or brown and black mixed; the corners of the eyes and the lips with a mixture of carmine and yellow.

For fair hair add a little yellow to white; for brown use brown and white; and for very dark hair add a little black.

Jewellery is put in from the gold or silver shell, as they both show through well, especially if a little turpentine be used as a medium.

For the complexion mix yellow, vermilion, and a trifle of carmine with white to the proper colour, and paint thickly over the face, neck, and hands, deepening the colour in the cheeks with vermilion. For the shadows round the eyes, &c., add a little blue to the complexion colour. Now paint in the dress and then the background, taking care to mix all colours that are required to be solid with white.

If the picture is to remain upon the glass all that is required to be done is to let it dry, then back it up with cardboard, and it is ready for framing. But if it be backed up with *papier mineral* and has to be transferred to cardboard or canvas, a little "siccatif" or "driers" should be mixed with the usual medium used in mixing the colours, and when the colouring is finished allow the paint to dry thoroughly; then release the extreme edges of the picture from the glass by passing the point of a thin palette knife between the glass and the picture, when the whole may be lifted completely away. Of course the *papier mineral* is not very strong; therefore care must be taken not to tear the picture, but proceed to mount at once.

If cardboard is to be the final support cover the piece thoroughly with hot glue; then place the picture upon it, face up; and, after covering the face with clean paper, rub it down vigorously, so as to get it well in contact with the card.

If the picture has to be transferred to canvas cover a stretcher of a suitable size with unprimed canvas, and give the surface of this a rather thick coating of good white paint as smooth as possible; place the back of the coloured transfer in contact with the coating of wet paint, and by vigorous friction upon both back and front get the two in contact.

If the mounted pictures are now laid under a weight in contact with a damp cloth for about an hour, after again drying all the glossy appearance imparted to the surface by the glass support will be done away with and the picture is finished.

W. T. Wilkinson.

NOTES FROM ITALY.

The value of hydrokinone as a developer in the place of pyrogallic acid has been so strongly stated by several correspondents that I determined to give it a thorough trial, because, if what has been said of it be true—that it reduces the exposure by half—it is simple folly not to dismiss pyro. at once. But the statement that it requires no restrainer made me suspicious of its superiority, as that indicates less energetic chemical action. Photographers are too often careless in comparative trials, testing one plate or chemical at one time and the next day, perhaps, testing that with which comparison is made, and the reports of experiments have a vagueness oftentimes which takes away all their value. One correspondent reports that he tried hydrokinone after an exposure "off cap and on" with good result; but I could equally report "off-cap-and-on" exposures with great over-exposure for pyro. development. The experiment proves nothing more than that hydrokinone will make a good negative.

Again: there is all the difference conceivable between two samples of pyro. or, I imagine, of hydrokinone. I have had samples of the former which decomposed and muddled before the development was half over. I sent, therefore, for an ounce of hydrokinone to Messrs. Hopkin and Williams, whose pyro. is certainly the best I have ever used, and I now never use any other—indeed I suppose that their chemicals generally may be accepted as of the highest attainable standard. I gave two plates exactly the same exposure, one immediately after the other, on a bright afternoon—subject: a wide landscape with strong contrasts. I developed them in trays side by side—one with five grains of hydrokinone to four ounces of water, and the other with five grains of pyro. and four ounces of water. The pyro. plate was all out, showing signs of slight over-exposure, with the addition of five drops of *aqua ammonia fort.* and three drops of solution of bromide of potassium of the strength of twenty per cent.; the hydrokinone having, to begin with, ten drops of saturated solution of carbonate of soda, followed by half-a-drachm of the same. The pyro. plate was passed into the fixing before the other showed anything but sky, and after the gradual addition of twenty drops of *aqua ammonia* to the hydrokinone the subject was not absolutely out in the dark corners, but the intensity in the lights was so great that the negative was worthless. The development occupied about three times that with pyro. Tested grain for grain, therefore, the pyro. was better. The negative developed by it was in every way satisfactory, while that made with hydrokinone was hard, brown, and veiled.

The next experiment was made with successive morning exposures—five and ten seconds, with stop $\frac{f}{16}$ on a wide distance, with a mass of dense green foliage in the foreground. To the ten seconds' exposure I gave five grains of hydrokinone to four ounces of water, five drops of saturated solution of washing soda, followed by two drachms of the latter. To the five seconds' one I gave my usual developer—two grains of pyro. to the ounce of water, and, to begin with, two drops of *aqua ammonia fort.* and the same of solution of bromide of potassium of twenty per cent. The latter developed, was fixed, and followed by two other negatives; and when these came out of the hypo. I put the hydrokinone negative in. It was, as before, intensely brown and hard, while the shadows in the foreground mass of foliage were much less brought out than in the corresponding pyro. negative, which was still somewhat deficient in the deeper passages.

My conclusion is that it is a waste of plates to use them in trying exposures with hydrokinone against pyro., and that the former is capable of producing great intensity and requires no restrainer, but that the exposure must be at least double that required for pyrogallic acid. My experience may be different from that of others; but in such experiments the greatest accuracy of comparison should be given, and random exposures with satisfactory results prove nothing either way.

I have been using the platinotype printing process now for more than a year, and my experience may be of value to some who have not employed it. I find it easier, simpler, and, for most subjects, more satisfactory than the silver process; and my friends almost universally, and especially artists, prefer the platinotype prints to those in silver. The paper should not be kept more than three months, while the sensitised paper (I use by preference that of Wratten and Wainwright), if kept under pressure to exclude light and air entirely, will keep a year and give results scarcely inferior to those with fresh paper. With the new tint of the platinotype and a proper negative it seems to me that the process leaves little to desire. The negatives require to be fully exposed and developed with a maximum of intensity—such as give the best results with silver paper when printed in the sun. The exposure should be sufficient to bring out well the detail in the masses of shadow, leaving only very small passages of clear glass—the less the better. The more well-developed middle-tint there is the better effect will the print have. A negative which has large passages of deep shadow, in which the detail is not well made out, will give better effect in silver; and I find that those negatives which, with a good balance of light and shade and good exposure, give hard prints in silver will often yield excellent prints in platinotype. The silver paper is, however, always most useful for trying the negatives *en voyage*—not only because it is more convenient for use in travelling, but because we can see at once what the print is, even without toning.

In developing the prints in platinotype I do not follow the directions given by the Platinotype Company exactly, but draw the print rapidly across the developing solution, not permitting it to be wetted at the back. The print is thus more brilliant than when immersed, as the flowing of the developer over the back of the paper produces a slight transparency, which does not entirely disappear on drying, as may be seen by immersing the half of a print after drawing it across the developer. If by chance part of the print is wetted at the back it should then be fully immersed; and if bubbles have been left on the

printed side in the first passage across the solution the print should be plunged into the solution entirely.

I print on paper a little longer than the negative, so as to leave a margin of white paper at the two ends, and then, a little while before developing, roll the prints up with the printed side out, and leave them till they retain the curvature; then, taking them by the two margins left white, I let one end down on the solution and draw the paper quickly across it, with the other margin keeping it down on the surface. This avoids bubbles and enables one to keep his fingers out of the solution. To make the developer I take a cold saturated solution of the oxalate, and add the full quantity prescribed of the special solution for the warm tint, then put it in a wide-mouthed glass bottle, which I place in a vessel of water on the fire until the solution stands at 170° Fahr. I now put the developing dish in a smothered charcoal fire or coal fire in the range, and pour the solution in. For prints of or under 8 × 10 a spirit lamp with a large flame will suffice to keep up the temperature.

The rough paper which the company sends out gives very brilliant prints, with a little tendency to granularity in the skies, &c. It is recommended for working on in water colour, but is not a good quality of drawing paper, and is liable to spots where washes are employed. Otherwise it takes water colour readily.

I send you a print on paper, which I must have had on hand nearly six months, to show what it can do with them, but the lights are not so brilliant as when new. W. J. Stillman.

Florence, August 6, 1883.

THE OBERNETTER EMULSION CONTROVERSY AND AFTER-RIPENING OF PREPARED EMULSION.

Herr Obernetter some time ago advertised a secret emulsifying process for sale should a certain number of subscribers come forward within a given time; and apparently the desired number did subscribe, for photographic circles both in Berlin and Vienna have been convulsed by the controversy raging between Herr Obernetter and his subscribers as to whether his process fulfils the just expectations of the latter or not; and the bitterness of the discussion has been such that the subject has had to be expressly banished from the meetings both of the Vienna Photographic Society and the Berlin Photographic Association for the Cultivation of Photography. It seems that, like many other secret processes, the Obernetter process gave good results in the hands of its inventor, but only middling or decidedly bad results in those of the licensees. Some of the latter attributed their failures to their inexperience, and others to the peculiar properties of the water of Berlin or Vienna; but the fact remained that they had been promised a simple process which could be worked to advantage by inexperienced persons. Herr Obernetter was then invited to give some personal demonstrations of his method to his Berlin subscribers. He did so, and the matter was believed to be adjusted; but not so, as the following excerpts from the *Wochenblatt* of the 5th July shows:—

"*Berlin, June, 1883.*

"We have received your obliging remarks upon Obernetter's emulsion, and now mention that Herr Obernetter has personally prepared emulsions in Berlin both exactly according to the formula sent us and with the modification of a subsequent ripening with alcohol. Experiments undertaken with these emulsions led to the working out of the following protocol, which was signed both by Herr J. B. Obernetter and by the following subscribers, who were present during the experiments. Herr Obernetter repeatedly explained that he had never worked up freshly-prepared emulsion, and thereby a proof is furnished that the faulty results which here as in other places were obtained when working *according to his formula* were not attributable either to local conditions nor to any fault of the workers in the laboratories; but that these unusable results arose solely from the formula furnished by Herr Obernetter.

Copy of the Protocol.

"After Herr Obernetter had, at the request of the Berlin subscribers, at Berlin, from the 11th to the 16th May inclusive, himself prepared emulsions according to the formula sent by him to the subscribers, and after minute experiments with plates prepared with these emulsions had been made he only obtained results which did not correspond in regard to sensitiveness with the promises held out in his advertisement inviting subscriptions, and he then declared that it was not possible to attain the promised results as regards sensitiveness by the formula sent out by him. On the other hand, Herr Obernetter is convinced and the subscribers are collectively of opinion that it is possible by the modification of a prolonged treatment with alcohol to produce a usable emulsion.

(Signed) J. B. Obernetter.
Theodor Prümm, J. C. Schaarwächter,
W. Fechner, Edmund Risse,
Ferd Beyrich, Otto Lindner,
A. Munzendorf, J. Sachs,
Rud Schuster, Hellwig and Maywald,
Robert Mulert, Chemist, J. Reichard (of F. Reichard and Lindner)."

Berlin, 16th May, 1883.

"Though only present at the commencement of the preparation of the emulsion, I declare myself as agreeing with the judgment expressed regarding the slight sensibility of the plates on the ground of the sight of the later results and tests; I am likewise firmly convinced of the advantageous influence of a subsequent ripening in alcohol.—H. Hartmann (of F. Loescher and Petsch).

"*The above document lay ready to be sent off when we were astonished to receive from Munich a circular dated May, 1883.* The beginning of this circular which concerns Berlin impels us to correct certain statements which do not quite agree with the facts of the matter:—

"1. The well-built, dry-plate factory of Joh. Sachs and Co. was placed at Herr Obernetter's disposal, and every wish expressed by him was immediately fulfilled by us. '*Special rooms are not necessary for the preparation of the emulsion*' Herr Obernetter said in his prospectus, in spite of which he now complains of the quality of the accommodation! 2. The temperature was constantly maintained and controlled exactly by Herr Obernetter! Ice was placed at his disposal! 3. Herr Obernetter repeatedly declared at the different stages of the preparation that the emulsionising mass had an *excellent appearance*, and that he would at once interrupt the work whenever he should encounter a fault. The only one which he had to expose was the not perfectly equal thickness of the strips of emulsion, though these were only about a-quarter as thick as was prescribed in the formula; they were cut by him with a comb. We had previously made the concession of *allowing him to cut thinner strips than were originally prescribed.* 4. The plates which were compared with the Obernetter experiments were the commercial plates of Monckhoven and Joh. Sachs and the uncommercially-prepared plates of Th. Prümm. *None* of these Berlin plates were *specially prepared*, nor were they after-ripened in alcohol. Those of Monckhoven were taken from a batch sent for sale. 5. In respect to the routine by which Herr Obernetter worked here, we can aver that it left nothing to be desired. Besides, the inventor of the process writes—'*The process is so simple to work that no previous knowledge is required.*' 6. The after-ripening of the plates lasted—not forty hours, but fifty-three hours.

"What were the results of all this? 1. The plates used for comparison with Herr Obernetter's with an exposure of four to six seconds gave fully exposed negatives with all the gradations of tone which were visible in nature. 2. The *plates prepared according to Obernetter's formula* showed when exposed for fifteen seconds to the same light *quite under-exposed negatives!* A further test with Warnerke's sensitometer gave No. 10, which is, according to Dr. Eder, a sensitiveness equal to that of a wet plate. On the other hand, Obernetter says in his prospectus '*my plates are as sensitive as bromide of silver can be.*' 3. *The plates ripened with alcohol for fifty-three hours* were also under-exposed in fifteen seconds, still they showed an increase of sensibility. The sensitometer test later gave No. 13, while almost all commercial dry plates show at least No. 18. We have repeatedly and very urgently pressed Herr Obernetter to prepare other emulsions in order that more favourable results might be obtained; but he has always refused, alleging, *first, that he had not time, and, secondly, that he did not think he could get better results without long subsequent ripening in alcohol.* In conclusion: we feel impelled to tell you that Herr Obernetter says he has 137 subscribers, of these we know of 118 who have either sent us their addresses or minute reports. Of these reports *seven* were *favourable* to and *fifty-four adverse* to Herr Obernetter's emulsion, while fifty-seven only sent their addresses. Of the less favourable judgments some were that as the results did not come up to the favourable estimates given of them in the appended notes Herr Obernetter had not fulfilled his obligations to the subscribers, but that the Berlin subscribers did not see their way to take any further steps in common.

Theodor Prümm, J. C. Schaarwächter,
J. Reichard (F. Reichard and Lindner), W. Fechner,
O. Lindner,
Ferd. Beyrich, L. G. Kleffel and Sohn,
J. Sachs, A. Menzendorf,
Rud Schuster, E. Martini (J. F. Schippang
Robert Mulert (Chemist), and Co.)"

"Having to go on a journey I was prevented from being present while Herr Obernetter was working, but saw the results, and can only confirm the judgment pronounced upon them. Albert Schwartz."

Regarding the foregoing the *Wochenblatt* says:—

"The foregoing is not printed on account of the few who are subscribers to Herr Obernetter's process, who, if they feel aggrieved, have other means of obtaining redress, but to establish the important point that *a fully-prepared emulsion may be very materially improved in sensitiveness by storing in alcohol.* That such a ripening might to some extent take place was known by those who prepare dry emulsion, but the intrinsic improvement which can take place is both new and surprising.

"The plates laid by Obernetter before the technical testing committee, though not very sensitive, still showed a fair sensibility, accompanied by a good deal of fog. From the above circular there can be no doubt that after washing that same emulsion was in a state of great insensibility. Now if so slow a product by long ripening in alcohol, perhaps prolonged for weeks, can attain a considerable sensitiveness, the question arises whether an emulsion prepared by a better method might not by a similar ripening process attain to quite extraordinary results which would surpass any sensitiveness hitherto obtained. How far this is the case must be learnt by experiment. It is by no means certain that the action of the alcohol goes beyond a certain point, after which fog sets in, and if so this point was apparently already somewhat overpassed by the plates placed before the technical testing committee, since chemical fog had already set in and could not be entirely removed by any modification of the development. The whole question is of such eminent importance that all emulsionists should zealously experiment in that direction. Perhaps the means is here found of subsequently imparting the desired quality to those emulsions of slight sensitiveness which occasionally occur in the hands of the most practised worker. Should this become proved Herr Obernetter will have unwittingly rendered a great and important service to the emulsion process regarded as a whole."

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

TO THE WATERFORD COAST AND ALONG IT.

It is only two years ago since I was sitting in my lodgings in the old metropolitan city of Scotland, consuming much tobacco and keeping a contemplative eye upon my last batch of plates which were "cooking" in the setting sun. From my lofty "flat" I commanded a view of a great wilderness of grey roofs topped with red chimneys, every one of them reeking up its contribution of carbon to vitiate my atmosphere. Away across this dreary waste rose the square massive tower of St. Giles, with its gothic top—an admirable object of practice for an embryonic photographer. Had I had a pupil St. Giles might have been to me what Salisbury Cathedral was to Mr. Pecksniff, who caused the budding architects, who had paid him their premiums, to draw it from the Nor'-Nor'-East and the Sou'-Sou'-West, and every other point in the compass from one year's end to another.

I was smiling languidly at the idea when a quick step on the stair and a knock at the door announced my irrepressible friend Cunningham—most enthusiastic of dry-plate workers. There was a look of consequence in his eye as he rolled it round in search of alcoholic refreshment, which denoted some weighty resolve taken or proposition of importance to be evolved.

"Guess where I am going?" he began.

"Gib it up!" I rejoined, with a mild attempt at facetiousness.

"Smith is going and so is Ramsay, and they want you to come too. We are all going to take our cameras and three or four dozen plates and make a regular trip of it."

"Where to?" I asked.

"We reckon we can do the whole thing within a week."

"Where?" I demanded.

"And the best of it is that the whole trip won't run us in for more than about twenty-five shillings travelling expenses right through and back."

"Where to?" I yelled.

"To Ireland, of course," said Cunningham in an aggrieved voice; "I told you that when I came in. Waterford is the place we were thinking of going to."

At first the idea seemed rather an out-of-the-way one; but as I came to talk it over with my friend he advanced a good many arguments in favour of it. A mutual chum of ours named Smith possessed a cousin at Youghal, which cousin possessed a yacht (a "yawl," Cunningham said, but he was always an incorrigible punster). We might reckon on the use of this vessel in coasting along the Waterford shore, and from its deck we might do justice to the splendid cliff scenery which characterises both this county and Wexford.

A single ticket from Edinburgh right through to Glasgow, and thence by boat to Waterford, touching at Dublin, came to something well under a pound. I may add that starting from the other end of the chain the boats run from London, *viâ* Portsmouth, Southampton, and Plymouth, to Waterford, and so on to Glasgow, and I have no doubt that the fare from London to Waterford would be even less than that quoted. For some time I had been intending to give myself a holiday, and when would I get a better opportunity? I silently drained Cunningham's glass to the bottom, and held out my hand as a pledge that I would not desert him.

There was little trouble about our "kits." With my old camera and five dozen trustworthy plates, with enough pyro., &c., to do a little test developing should I wish, I was fully equipped for the campaign. I had a light tripod stand with ball-and-socket joint for outdoor work on land, and an ordinary tripod for all other exigencies. Some of my companions were more ambitious in their preparations, but still the total amount of luggage was not a very formidable one.

We took our through tickets at Cook's tourist office, by which a further saving was effected. The mild-eyed clerk who dispensed them looked at us curiously and remarked that he had not sold many that year, for they were dangerous times in Ireland, and there was little inducement for the Saxon tourist unless he hankered for the absorbing but brief excitement of having his head battered in or otherwise tampered with by the "down-trodden Clan-na-Gael." Every day brought a grim list across the sea of midnight visits, maimed cattle, half-murdered bailiffs, and ruined landlords. These things, however, rather served to inflame our fanatical photographic propensities than to allay them. We saw a glorious vista of character portraits and other novelties stretching out before us. The "foinest pisant in the worrld," or rather an assorted set of samples of that individual—a rack-rent landlord in a state of bloated impecuniosity ("lack-rent" would be a better name for the class)—an agent, or as much of one as the aborigines had left together by the time of our arrival—these and all the other curiosities of Irish life should adorn our collections. Then in still life there would be the ruined homestead, the caretaker's hut, and other signs of the times. It seemed to us, as we stepped gaily into the train at the Caledonian Station and deposited our traps under the seats, that apart from the scenery our trip could hardly fail to have interesting results.

Of the four of us three were photographically inclined. My friend, Ramsay, was the only one who did not dabble in the black art—as an old friend of mine used to call it in the pre-gelatine, hand-staining days. Ramsay, however, was artistically inclined, and carried with him his cardboard and his paints, so that he was safe against *ennui*. Besides, he hunted and fished, and knew enough of photography to appreciate our objects and take an intelligent interest. Though he had no scientific necessities to provide for he indulged in more luggage than all the rest of the party. "He is a fellow of infinite chest" remarked Cunningham ruefully as he surveyed the pile upon the Edinburgh platform.

The run to Glasgow occupied a little more than an hour, and when we arrived there we found that owing to the tide we should not leave by boat for several hours. We had dinner comfortably at a hotel, therefore; and having fallen in with one or two old friends we all proceeded to Greenock together by rail, to await the steamer there. We filled in the interval very pleasantly by wandering over the old town and inspecting one of the shipbuilding yards, which we had hardly left before our steamer came churning down the river, and we found ourselves with our chattels on board of the good ship "Rathlin." There was a shouting, a throwing off of warps, and a cheer from our friends on the shore, and we were fairly started for the land of Ire.

I know no place where a photographer may have such an *embarras des richesses* as on the Clyde in a steamer when the sea is calm. There were hardly any passengers besides ourselves and a few commercial travellers with a couple of young ladies, so that we could plant our cameras where we liked upon the poop. As we steamed along a great moving panorama seemed to be unrolled before us. The huge half-finished ships which lined the bank, with their gaunt ribs sticking up to heaven like skeletons of some antedeluvian saurian, gradually gave place to green meadows and country scenery, which alternated with the pretty little watering-places which dot the coast from Greenock to Ardrossan. Steamers from Ireland and America ploughed past us, and a host of little yachts played all round. We wasted several plates in endeavouring to secure some of these as they passed. Even when the camera is on the shore it is surprising how easy it is to miss a large object which is crossing the field. Many a time have I borne home what I imagined to be a splendid plate of yacht or steamer, only to find, as I watched the detail coming up, nothing but a single monotonous line of horizon. When, however, the stand of your camera is also moving at eight or ten miles an hour the difficulty is proportionately increased, and the chances are, as we found, very much against a successful result. Our landscapes, however, and views of the banks were all that could be desired.

As the sun sank down towards the horizon we had got well out to the mouth of the Clyde. The water was as calm as a mill pond and reflected the scarlet tinge of the clouds. Away to the north were the rugged mountains of Argyleshire and of the great islands, wrapped in that purple evening mist which Waller Paton loves. Ahead of us was Arran, whose beauties my friend Dr. Thompson has already recounted in this Journal, with its great peak of Goat Fell enveloped in fleecy clouds. To the south the strange precipitous upheaval called Ailsa Crag reared itself out of the ocean—a grim looking place, which has been the last spot upon earth that the eyes of many a drowning man has rested on. The whole scene was as beautiful a one as an artist could love to dwell upon. Ramsay produced his paint-box, and certainly put our whites and greys to shame for the nonce with his purples and vermilions. We passed Ailsa Crag before it was quite dark, but it was too late by that time for us to do it justice in a plate. However, we had succeeded in several distant views, so we had no cause to be discontented. As we passed the captain ordered the steam-whistle to be blown, which had the effect of sending up an innumerable cloud of sea-birds from their nests on the rock. For some minutes the air was simply alive with kittiewakes, gulls, solan geese, gannets, blackbacks, and other birds, whose screams and cries drowned every other sound. Then we steamed on, and the great Crag was left far astern until it was simply a dark loom in the darkness.

It was unanimously voted that it was simply preposterous to go to bed early on a night like this, when the water was rippling pleasantly and the moon silvering our decks. A proposition for a game of "Nap." was met with disdain as being too prosaic for the occasion, and an impromptu concert *al fresco* was declared to be the very thing. The captain joined in and brought the mate. The bagmen mustered in full force. Even the young ladies were induced to come on deck, and eventually one of them went so far as to sing a song—"Won't you tell me why, Robin?"—which was the hit of the evening. The captain also obliged the company, and, indeed, we all did our best to please, though, if the noises emitted by some of our party, including myself, pleased anyone, that person must have had a wonderful faculty for pleasure. They struck me at the time, I remember, as being very painful; however, the audience were lenient and a roaring chorus covers a multitude of sins. So we enjoyed ourselves to our hearts' content until nine bells, or some other heathenish hour unintelligible to landsmen, came to put an end to the festivity.

Next morning—a Tuesday, if I remember right—found us steaming into the Bay of Dublin with the long line of the Irish coast on each side of us, and a single hill in front which marked the position of the

city. As we approached it we expended a couple of plates upon the scene; but Dublin from the seaside is neither picturesque nor impressive. Steaming up the Liffey we threw out our warps at the North Wall, and found that six hours would elapse before the unloading of the cargo and the state of the tide would allow us to pursue our journey. We spent this time in rambling over the Irish metropolis, and were surprised at the civility we met with and at the order of the streets. The newspapers had prepared us to find it in a state of semi-rebellion; but, as a matter of fact, everything was quiet enough. The only bad sympton we could see was the great number of big, hulking fellows lounging about without employment—"corner boys" they are named there—all apparently ripe for any mischief.

The monotony of our voyage was relieved by our running high and dry upon a mud-bank in our attempt to leave the Liffey. This incident delayed us for two or three more hours, so that it was late before we found ourselves at sea once more. We spent the night running down the Irish coast, and at six in the morning steamed past Dungannon and entered the mouth of the Waterford river, which winds along for many miles, and is so narrow that the sight of a large steamer upon it had a most incongruous effect. In our ascent of it we took several views of the wooded banks with country houses peeping here and there from among the trees. A sudden bend of the river brought us right up to the town—a long, thin straggling line of grey houses with a few steeples here and there, and a sprinkling of shipping in the river in front of it, the whole giving rather an impression of decay. A. CONAN DOYLE, M.B., C.M.

(To be continued.)

FOREIGN NOTES AND NEWS.

DISASTROUS EFFECT OF POSITIVE RETOUCHING.—A GOOD WAY TO CLEAN ZINC AND TIN BATHS AND OTHER VESSELS.—HERR SUCK ON GREEN WINDOWS FOR THE DARK ROOM.—DROPPING TABLE FOR VARIOUS FLUIDS.

IN a previous number of the *Archiv* a story is given illustrative of the results of retouching. About a year ago a case was tried at Frankfort-on-Maine, before the magistrates, in which the defendant was the keeper of a coffee-house and the complainant a barmaid. The defendant had advertised for a barmaid or attendant, and amongst the required qualifications he mentioned a "pleasing appearance," and that applicants should send their photographs. Of course there were numerous applications, one being accompanied by a photograph which far exceeded all the others in beauty. He engaged the original forthwith; but who shall describe his astonishment when, out of the *coupé* of the stage coach, instead of the fairy vision of almost ideal, youthful beauty he had been led to expect, there stepped out an extremely-thin, dried-up looking woman no longer young, and whose face was pitted with smallpox marks. The coffee-house keeper on the spot declared his intention of breaking the bargain, saying he had been led into making it by a false portrait, and to recoup himself for the outlay (her passage-money probably) he had incurred he retained possession of her trunk. Hence, she raised an action for the recovery of her trunk and for damages. She denied having used any other person's portrait, and affirmed that the one sent was her living counterfeit. The portrait and original were compared before the judge, and the latter found her far too deficient in the matter of beauty. The complainant still persisted in saying that she had sat for the portrait, and begged the *corpus delicti*, which was handed to her. She then, in presence of the court, *licked the surface of the photograph with her tongue* until the varnish was removed, and with it the paint with which the portrait had been worked up, when the likeness shone forth. Not even the tatoo-like pock-marks were absent. The photograph was evidently genuine, and the idealisation produced by skilful working up in black and white. So far the complainant had proved her case. She was evidently the original of the photograph; but the beauty imparted by the retoucher was misleading, in so far as the likeness was entirely removed. At this point the case was compromised, her trunk being handed over to her along with fifteen shillings in lieu of damages. How would a British magistrate have decided such a case?

Dr. Franz Stolze, in the *Wochenblatt*, says:—Of late years the employment of zinc and tinned vessels for most varied purposes has greatly increased in photographic studios, so that it is advisable to know how to keep them clean. Tinned vessels rust, as every one knows, at the joints and at places where minute holes have perforated the tin film, while zinc becomes covered with a film of oxidation which gradually penetrates deeper and deeper, and at last destroys the metal plate altogether. This latter circumstance would not matter—further than the destruction of the vessel, because zinc oxide is insoluble in most of the baths used—if it did not, by its dirty appearance, make it difficult to know whether the flat bath were clean enough, and if the different degrees of oxidation, occurring as they do in patches, did not make the surface of the bath rough and tend to retain impurities. A means by which, with little trouble, any zinc or tin vessel may be made as bright as a mirror will be desired by many. Stannous chloride, which is sold by druggists under the name of "salt of tin," is known to be one of the most powerful deoxidising agents. As such it acts up hydrated ferrous oxide, and so is a sure means for removing rust. this is by no means its universal action. In contact with zinc, instance, replacement takes place between the zinc and tin, so that t zinc becomes coated with a film of tin—is tinned, in short; and th by treating tinned goods with stannous chloride the small holes fr which the tin has been removed get filled up with tin, which can easily ascertained by experiment. Now, in order to set going these reactio quickly and easily, it is generally necessary to boil the object to treated, and the addition of alum, tartar, &c., to the tinning bath required. But this inconvenient and troublesome procedure m easily be avoided in the following way:—Dissolve the stannous chlori in water, and add sand until a somewhat stiff paste is formed. Take little of this paste upon a woollen rag and scour the object to be cleane The dirty oxidised film disappears with surprising ease; and, wh rinsed and rubbed dry, the polished surface will shine like silver, a (at least in the case of zinc articles) be brighter and pleasanter to loo at than when new. Now, if the oxidised film be not allowed to form but if from the time of the articles being taken into use they a occasionally—say once a fortnight—cleaned in the manner describe above, the work is very light, and a quick rub up is all that is r quired to keep them bright. One will then have the pleasure no only of having the vessels always smooth and lasting much longe but will also be sure that there is no danger of them dirtying th baths.

Herr Oscar Suck writes to the *Wochenblatt* complaining of the effec on his eyes of ruby and orange glass dark-room windows. He foun relief in using green glass or glass covered with green paper. Bu green light is too actinic for the dry process; so, when developing, h pulls a red curtain in front of the green window, and as soon as th outline of the image begins to appear he pushes back the curtain an continues the development by green light. There is a house exactly opposite his dark room the white walls of which reflect much sunlight into his window, which is a metre square; so in summer he does not find the green paper sufficient, but supplements it with a wooden frame, upon which green oiled silk is stretched, placed in front of the window.

In many formulæ, besides the weights which are given in grammes, smaller quantities of fluids are often given—not in cubic centimetres, but in "drops." When only a few drops have to be poured there is no difficulty, but when the number is large an error is very easily made. Now, on the one hand, to prevent such errors, which have often been the cause of unsatisfactory results, and, on the other hand, to facilitate the making up of a preparation according to a formula in which such quantities occur, Dr. Eder gives, in his hand-book of photography, the following table for the number of drops of various fluids which go to make a cubic centimetre, and from which the number of cubic centimetres in any given formula can easily be calculated.

Number of drops required to make one cubic centimetre:—

Water	20	Castor oil	44
Hydrochloric acid	20	Olive oil	47
Nitric acid	27	Oil of turpentine	55
Sulphuric acid	28	Alcohol of 86°	62
Acetic ether	38	Ether	83

If 140 drops of sulphuric acid were prescribed in a formula, one has only to divide that number by 28 in order to arrive at the number of cubic centimetres which have to be measured out; thus—$140 \div 28 = 5$. Should there be any small remainder, these few drops might be dropped as usual; "that goes without saying," as our Gallic neighbours say.

RECENT PATENTS.

APPLICATION FOR PATENT.

No. 3,948.—"Manufacture of Pliable Plates and Surfaces as a Substitute for Glass for Photographic and Other Purposes." J. J. SACHS; communicated by Messrs. Fickeissen and Becker.—*Dated August* 14, 1883.

PATENT GRANTED IN THE UNITED STATES, JULY 17, 1883.

"Apparatus for Changing and Storing Backgrounds." W. E. LINDOP, St. Thomas, Canada.—*Application filed March* 9, 1883.

INVENTION PROTECTED FOR SIX MONTHS ON THE DEPOSIT OF COMPLETE SPECIFICATION.

No. 3,837.—"Improvements in Adjustable Chairs for Photographic Purposes." WILLIAM SHIELDS LISCOMB, of Providence, U.S.A.—*Dated August* 7, 1883.

PATENT SEALED, AUGUST 10, 1883.

"An Improved Process, System, or Method of Producing Permanent Coloured Photographic Card Pictures." ALFRED HORACE DAWES, Windermere.—*Dated March* 7, 1883.

GRANT OF PROVISIONAL PROTECTION FOR SIX MONTHS.

"Manufacture of Cyanides." WM. ROBERT LAKE.—*Dated July* 25, 1883.

PHOTOGRAPHIC ALBUMS.

This invention, submitted by Albert Aron, of London, and communicated to him from abroad by Adolphe Aron, of Paris, received provisional protection only.

The object of this invention is to construct albums for holding photographs in such a manner that the said photographs may be readily placed into or withdrawn from the leaves without risk of tearing or injuring that portion of the leaf which is visible to the eye.

For this purpose, and according to one arrangement, each leaf of the album is composed of two portions, namely, a fixed portion, or leaf proper, and a removable portion, or slide, this latter portion being adapted to be slidden into the fixed portion, either from the top or from the bottom edge or from the lateral edge of the leaf, and to be readily withdrawn therefrom as required.

This removable or sliding portion carries the photographs, which are inserted therein through slits or openings in the lateral edges, or in any other suitable part of such portion, and this portion is also provided with apertures or openings for the exhibition of the photographs, the said apertures or openings corresponding with and lying between those in the fixed portion, or leaf proper, when the sliding portion is fitted in place.

In another arrangement or modification the portion carrying the photographs is a fixture, and the outer leaf is adapted to be slidden over this fixed portion, and to form a sheath or envelope therefor.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 22	Bristol	Studio, Portland-st., Kingsdown.
" 23	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on Thursday, the 9th inst., the chair was taken by Mr. W. H. Prestwich.

Mr. J. B. B. Wellington showed some portrait negatives with the economical emulsion plates, the formula for which was given last week. On one of the plates there was a patch which appeared to have given greater sensitiveness and density than the surrounding portion, and it was explained that this patch had been longer in drying than the rest of the plate.

Mr. A. Cowan and Mr. W. E. Debenham had remarked in their practice that when a plate had halted in drying, the part remaining longer moist had undergone what was called the ripening action.

Mr. A. Haddon said that the quickening action in an emulsion depended upon the presence of a solvent of silver bromide which could take up the less sensitive modification, and leave it in larger particles in the more sensitive form. In Mr. Wellington's plates, as the emulsion was unwashed, there would be a considerable amount of such a solvent—that is the excess of alkaline bromide; and this would exist in a concentrated condition in the partially-dry portion of the film.

Mr. Wellington inquired whether in the presence of excess of soluble bromide in the finished emulsion, insensitiveness did not result.

Mr. A. L. Henderson said that it slowed the developing, but did not necessitate a longer exposure, or but so little longer as not to be important. He stated that he believed that one of the best-known rapid commercial makes of plate contained soluble bromide, and that he could produce a plate closely resembling this particular commercial one, by adding bromide of potassium to the washed emulsion before coating.

A question was read—"Is soft gelatine more liable to give green fog in emulsion than hard gelatine?"

Mr. Henderson thought that hard gelatine was more liable to give green fog than soft.

Another question was then read—"Why does a gelatine negative that has been treated with alcohol increase in density with drying?"

Several of the members thought that the form of the question assumed an intensifying action to be caused by the use of alcohol which had not been proved to exist.

Mr. Henderson said that it was a fact that could be proved by immersing half a plate in alcohol, which half, after drying, would be found the more intense.

Another question (which was thought by some to assume a condition not absolutely proved) was—"Why do precipitated emulsions give denser images than those washed in the ordinary way?"

The Chairman thought it was confirmatory of the idea set out in this question that he had found that an emulsion made into pellicle by precipitation and drying *did* give more density than the same emulsion simply washed. In answer to a question by a member, he (the Chairman) added that the density of the film was increased as well as the intensity of the image.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of the Council of this Society was held on Friday, the 10th inst., at 12, York-place,—Dr. Arthur Farre, F.R.S., in the chair.

The minutes of the last meeting having been confirmed, the following gentlemen were elected members:—The Honourable Henry O'Callighan; The Honourable Denis Lawless; Mr. Inspector Hirst; A. J. Corry, Esq.; J. B. Colgrove, Esq., M.A., F.R.A.S.; and G. R. Fludder, Esq.

The Secretary then laid before the meeting the pictures of the current year.

Mr. J. Glaisher remarked that he and his co-referee were gratified to find that a larger number of pictures, and of a higher standard, had been contributed this year than at any previous time, many pictures being now ranked in the second class which used to be placed in the first. He called especial attention to a series of remarkably-fine anthropological subjects (portraits of the native races of India) by George Western, Esq., to some large figure subjects by W. Adcock, Esq., and a cattle piece by Lord Emlyn.

The following is an abstract of Mr. Glaisher's report:—

"Class I. contains 162 pictures, contributed as follows:—R. Leventhorpe, 20; W. Muller, 21; G. Western, 15; W. S. Hobson, 14; C. Stephens, 6; F. Beasley, 6; R. Murray, 5; T. Brownrigg, 6; F. H. Lloyd, 1; W. Adcock, 4; F. S. Schwabe, 7; Major Board, 2; R. O. Milne, 8; P. Gunyon, 5; Lieut.-Col. Warde, 1; Mrs. Evans, 3; J. C. Hannyngton, 4; J. L. Ranking, 1; G. Brook, jun., 6; S. Norman, 7; R. C. Carr, 1; A. R. Dresser, 3; The Right Hon. The Lord Emlyn, 2; J. R. Ellerbeck, 3; Mrs. Abbott, 5; R. B. White, 1; J. S. Byers, 2; H. O'Farrell, 1; A. Tagliaferro, 2.

"Class II. contains 160 pictures, contributed as follows:—C. Stephens, 11; The Right Hon. The Lord de Ros, 2; F. Beasley, 11; R. Murray, 5; T. Brownrigg, 2; F. H. Lloyd, 2; W. S. Hobson, 6; W. Adcock, 1; F. S. Schwabe, 2; Major Board, 4; Mrs. Gulston, 1; G. Western, 7; R. O. Milne, 5; P. Gunyon, 11; W. Muller, 21; Lieut.-Col. Warde, 4; R. Leventhorpe, 3; F. A. W. Whitmore, 1; J. C. Hannyngton, 9; J. L. Ranking, 4; F. H. Shaw, 4; J. W. Robinson, 1; E. J. Jackson, 3; A. R. Dresser, 11; The Right Hon. The Lord Emlyn, 3; J. R. Ellerbeck, 7; Mrs. Abbott, 10; R. B. White, 3; T. Perrot, 1; J. S. Byers, 1; H. O'Farrell, 1; A. Tagliaferro, 3.

"Class III. contains 185 pictures, contributed as follows:—His Highness the Rajah of Cochin, 1; C. Stephens, 8; the Right Hon. the Lord de Ros, 1; F. Beasley, 7; R. Murray, 2; T. Brownrigg, 4; W. S. Hobson, 2; W. Adcock, 1; J. H. Ritchie, 5; F. S. Schwabe, 2; Major Board, 7; General Sladen, 5; Mrs. Gulston, 6; G. Western, 1; R. O. Milne, 5; P. Gunyon, 2; W. Muller, 11; Lieut.-Col. Warde, 2; R. Leventhorpe, 1; Mrs. Evans, 4; F. H. Shaw, 5; F. A. Whitmore, 1; J. C. Hannyngton, 8; J. L. Ranking, 4; S. Norman, 2; The Right Hon. The Earl of Rosse, 6; J. W. Robinson, 3; E. J. Jackson, 4; R. de Salis, 2; R. C. Carr, 7; A. R. Dresser, 11; The Right Hon. The Lord Emlyn, 3; J. R. Ellerbeck, 10; J. W. Baxendale, 3; Mrs. Abbott, 18; R. B. White, 3; T. Perrot, 7; H. O'Farrell, 8; A. Tagliaferro, 3."

The remainder of the pictures are comprised in Classes IV., V., and VI.

The following prizes were awarded:—The first prize to R. Leventhorpe, Esq., for Nos. 78, 86, 90, 98, and 100, an oil painting, by Carl Frisch, in frame. S. Norman, Esq., for Nos. 1, 2, 3, and 8, a siver goblet. W. Muller, Esq., for Nos. 882, 832, and 896, a silver goblet. W. S. Hobson, Esq., for Nos. 272 and 293, a silver goblet. Mrs. Abbott, for Nos. 4 and 6, a painting in frame. G. Brook, Esq., for Nos. 1 and 2, an album elegantly bound. R. O. Milne, Esq., a water-colour drawing in frame. P. Gunyon, Esq., a water-colour drawing in frame. F. S. Schwabe, Esq., an album elegantly bound. G. Western, Esq., a silver goblet. W. Adcock, Esq., a water-colour drawing in frame. T. Brownrigg, Esq., an album elegantly bound. Certificates of honourable mention were awarded to the following members:—R. Murray, Esq., J. R. Ellerbeck, Esq., A. R. Dresser, Esq., Major Board, Lord Emlyn, A. Tagliaferro, Esq., J. S. Byers, Esq., Lieut.-Col. Warde, Mrs. Evans, J. C. Hannyngton, Esq., H. O'Farrell, Esq., and R. C. Carr, Esq.

A. J. Melhuish, *Hon. Sec.*

LEEDS PHOTOGRAPHIC SOCIETY.

The usual monthly meeting was held on Thursday, the 2nd inst.,—Mr. W. Teasdale, F.R.M.S., in the chair.

Mr. F. W. Branson exhibited a drop and flap shutter so arranged that any exposure could be given at pleasure. Mr. J. W. Reffitt exhibited a very simple but very effective camera finder. The Chairman showed some results from different sensitometers.

A paper *On the Preparation of Gelatino-Bromide Plates* was read by Mr. G. H. Rodwell. [See page 466 in last number.] After the reading of the paper,

The Chairman said he had tried almost all the plates in the market, and, although there was a great difference in their price and appearance, yet it was possible to procure good negatives with all but two. He was in favour of the amateur preparing his own plates, and thought he would find much advantage in so doing.

The Hon. Secretary said that he had, since the publication of Mr. C. Bennett's process, prepared his own gelatine plates; and, although he had tried every formula he had seen published, and made numerous experiments on his own account, yet he could get the best plates—that is, plates giving the greatest range of density—from Bennett's proportions, prepared in a somewhat similar manner to Mr. Rodwell's. He specially called attention to the small quantity of silver in the formula, and also to the different degrees of sensitiveness that could be produced almost at will. Reference had been made to the light used in the preparation of plates. He (the Hon. Sec.) always used canary medium and a gas jet, and found that he could develope the most rapid plates with this light, without the fear of fog.

The Chairman said the use of canary medium, so far as he knew, was almost confined to Yorkshire. In conversation with several London friends, he found they looked in a very incredulous manner when he spoke of the light he used.

The conversation then became very general. It was decided to hold a technical meeting early in December. The meeting was then adjourned.

HALIFAX PHOTOGRAPHIC CLUB.

A meeting of this Club was held on Wednesday, the 8th instant,—Major Holroyde, President, in the chair. The Secretary read the minutes of the last meeting, which were confirmed.

An invitation letter was read from the Committee of the Photographic Society of France for erecting a monument to the honour of M. Daguerre—inventor of photography called "daguerreotype," a native of Cormeilles en Parisis—inviting the Club to subscribe to the fund and to send a representative to be present at the *fête* to be held on August 12th, to render homage to the illustrious inventor of one of the three marvels of the age (photography). An invitation was also received to take part in the exhibition of the Newcastle-on-Tyne Photographic Society, to be held in November next, and a letter from Captain W. F. Turton, R.A., of Florence, Italy, thanking the Club for electing him a honorary member.

Dr. Bowman, F.R.A.S., was elected a member of the Club.

A committee was appointed to adjudicate on the diploma pictures and negatives taken at Bolton Woods, Wharfedale, on the occasion of the Club's summer excursion on June 25th. The following members, not being present on the excursion nor competing, were proposed as judges:—Rev. W. E. Hancock, Mr. J. E. Jones, Mr. J. I. Learoyd, Mr. D. Smith, and Mr. J. Hill. The awards, after deliberate judgment, were as follow:—Mr. W. C. Williams, first, for technical excellence, the photograph called *The Sun-lit Woods*. Mr. Williams, first, for artistic merit—with the *Fisherman*—a beautiful picture with a fisherman wading in the river Wharfe, with a fine background of woodland foliage. These were taken on Bennett's slow landscape plates; exposure ten seconds. Several other prints were much admired. *Shades of Evening*, *Landscape with Cattle*, *Reflection*, *The Waterfall*, &c., were all marvellous specimens of photographic art, the cloud effects being exceedingly magnificent. The second picture for technical excellence was by Mr. Councillor John Smith. The second for artistic merit was by Mr. Edward Huntriss. Three pictures were shown by the Chairman—one of the Cavendish Memorial and two woodland scenes—two by Mr. Councillor J. Smith, two by Mr. J. Whiteley, three by Mr. E. J. Caw, and one by Mr. F. Smith. These were very highly commended by the committee; and the meeting being late, the judging of the negatives was deferred.

COVENTRY AND MIDLANDS PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held on Thursday, the 2nd instant. In the absence of Mr. Councillor Andrews, the President, Mr. Ambrose, Vice-President, occupied the chair. On the conclusion of the business part of the meeting,

The CHAIRMAN called upon Mr. T. J. Lloyd to read a short paper on the subject of *Chloride of Gold*.

Mr. LLOYD said that it was not at all necessary to use pure gold, for in making his chloride he used up any scrap gold he might have by him, and leaving in the finished solution all the alloys (such as copper) and other impurities. He (Mr. Lloyd) always used the acetate bath, and found that the presence of copper, &c., in the bath was not a disadvantage, but a decided saving in gold, while giving better tones. His formula was as follows:—

Gold (half-sovereign will do)	$2\frac{1}{2}$ dwts.
Nitric acid	3 drachms.
Hydrochloric acid	9 ,,
Water	6 ,,

Apply heat until dissolved, and neutralise with an excess of prepared chalk. Then make the solution up to twelve ounces with water.

After some discussion as to the advisability of having other metals besides gold in the toning-bath, and on other minor matters, the meeting terminated at ten o'clock.

Correspondence.

IMPROVEMENTS IN THE WOODBURYTYPE PROCESS.

To the EDITORS.

GENTLEMEN,—The communication of Mr. Richard Brown (of Brown, Barnes, and Bell) is so replete with inconsistencies and inaccuracies that I cannot allow it to pass unchallenged.

If their new process had been simply announced in the ordinary way, by the publication of their specification, I should have held my peace; but as it formed the subject of a leading article, and was there spoken of in terms which I felt might be misleading, and being probably the only absolutely disinterested person in existence sufficiently well informed on the subject to express a positive opinion, I thought it only my duty to do so.

The special point claimed in the specification, and strongly emphasised in the leading article (see THE BRITISH JOURNAL OF PHOTOGRAPHY, June 29, 1883) was that Messrs. Brown, Barnes, and Bell had discovered a *simpler* process of producing Woodbury moulds in lead by rolling instead of by direct pressure. The Editors hailed it with pleasure as an advance, and considered themselves justified in anticipating that it would fulfil all its promises.

In my communication in the issue of the 6th ult. I purposely refrained from alluding to Mr. Woodbury's rolling process—stannotype—as I did not wish to provoke a controversy, but confined myself to the simple facts of what had been done years ago; and from those facts deduced my opinion that it was very improbable that the new patent would be a practical success. My letter, "boiled down," was by no means a confession of failure to produce Woodburytype moulds by rolling pressure; on the contrary, I endeavoured to explain the steps which led to success, particularly the elastic pressure that appears to be essential.

"The Woodbury process is not one which is likely to be worked very largely by the general body of photographers." Granted; but a simplified Woodbury process is desired by many who hesitate abo[ut] the expense of hydraulic machinery, as doubtless Messrs. Brow[n], Barnes, and Bell would have found had they desired to grant licenses f[or] their new process. If, however, they wish to keep it to themselves th[e] discussion may still interest the would-be licensees.

If, as Mr. Brown states, it requires the special rolling machinery whic[h] they alone possess it would seem to be self-evident that "simplified" is a misnomer. It is only exchanging special rolling for special hydraul[ic] machinery; and for the smaller sizes, at anyrate, the rolling would pro[bably] be the more expensive, while for the larger ones—that is, ov[er] ten inches—I have every reason to believe it is not yet in existenc[e]. So much for the "invention which has for its object the simplifying [of] the process."

Most so-called "new inventions" are in a great measure open to th[e] three styles of criticism Mr. Brown particularises. I did not say tha[t] Messrs. Brown, Barnes, and Bell *cannot do what they profess to d[o]*, although such might have been inferred to be my private opinion, as [I] said that "the chances of its failure, in a practical sense, are enormous." I should, perhaps, have said at once what I now do say—that the process, as described in their specification, is utterly incapable of producin[g] a mould fit for printing half-tone photographs. I take it from Mr Brown's own words. There were difficulties to overcome, and Mr Woodbury says it is surprising that the "*simple idea which is the key to the success of the whole matter*" was not thought of before. If there be such a simple key it is a pity it was omitted in the specification, as I have always understood that no essential could be omitted without absolutely invalidating the patent.

"From the recognised practical and commercial status of the patentees" no one doubts but that they had what they considered *good reason* for completing the patent. What that might be it is not my place to discuss or suggest. It is, however, worthy of remark that Mr. Brown considers that Woodbury printing "will very shortly be one of the processes that have passed out of practice"—an opinion which seems hardly consistent with their efforts to improve it. Threatened people, and processes also, live long. Woodburytype, and carbon too, at one time were expected to supersede silver printing, and Albertype was to supersede both; but all still survive, and all have yet excellent leases which are not appreciably threatened even by Messrs. Brown, Barnes, and Bell's "photographic productions capable of being printed in a type-printing press."

The only good word Mr. Brown has for Woodburytype prints is that they resemble silver prints. Well, this is something, for silver prints have taken a great hold of the public taste; but he overlooks the fact that a good Woodbury print (alas! that they should be so few) is always preferred by artists to the silver print from the same negative. There is about them what the French call "*gras*"—a richness and softness that is so diametrically opposed to the "thinner" productions of photolithography and phototypography, that I shall venture to prophesy still greater favour for them as the process and its branches, such as stannotype, become better known and better worked. We shall be better able to judge of the type-printing process when its results are available for comparison with other type processes in use. So far, promising as the photographic black-ink processes may be, they have not yet reached that degree of perfection required to supplant the half-tone photographic processes. For the present we are talking of simplified Woodbury processes.

I send with this a specimen done entirely by a beginner who had had no experience whatever in Woodbury printing. The mould from which it was printed was produced by Mr. Woodbury's stannotype process, from an $8\frac{1}{2} \times 6\frac{1}{2}$ landscape negative, and the special rolling machinery necessary for its production was scarcely more expensive or complicated than the pair of rollers known as a "family wringer." The print is not what Mr. Woodbury would call perfect; but to an expert it is conclusive that stannotype is capable of giving a high degree of perfection with an insignificant expense for plant with, as far as I can see, every probabilty of doing large sizes equally easily and simply. It will remain at the Editorial Office of this Journal for inspection, and I challenge Messrs. Brown, Barnes, and Bell to send one done by their process to this date for comparison with it.

The expense of Woodburytype plant has been much exaggerated. Though much higher than it would be if there were a real commercial demand, it is still small compared with (say) ordinary letterpress machines. The principal cause which has militated against its more extended use has been the want of suitably-prepared paper. Even those firms who are most successful in working the process would gladly employ a commercial paper if such were in the market. This has become a necessity, now that stannotype is found practical; and as soon as it is accomplished I shall be much surprised if Woodburytype and its kindred processes do not all of them find a large field for development, to the great advantage of the results, as from the interchange of ideas by many workers it will no longer be, as it is now, almost a secret process.—I am, yours, &c., GEORGE SMITH.

London, August 11, 1883.

P.S.—Since the above was in print I have seen a specimen of Messrs. Brown, Barnes, and Bell's phototypography bearing their name, dated March, 1883, and purporting to be the *first* block pro-

ced, photographically, capable of being printed with letterpress. rely Messrs. Brown, Barnes, and Bell must have known that blocks this character had been produced years ago, and that in the ALMANAC for 1883 there was a specimen of one of these block prosses—an indifferent one it is true, but still very much superior to, d far more promising than, Messrs. Brown, Barnes, and Bell's st block.—G. S.

PECULIAR DEFECT IN DRY PLATES.

To the EDITORS.

GENTLEMEN,—I send herewith a specimen of a defect sometimes ound in dry plates, the cause of which is not clear.

The most exposed parts, such as the sky in a landscape, appear after evelopment covered with hair-like and ripple markings. I used to be uch troubled with this in the days of collodio-albumen plates, but ntil lately I have not experienced it with gelatine plates. It seems to e associated with slow development when the plate has been left to tself in a dish undisturbed—that is, without rocking.

The explanation which has occurred to me, in reference to plates eveloped by a deposit of silver to form the image, is that it is thrown own in that peculiar form as an effect of an almost imperceptible ibratory motion of the fluid, as a similar form may be produced by gently haking a vessel containing water holding a fine deposit in suspension. f, however, our modern system of development be not by deposit, but y molecular change, I suppose this explanation will hardly account for he appearance.—I am, yours, &c., G. S. PENNY.

Cheltenham, August 14, 1883.

[The effect is undoubtedly produced by allowing the developer to remain undisturbed upon the film for some time; but the exact manner in which the solution acts in the case of alkaline pyro. is not quite clear. Possibly some of our readers may have investigated the phenomenon.—EDS.]

POST-MORTEM PHOTOGRAPHY.—IDENTIFICATION BY MEANS OF A PHOTOGRAPH.

To the EDITORS.

GENTLEMEN,—The following experience may be of interest to some of your readers :—

A few days since the police, finding a difficulty in obtaining professional assistance, applied to me to photograph a *post-mortem* case for the purpose of identification. I secured two excellent negatives, with a Ross's rapid (middle stop), in six and eight seconds, in a moderately well-lighted mortuary, and within three hours placed a finished print in the hands of the police.

A somewhat remarkable circumstance in connection with the case consisted in the fact that the relatives of the deceased, unable to recognise the body, at once identified the features from the photograph. I think this striking testimony in favour of our art-science worthy of being placed on record.—I am, yours, &c., C. I. LAMBE EAMES,

Hon. Sec. St. John's Ambulance Association, No. V. District.

28, Rockley-road, West Kensington Park, August 14, 1883.

THE RECENT COPYRIGHT CASE.

To the EDITORS.

GENTLEMEN,—Till the other day I was under the impression that the province of a judge was so to expound the law and so to clear up legal difficulties or technicalities that the thicker-headed portion of our community—which, according to Carlyle, forms the bulk of our population, and, therefore, needs this judicial enlightenment—might at first glance perceive the right path, and under no circumstances ever deviate from the course which the spotless integrity of the English bench has marked out; but, like many other illusions of my early youth, this one has faded away amidst the Master of the Rolls' "difficulty in construing the Act" (of copyright).

Now, in the first place, his lordship falls foul of the word "author," as applied to the man who has painted a picture, and he rather innocently continues in this language—"of course, one knows that the author of a painting must be the artist who draws it." I respectfully demur to this interpretation of the Master of the Rolls, and I would submit that the author of a certain picture is he whose genius conceived it. A painting goes forth to the world stamped with the name of a particular artist, but it does not necessarily follow that the one hand alone is responsible for all the drawing, for all the painting, and for the whole idea of the work. It is notorious that many artists have painted together, but the finished work often goes forth as the work of one man, and as the work of the man whose genius gave birth to the story portrayed on the canvas. Again: in the days of the old masters there is precedent without end of pupils performing the major part of the work, leaving to the master-hand solely its finishing touches and certain "points" in which this hand excelled.

To continue this reasoning and this precedent: it would necessarily follow that the author of a photograph is he who conceives the idea, leaving to subordinate minds to carry out the conception of his brain; and this must be accepted as the strict and literal meaning of the word "author," which has evidently so materially exercised the brains of the Lords Justices of the Court of Appeal. Authorship implies a mental conception; hence Milton is spoken of as the author of *Paradise Lost*, &c., and yet we know that, owing to his infirmity, he never actually wrote one line of it. His Lordship says—"The question is full of difficulty." So is every case, if difficulties be created by forced interpretation of language in defiance of ordinary usage and in defiance of etymology.

Hear Lord Justice Bowen on the word "author":—"Who is the author?" * * * "The man who produces the work." There are four notable lions on the base of the Nelson column known as "Landseer's lions"; did Sir Edwin cast them himself? If not, according to the light of the legal luminary last mentioned they are not Landseer's lions at all; they are the "lions" of the men who guided the liquid metal into the mould. We speak of St. Paul's as the work of Wren—of the Houses of Parliament as Sir Charles Barry's; but, unless these artists carved every detail and laid every stone, we must regard these monuments as additional illustrations that "the world knows nothing of her greatest men."

In the case of "Nottage and Another *versus* Jackson" there is no doubt the Master of the Rolls was correct in his surmise that a photograph of the Australian cricketers occurred to the mind of one of the plaintiffs, and a natural consequence of that inception would be a short correspondence on the part of "Nottage and Another" with the captain of the team, for permission to carry out this idea by the despatch of some one to execute the details, such as "placing the people in position" and "adjusting the lenses;" and, with the experience of very many groups before my eyes, I fear me greatly that the "arrangement of the group" is but too often the inspiration of the "people in position." They have been photographed so many times before that they know, as by instinct, the front-row-sitting-and-the-back-row-standing-behind arrangement, so that, in all kindness to "the man who went to the Oval," it is scarcely correct to credit such a mechanical though "effective cause of the picture being produced" with the name of authorship, when the actual "giving of orders" must have emanated from one of the plaintiffs themselves, else their servant would not have been upon the spot to execute the commission entrusted to him.

Lord Justice Cotton just touches the subject in his admission that "the author of a painting does not make his colours," &c. That is perfectly correct; it is the mental conception makes him the author of his picture despite the query of the Master of the Rolls—"Who ever speaks of the author of a painting?" But Lord Justice Cotton is in error when he says the author of a photograph (supposing two or more persons are concerned in the production of this photograph) is he who produces the photograph. Suppose a man to say to me—"Dress up a figure in a certain costume, and with a certain expression of countenance upon the face, and call the plate *Cherry Ripe*"—will that be my authorship when I merely carry out the order on the inception of another? Most certainly not; and if I copy by means of canvas, colours, and brush *The Descent from the Cross*, by Reubens, am I the author of that picture? Certainly not! I copy or carry out the conception of another, and mine is a "copy after Reubens." And if I am told to go and take a photograph of a specific group of persons, I am not the author of that photograph, because the mental conception to constitute me the author did not occur to me, but to the person sending me.—I am, yours, &c.,

August 14, 1883. AUDI ALTERAM PARTEM.

"STANDARD DEVELOPING SOLUTIONS."

To the EDITORS.

GENTLEMEN,—It certainly is more amusing than interesting to find in the pages of the Journal this week *two* gentlemen posing as inventors, or authors, or whatever they may term it, of a system of developing dry plates which has been in common use professionally for several years, whilst they only lay claim to the discovery for about two years back. Surely both these gentlemen must be better read in photographic literature and better versed in its practice than would at first sight appear. One of them I have always understood to be a skilled amateur, the other one I presume to be.

How is it, then, may I ask, that these gentlemen have only recently arrived at the conclusion that the correct and scientific manner of developing a dry plate (of any make) is in using two separate solutions of ammonia and bromide of a known strength (ten per cent., or whatever you like for convenience), when this system has been announced in the printed instructions of more than one manufacturer for four or five years to my knowledge, and probably ever since the gelatine dry plate came generally into use?

I enclose for your inspection a formula printed in 1879, in which you will see that the three solutions of pyro., ammonia, and bromide are directed to be used separately, and mixed in the desired proportions for developing, and that formula is considered the proper one for use to this day. A similar formula has long been published by the makers of other plates. I believe, too, that it has been freely advocated in several articles in the photographic journals; and a friend who has just dropped in says that he has invariably adopted this plan for the last six years with any and every make of plate.

Therefore, I fail to see any novelty in the announcement just made by your two correspondents. I should be glad to see them give us something more original.—I am, yours, &c., SECUNDUM ARTEM.

August 11, 1883.

EXCHANGE COLUMN.

I will exchange, for anything useful, Mason's hot rolling-press, complete, good as new.—Address, MANAGER, 28, Micklegate, York.

I will exchange a 12 × 10 English group lens for views, &c., for portable whole-plate camera or accessories.—Address, CHAFFIN, Sherborne, Dorset.

I will exchange a rolling-press for a camera (without lens) suitable for half- and quarter-plates.—Address, G. H. P. JONES, 33, Devonshire-street, Monkwearmouth.

We will exchange a Victoria camera, with two lenses, repeating-back, good as new, for a posing-chair or anything useful.—Address, LONDON PHOTOGRAPHIC CO., Morecambe.

Wanted, good interior background, balustrade, Ross's symmetrical lens for 10 × 8 views, for which I offer (to value) photo. studio (movable), dark tent, &c.—Address, G. H. JASPER, Stourbridge.

I will exchange a 10 × 8 square mahogany camera, with a three-draw sliding-body, focussing from eight to twenty-one inches, focussing-screen and folding tailboard, for balcony, backgrounds, or accessories.—Address, WEST OF ENGLAND STUDIO, Cheap-street, Sherborne, Dorset.

I will exchange a drying-box for gelatine plates—will hold a gross of quarter-plates—dark tent on wheels, first-class condition, and a quantity of other apparatus. Wanted, a half-plate bellows-body camera, with double dark slide. Say length, breadth, and depth when folded, and weight.—Address, PHOTOGRAPHER, 104, Senhouse-street, Maryport.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Joseph Wingrave, 4, High-street, Coventry.—*Two Photographs of Miss Maud Forrester as Lady Godiva.*

Messrs. Blake and Edgar, 74, Midland-road, Bedford.—*Photograph of the Rev. J. Miley and Robert Arkwright, Esq.*

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Two Photographs of the Grand Stand and Racecourse at Goodwood, Showing Horses Entering Paddock.*

William Broughton, Victoria Cottage, Vernon Grove, Eccles.—*Photograph of the Earl of Shaftesbury, K.G.* Also, *Photograph of the Earl Surrounded by a Group of Lads.*

Rev. Alfred Henry Malan, Perranarworthal Vicarage, Cornwall.—*Photographs of the "Flying Dutchman" Going Through Collumpton at Sixty Miles an Hour.* Also, *Broadgauge Express Train Going Through Tiverton Junction at Full Speed.*

A. B. Z.—Send us fuller particulars.

A. J. WILLIAMS.—The firm named are not paper-makers—only albumenisers and dealers.

AMATEUR.—Thanks. The pictures are extremely interesting, and are certainly very good photographs.

B. A. (Cambs.).—See leading article in the present number. If you require further information write again.

J. SMART.—Although the business is still carried on in the same name, the gentleman in question has been dead some years.

DRY PLATE.—The formula you have employed is right enough, but you have not sufficiently washed the emulsion; hence the cause of your trouble.

H. PIPER.—You are perfectly right in your surmise. The patent has lapsed some years, and you are quite at liberty to work the process in any manner you may choose.

IOLANTHE.—Make a couple of nicks with a saw in the rim of the lens cell opposite each other, and then place the blade of a knife in them; you will now be able to unscrew the lens without risk of injury.

ASCALON.—Alum will enable you to render the gelatine insoluble before submitting the mould to the electrotyping process. Immerse the mould in a saturated solution for a few minutes; that will be quite sufficient.

B. J. J. S.—The collotype process is, we believe, being worked in some parts of Australia. It is also worked on an extensive scale in America. England is somewhat behind in this process and its numberless applications.

W. L. GROVES.—Mr. Jabez Hughes's *Manual of Photography*, published by Mr. J. Werge, Berners-street, will probably answer your purpose. Hardwich's *Photographic Chemistry* (Churchill and Co.) will be the best as a theoretical work.

S. J. HOWARD.—You had better not attempt to reduce any of the prints you purchased in Rome—otherwise, we fear, you will spoil them. Better put up with their being slightly over-printed rather than run the risk of spoiling them entirely.

DISSATISFIED.—Whenever we have sent residues to a refiner we have always been well satisfied with the returns. We make it a rule always to assay before sending. Your experience is, we imagine, exceptional, if you deal with respectable houses.

S. LINDSAY.—The recent decision in connection with copyright in photographs will not affect your titles in the least. If, as you say, all the negatives were taken by yourself, and registered in your name, you can certainly proceed against any one who pirates them.

S. J. W.—We have no means of knowing if the portrait in question was taken by the principal or his operator. If you choose to copy it you must take the risk of the picture being legally copyright. We cannot assist you in the matter; nor would we if we had the power.

A. SHUTER.—You have been misinformed; it will be illegal. It is quite true that for ten shillings per annum you can obtain a license to keep a still; but that license, or any other, will not permit you to re-distil methylated finish in order to free it from the gums, or wood naphtha.

D. MCGREGOR.—The addition of cyanide of potassium has often been employed for restoring a silver bath to working order, but hyposulphite of soda will certainly not answer the same purpose. No wonder that by the addition you have spoiled the solution. Better not spend any time on it now. Make up a new one; it will save you expense.

PHIL.—There is no reason why you should not clean off the old collodion negatives, and employ the glass for gelatine. The reason that platemakers will not coat your own glass is that it would put them to the inconvenience of having to clean it, which would incur more trouble than using new glass. If you wish to utilise the old glass you will have to coat it yourself.

H. HARRISON.—The opal glass received, per parcels post, appears to be of very fair quality; but, from what you say, it is not the kind you require. The sample sent is the unground. For your purpose you should employ what is known as the "dead smoothed pot opal." It is the same kind of glass as you now have, but the surface is finely ground, like that of ordinary ground glass.

RECEIVED.—"Free Lance."

ASSOCIATION BELGE DE PHOTOGRAPHIE.—The exhibition of this Association was opened on Wednesday last with great *eclat;* but we are this week unable to give any details, as the news only reaches us as we go to press. Next week we hope to give a critical report of the exhibition by our special correspondent.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—In consequence of the recent legal decision on the subject of copyright, members and visitors are requested to observe that it has been considered advisable to alter the title of the subject for discussion on Wednesday evening next, the 22nd inst., to that of—*Photography as a Fine Art.*

POLYTECHNIC INSTITUTE.—The names of the successful students in the recent examination are as follow:—*Silver medal* and £3: George F. Davies.—*Bronze Medal* and £3: William Coles.—*Bronze Medal:* Benjamin F. Winks.—*1st Class Technological Certificates:* Messrs. Bowen, Carey, Coles, D'Anter, Davies, Sawyer, Hart, Henderson, Hyde, Lynes, Turner, and Winks.—*2nd Class Technological Certificates:* Messrs. Ayling, Cox, St. George, Hayward, Ouin, Penny, Salmon, Spencer, Tully, Velasco, and Miss E. L. Hare.——The report of the examiner, Captain Abney, is as follows:—"I am happy to report that the results of this year's examination are much in advance of those of last year. The small percentage of failures out of a larger number of candidates alone would show an improvement. The answers given in the majority of papers show that most of the candidates have had a careful theoretical as well as practical training, and that 'rule-of-thumb' photography, which I have animadverted upon in a former report, has been replaced by instruction in the subject on a much sounder basis. My belief is that the past session marks 'a new era in the technical teaching of photography.'"

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For the Week ending August 15, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

August	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
9	29·66	NW	60	56	111	69	56	Cloudy.
10	29·62	W	60	53	113	69	51	Cloudy.
11	29·89	NW	61	56	113	70	53	Cloudy.
13	29 98	SW	69	62	121	84	58	Cloudy.
14	29·81	W	69	63	121	77	63	Bright & Clear.
15	29·69	W	62	57	107	65	57	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1216. Vol. XXX.—AUGUST 24, 1883.

PHOTOMICROGRAPHY.

The present article upon *Photomicrography* is written in compliance with the request which has several times lately been expressed by readers of this Journal. It is hoped, therefore, the plan that will be adopted in the treatment of the subject may meet the requirements of different investigators, and present such details as may prove useful to those now desirous of adapting photography to their microscopical studies, and also be an inducement to others to take up this fascinating branch, so as to lead to its more universal application for producing efficient representations of microscopic objects.

Much discredit has been brought upon it through the effort to reproduce by photography the pictorial image of various objects as seen by the aid of the microscope which in themselves are wholly unsuitable for the purpose, and to obtain in a single negative all that has been learnt by a mental combination of a series of images presented to the eye by the examination of the object at different planes and under different varieties of illumination. The most that can be done in such a case is to select the best general appearance, and to reproduce this in the print; but it will be at once seen that this cannot be satisfactory, as the interference by the planes that may be above or below the selected focus tend to destroy the definition, and give rise to a heavy and unintelligible picture. There is no longer the power to shift the focus, and to the eye of one who has not studied the original object the representation is fairly confusing. By the careful draughtsman this in such an object is largely avoided. He, by selecting the point at which the greatest harmony is secured, or the details of parts of chief interest, is capable of presenting a picture which is far more readily appreciable to one who has never seen the object through the microscope than can be attained by a single, or indeed by several, photographic representations.

These remarks, which appear at first sight so damaging to the utility of photomicrography, apply largely to the subjects of histology and sections generally which have been too thickly cut. In the former, amongst the coarser tissues, may lie the most delicate structures, the very parts of most interest; and, when attempts have been made to render more transparent the coarser portions, unfortunately it often happens that the most delicate are entirely lost to view. To remedy this, the process of differentiating, by staining, has been most successfully applied in many cases, the most delicate structures standing out with marked facility of recognition by the help of the microscope. But here, again, what is of such signal value to the microscopist is often really detrimental to the photographer, as many of the colours employed are transparent to the actinic rays; thus the gradations of light and shade, which give form and substance to the structures in the image, are lost, and imperfect definition is the result. Moreover, it often happens that some portion of the staining material has by the method of preparation, in washing away the colouring matter from the non-stained portions, led to some exudation from the stained part into the immediately surrounding portions, and rendered the specimen useless for obtaining a good photographic image; or a portion of the staining fluid may remain on the surface of the slide or thin cover, and thus lead to trouble. This is of frequent occurrence in endeavouring to stain objects, such as *Bacteria*, which have been tried on the thin cover or slide before staining.

Again: many of the mounted objects—such as insects—have their chitinous coverings very dense, and strongly impervious by their dark colour to the actinic rays; yet, very likely, upon their general surface, or the antennæ, or limbs, or palpi are placed the most delicate hairs or transparent parts or organs. It cannot be expected, then, by long exposure to be able to get any definition in the former without much over-exposure of the most delicate parts, which, again, means imperfect definition, for instance, in the very delicate, hair-like proboscis of many of the insect parasites. Attempts to bleach the deeply-coloured chitinous portions before mounting is not satisfactory.

These statements — which are not made to deter any from attempting the right employment of photomicrography—may by some be regarded as signs of its total inadequacy. They in reality belong to one of its weak points; yet good work has been, and continually is, done by its use. Why? Because proper subjects have been selected, and due care taken in photographing their images. The student must not expect to be able to take at random from his cabinet any object and obtain a good photomicrograph of it. Should he make the trial he will certainly meet with disappointment; and, though this may be an excellent teacher under the strict rod of patience and perseverance, it very often cuts short any further effort. Unfortunately, it is sometimes impossible beforehand to say such a specimen will yield an excellent negative. The resultant print comes out flat or heavy; the gradations, as depicted by transmitted light, may be either too abrupt or too diffused, or portions of the object that should present some rotundity offer none; and, perhaps, the colour of the mounting medium—as strongly-heated old Canada balsam—and the tint of the object too closely correspond. The foregoing remarks will show that careful judgment is, at starting, necessary in the selection of the objects.

Photomicrography has long held a certain position in photography, and very early in the history of this art was utilised by the employment of the solar microscope, or by artificial illumination with the limelight, as in the time of the daguerreotype, when Messrs. Douné and Foucault adapted it for the illustrations of the atlas issued with Dr. Douné's work *On the Use of the Microscope*, published in 1845. These chemically-etched daguerreotype plates yielded very beautiful prints.

The papers that have appeared at various times from the pioneers of the art and their followers have been so scattered in the various transactions, proceedings, magazines, periodicals, and photographic almanacs, that it would be difficult to trace the correct history from the earliest to the most recent date. For the benefit of those who wish to see something of its bibliography we may refer to the late editions of Dr. Beale's *How to Work with the Microscope*, where the entire subject has been treated. In recent years there have been various useful articles dealing with this branch in some of the current journals devoted to microscopy or to photography. Much has been done abroad, especially in America, where its employment met with a liberal support from the Government, and by the generosity of those under whose care it was duly fostered very

large numbers of prints were distributed in this country. Also, valuable and leading papers from Dr. Curtis and the facile pen of Dr. Woodward, of the Surgeon-General's Office, Washington, appeared from time to time in the scientific journals. It may be safely said these contributions and the excellence of the prints helped largely to keep the subject afloat before microscopists in this country. Dr. Dean, of Boston, U.S., applied it to his work *On the Pathology of the Spinal Cord*, in 1864. Professors Draper and Rood also adopted it, and latterly it has been advocated in the American microscopical journals, and employed by Carl Seiler, Dr. Mercer, and also by Dr. Steenberg, U.S.A., in illustrating his studies of some of the *Bacteria* by heliotypes from his photomicrographs.

In France it was early adopted, and with it must be associated the names of Duchesne, of Boulogne, and Rouget, of Montpellier. In 1866 Dr. Moitessier published his excellent work on *Photography Applied to Microscopical Researches.* In 1870 appeared the second edition of M. Jules Girard's *The Camera and the Microscope, or Practical Photomicrography*, with woodcuts or heliotypes from his photomicrographs; and the same author published, in 1873, his work on *Plants Studied by the Aid of the Microscope*, with a large number of woodcuts from his photographs. In connection with the subject stand the names of Nachet, Bertsch, Neyt, Lakubauer, Dounadieu, Lilleferme, Guinard, Brebisson, &c.

In Italy the Count Castracene has most successfully employed it in his studies of the *Diatomaceæ.*

In Germany several *brochures* appeared in connection with the subject. Herren Reichardt and Strüenberg published their *Handbook of Microscopical Photography* in 1868; and previous to this may be mentioned the names of Meyer, Albert, Hesseling, Kallmann, Gerlach, and Melwig; whilst one of the latest authorities upon its use has been Dr. Koch, of Berlin, who has employed photomicrography to secure correct representations of some of the *Bacteria*, which have been so carefully studied by him.

And in this country may be enumerated the names of Talbot, Dancer, Hodgson, Reade, Kingsley, Diamond, Archer, Shadbolt, Delves, Highley, Wenham, Busk, Herapath, Howlet, Bocket, Durham, Pollock, Legg, Wace, Davis, Parry, Hislop, Beck, Heisch, Higgins, Hughes, Wilson, Abercrombie, Norris, Taylor, Viles, Fowke, Maddox, Jennings, &c. It has received special attention in the aforenamed work of Dr. Beale; also in Davis's work on the *Microscope*, Cutter's *Microscopical Technology*, and in a paper by Mr. Charter White, of the Quekett Microscopical Club. Lately a small work has been published, from the pen of Mr. A.C. Malley, on *Microphotography* (!). Unfortunately here the labours of others are almost totally ignored, and the subject is presented in rather a pedantic way, whilst the frontispiece is a poor illustration of the capabilities of photomicrography, or it would have been far easier to refer our readers especially to this work to satisfy their requests than to deal with the subject afresh in these pages.

It seems almost unpardonable to pass over many of the above names without recounting their special work; but the object is to offer an article upon the subject in its recent phase, and not to write the history of photomicrography. The details will be commenced in the next article.

THE COPYRIGHT QUESTION.

Our readers will be interested to know that one day last week, in the House of Commons, Mr. M'Laren, the Member for Stafford, obtained leave to bring in a Bill to amend the law relating to copyright in photographs. But, owing to the late period of the session at which it is introduced, and the pressure of business in connection with matters of greater general public importance, it is next to impossible to expect that any really effective and substantial measure can be carried before the recess, seeing that we are on the eve of the adjournment.

As the matter now stands, there is no getting clear of the fact that the late ruling in the Court of Appeal renders invalid the copyright in a very large majority of the photographs issued by the chief publishing houses, and will, as a consequence, very materially affect their incomes. Whether, in the event of the new Bill not becoming law, the plaintiffs intend to let the matter rest where it is, or take it to a higher tribunal, we are unable to say; but, if they should, it is quite within the bounds of possibility that the decision may yet be reversed. A *cause célèbre* just decided (Dobbs *v.* The Grand Junction Water Company) fully illustrates the "glorious uncertainty of the law." In the first place, a magistrate decided the case one way. It was then taken to the Court of Queen's Bench, where the magistrate's decision was reversed. Then it was brought before the Court of Appeal, where the judgment of the Queen's Bench was reversed and that of the magistrate sustained. From the Court of Appeal the suit was carried to the House of Lords; here the judgment of the Court below was again reversed and that of the Queen's Bench affirmed. An appeal in the Nottage case might therefore be successful, if it become necessary.

It will be remembered that, in the Nottage-Jackson case the chief difficulty with the three learned Judges who had the case before them was in arriving at what was intended by the present Act, owing, in the framing of it, to the vagueness of the phraseology employed. Particularly was this the case with the meaning of the word "author" as applied to photography.

If the phraseology in the present Act is so vague that its meaning cannot be understood, what shall be said for that occurring in the projected one? "Author of a photograph shall mean the person at whose house or studio, being a house or studio used for the purpose of taking and selling photographs, or by means of whose instruments and materials the negative thereof shall have been made, and who shall have been permitted or employed to make such negative by the person on whose behalf such photograph shall have been taken." This, indeed, constitutes the whole gist of the Bill, and it will be seen that it is framed expressly to define who is the author of a photograph, and to supply the definitiveness absent in the present Act. But does it do this?

At present a personal authorship is intended, and the copyright shall exist during the lifetime of the author and for seven years after his death. Now, in the case of the negatives being taken in the studio of a firm consisting of several persons the copyright will be the property of that firm; but what will be its *duration?* We see no mention of it in the Bill as it stands. Surely it is not intended to last for seven years after the death of the oldest surviving partner.

In the proposed Bill of last year it was the intention of the promoters, in the case of photographs, that the copyright should exist for fifty years from the date of publication and not be dependent, as it now is, upon the life of the person who holds the copyright of the negative, which will always prove a source of inconvenience, and may often lead to litigation. It will be seen that when the duration of the copyright is for a fixed period it meets the difficulty which now exists, and this is not altered by the proposed new Bill, where the authorship still appears to be a personal one, and the copyright may eventually become the property of a firm.

Again: as the new Bill is now framed it would appear that a photographer would be entitled to the copyright in the portraits of all his sitters. On this several of the daily papers have already expressed very strong adverse opinions, one or two of which will be found in the current number; but the wording of the Bill, as it at present stands, is so very ambiguous it is difficult to arrive at what is the correct meaning. So far as we can at present see there is nothing, should the Bill pass, to make the Act retrospective; hence, the copyright in all photographs which have been taken by operators and registered in the name of their employers will be lost. This is certainly an oversight, as the registration of thousands of photographs has been effected under the belief that it was in conformity with the law. It happens most unfortunately that it has been found necessary to introduce the Bill at so late a period of the session, as it is rarely that hurried legislation proves satisfactory. All we can now say is, of course, speculation, for it is quite possible by the time these lines appear in print that the Bill will have been introduced, discussed, perhaps considerably altered, amended, or even become law, or (what is quite as probable) rejected.

We note that the names of Mr. M'Laren and Mr. Lewis, the gentlemen who have taken the matter in hand, are not amongst

those who were the promoters of the Bill introduced last year. This is to be regretted, as the matter of copyright generally then received a very long and careful consideration. We have before expressed the opinion that the proposed Bill of last year, slightly amended, would be a very effective and valuable measure to photographers as a body; and we should, therefore, liked to have seen some, at least, of those gentlemen associated with the Bill now before Parliament.

ON THE USE OF GAS.

Last week we dealt with the use of gas for heating apartments, its employment for dark-rooms, studios, waiting-rooms, &c., having been many times strongly recommended, though, as we then said, a great number of those who had tried it had given up its use. For such purposes, however, as boiling liquids, reducing residues, enamelling, and so forth the gas furnace in one form or another might almost be termed a necessity, were it not that some unfortunate photographers are situated where no cheerful gas-flame can ever be seen.

It is our purpose to lightly touch upon the most useful kind of gas heaters, and to give a few practical hints as to their use. We may at the outset correct one very common misconception upon the burning of gas that still exists after repeated explanations have been made. We refer to the use of gas mixed with air, which is almost universally believed to produce more heat than when burnt from an ordinary bat's-wing or fish-tail burner; there is, however, no such difference of effect; gas burnt with a suitable draught and under due pressure gives off just the same amount of heat in whichever way it is burnt. The only reason for the use of a mixed gas is the ensuring of a due admixture of air under all conditions and with all distances between flame and object—smoke being produced, carbon deposited, and heat lost where unmixed gas is burnt in a confined space or in too close proximity to the solid body.

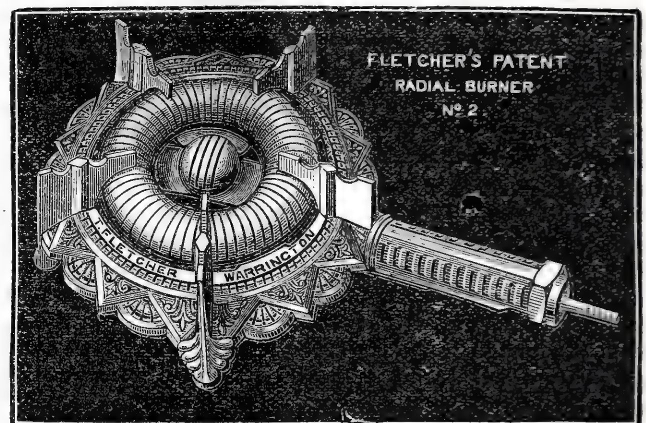
The conditions under which gas is employed for heating vessels being usually so conducive to the production of this soot with an ordinary gas-flame the mixed gas burner is in almost universal use; but we must inform our readers unversed in the subject that if they possess any such old-fashioned kind of burner there is, if it answer their purpose, no need to reject it for a new pattern.

The most common form of mixed burner is the well-known "Bunsen," which, in its simplest form, is merely a jet of gas issuing into a wide tube through a small jet pointing directly along its diameter, the wide tube being pierced with holes, just on a level with the jet the rushing gas from which sucks in the air, as it were, and delivers the mixture of gas and air at its mouth, where it is ignited. The whole forms, with the addition of a foot, a portable burner, which, attached to a piece of rubber tubing, is one of the most handy pieces of apparatus a photographer can have who does the slightest amount of what we might term "laboratory work." The proper mode of employing it being also by no means well-known, something more than a passing allusion will be useful. The form of Bunsen that should be purchased is that having a loose ring fitting round the holes in the base and pierced with apertures to correspond—the use of this simple contrivance, which increases the value of the burner tenfold, being to regulate the indraught of air. When it is wished to keep a very feeble light burning it is necessary to stop the air-holes almost entirely; for if the air come in too freely it will cause the flame to run down the burner and ignite the gas at the small jet, which causes a very disagreeable smell and produces a densely-smoky and almost heatless flame. It is a want of knowledge of this fact, or of application of knowledge, that so frequently has led to accident with other forms of heating apparatus constructed on the same principle.

Even the mixture issuing from a Bunsen would seem to require more air while burning; for if the flask or other vessel be made to approach too closely it will cause the production of a most penetrating and disagreeable smell. The same smell is perceived with larger burners of a similar class, but its cause is rarely alluded to—the too close proximity to the flame of the object to be heated.

When large vessels, such, for instance, as those required to boil down baths, have to be heated, or hot water is required for toning purposes, or, indeed, any of the thousand-and-one purposes where it is essential to the photographer, a larger burner than a Bunsen is required, and to meet the want an immense variety of forms have been devised—some very good and some very bad. For efficiency, cheapness, compactness, and durability, combined with ease of cleaning and value obtainable from the gas, the later forms of burners invented by Mr. Fletcher are likely to supersede all other forms. He causes the mixed gas (the mixture being ingeniously brought about) to issue, not from a gauze or perforated plate, but from a series of slits cut in what looks like a wide tube bent into a circle, and fitted with feet to stand on and supports to hold the vessel to be heated. These burners, which the inventor terms "Radial," and which are made in several sizes, are so far in advance of anything else of the kind hitherto manufactured, that we make no invidious distinction in recommending them.

One great advantage they possess is the readiness with which they can be cleaned in case of a "spill," which, with even the greatest care, must happen at times. We ourselves have been in laboratories in which gauze or perforated metal tops have been used for mixed air furnaces when more than half the surface was rusted or otherwise plugged and its power to that extent crippled, to the waste of gas and the production of disagreeable odours—a most important thing to avoid in a studio, as we need scarcely observe. We here give an illustration of the radial burner, so that our readers can to



some extent form their own opinion of, at anyrate, the latter qualities we have described.

In using this—or any other gas heater, in fact—it is very useful to have a tap which can be easily turned or turned down to any desired point. The same maker supplies such a tap, which works along a quadrant that can be marked at the desired point for any special purpose without any trouble of adjusting after the first trial. It is one of those contrivances which, like the pneumatic shutter, only requires to be seen to be at once appreciated.

In our next we shall have something to say about furnaces and gas supply and attachments.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XVII.—Concerning the Shape of the Aperture in the Diaphragm.

A popular fallacy existed at one time in a greater degree of strength than at present to the effect that the shape of the aperture in the diaphragm should bear a certain relation to the general form of the principal subject in the photograph. For example: a vertical slit instead of a round hole was believed to be the correct form when the subject was tall, such as a church spire or other similar vertically-elongated subject.

In the case of portraiture an aperture somewhat like a keyhole has been proposed as that best adapted for this class of subject, while for landscapes some virtue is still by some imagined to be imparted to the illumination of the image if the aperture be wide

at the base and tapered off to a fine point at the top, the imagined advantage consisting in a greater volume of light being permitted to reach the foreground than that by which the sky is produced.

The best shape of aperture is circular, and the next best such a degree of departure from the circular form as shall most nearly confine the transmitted rays to a condensed bundle. This embraces a circle formed of several movable sides, by the motion of which, regulated by a volute, the aperture in the stop may be expanded or contracted to a large extent, while a sufficient approximation to the circular form is still maintained. Next to this comes a square, which by the motion of two plates in opposite directions—as first shown by the late Mr. M. Noton—is also applicable to an easy formation of an expanding and contracting aperture. The worst forms of all are those whimsical ones shaped sometimes like a bottle, sometimes like a pyramid erected on a circle, and, worse than all, like a slot.

It is not difficult to give a reason for such condemnation. Take the case of a sky and foreground as an example. For such a subject an aperture of an exceedingly-tall pyramidal shape has been recommended as possessing advantages over others. This recommendation has been made by individuals who are not considered mere "nobodies" in photography, otherwise it might be allowed to pass without reference; but it is worthy of notice that the recommendation has not been backed up by a single argument of a scientific nature. They imagine it *ought* to be so, and think that it really *is* so; and there the demonstration ends. Let us see in what manner this wedge-shape slot or aperture affects the foreground as contrasted with the sky of the landscape.

In a previous chapter it has been shown that, in a landscape lens, the margin of the picture must be formed by the margin of the lens, the same conditions prevailing with the centre of the photograph. Any departure from this is attended by disadvantages, such as spherical aberration. In order that any photographer may satisfy himself that the shape of the diaphragm goes for nought in reducing the intensity of light upon the sky, it merely suffices that after placing the camera in position in front of a landscape he then removes the ground glass. Now, having placed his eye where the sky on the ground glass was, let him direct his vision towards the stop. This will demonstrate to the observer that he can see the whole of the aperture in the diaphragm. Let, now, the same thing be done from the position occupied by the sky, and precisely the same amount of aperture in the diaphragm is seen, showing that whimsicality in shape goes for nothing in regard to illuminating one portion of the picture more than another.

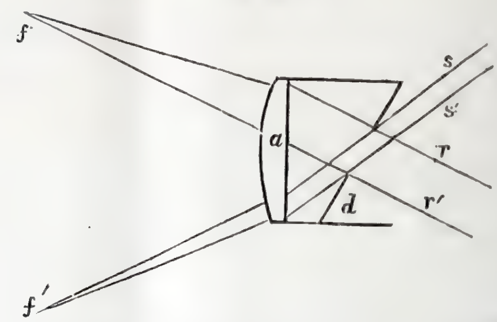
This applies also to the use of either a vertical or horizontal slit instead of a circular hole. If a set of parallel oblique rays fall upon the lens they do not all proceed in the same direction after transmission; but, according to the principles of spherical aberration, the focus of a pencil transmitted by that side of the lens farthest removed from the object whence the rays emanate will be much longer than those transmitted by the nearer margin of the lens. Hence a *slit* aperture will give confusion; but if a round aperture be substituted all such confusion will cease to exist.

Chapter XVIII.—Equalising the Illumination of Subjects—Skies and Foregrounds.

It is not only possible but quite easy to arrange a stop so that it will admit a much larger volume of light to the foreground of a landscape image than to the sky. Not only so, but if one side of a subject were in deep shadow or of a dark colour—such as a dense mass of trees on one side placed in contrast with a sunny, well-lighted object on the other—it is comparatively easy so to arrange matters as that one side will receive a more intense pencil of light than the other.

Much ingenuity has of late been displayed in the construction of shutters which, in falling, will permit of a longer exposure being given to the foreground than to the sky. But this can be obtained equally well by means of a shutter of the ordinary class, or by a prolonged exposure, provided the diaphragm be placed oblique to the axis of the lens. In demonstration of this we refer to *fig.* 26, in which a represents a lens of any form; d is a diaphragm placed at a slope instead of the right angle at which it is usually fixed. In this position it is directed downwards towards the foreground or less-lighted portion of the subject, the consequence of this being that the large volume of light bounded by the lines r, r', and

FIG. 26.



which comes from the foreground, exceeds by many degrees that coming from the sky shown at s, s'; and these arrive at their respective foci $f f'$, the one in a state of great attenuation in comparison with the other.

The principle of the oblique stop is the same whether it be applied to a single landscape lens, as in the figure, or to a combination. But we have found opticians very reluctant to adapt this oblique system to any lens. The usual working appliances, we were told, did not embrace the easy or effective cutting of a slot obliquely in the mount. To describe the several mechanical expedients we found it advantageous to adopt in having stops so arranged as to be capable of standing at any desired angle would be rather out of place in this chapter, especially as the mere indication of the remedy for under-exposed foregrounds is all that is here required.

A system which we adopted a few years ago, with exceedingly satisfactory results, consists in placing at a little distance in front of the diaphragm a small piece of blackened brass of a V shape, base upwards. One or two trials will suffice to determine its best position. This fulfils the following conditions:—It gives a proportionately-greater illumination to the foreground than to the sky, and, while it diminishes to any required extent the intensity of the light which falls upon the centre of the plate, it gives a great increase to that by which the sides are illuminated. Added to these, it costs nothing, and can be applied by any photographer to his lens without any disfigurement of, or tampering with, the brasswork; for the whole appliance can easily be made and fixed in a couple of minutes by means of a pair of scissors, a bit of stiff black paper, and a little mucilage. When making our original experiments with this device we actually succeeded in turning the tables so that the foreground was far better illuminated than the sky, and the margins much more so than the centre, a wide angle of subject being included.

The unequal illumination of a negative, especially one of wide angle, is due to two causes. The centre receives a more intense impact of light than the sides on account of the pencil of light transmitted to it being both larger and having a shorter distance to travel from the lens to the sensitive surface. Not so with the margins; for the stop with its circular aperture being placed obliquely as regards the margin the aperture is not then circular, but oval—a matter easily verified by looking through a stop, first directly, and then when turned in an oblique direction. This renders the oblique light less to begin with; but this attenuated light has also got much farther to travel than the stronger central bundle, and hence the marginal weakness.

In the case of ordinary angles of view this difference is so little as not to merit much attention; but this is not so in the case of highly oblique incidences. To equalise the light by means of the stop in his panoramic camera the late Mr. Thomas Sutton devised a little adjunct of great ingenuity. It was a stop which, no matter whether held at right angles and looked at directly or at a very oblique angle, always presented a perfectly-circular aperture. This was effected by two thin, little wings of brass screwed upon the stop in such a manner as to effect the equalisation required.

We close this chapter by alluding to one other method suggested (by Mr. R. H. Bow, C.E.) for causing the lens itself to be the equalising medium. It consists in having the crown- or plate-glass element of the lens of a delicate green colour, by which the thick centre will stop more actinic rays than the thin margin, the other portions of the lens acting in an intermediate degree.

The International Photographic Exhibition, now open at Brussels, is one of the most thoroughly representative collections of photographs and photographic appliances that probably the world has seen. The Belgian Photographic Association is certainly to be congratulated upon the results of their labours; and, having secured the patronage as well as the actual presence of Royalty, there can be little doubt as to the success of the venture financially. On the occasion of the King's visit, on Friday last, he evinced much interest in many technical matters, entering into conversation with several members of the jury who were presented to him, amongst the number being Captain Abney and M. Leon Warnerke, who represented England.

While on the subject of exhibitions we may call the attention of our readers to Mr. Brooks's letter in another column in connection with the forthcoming exhibition of the Royal Cornwall Polytechnic Society. We have also an intimation from the Secretary of the Photographic Society of Ireland, that an exhibition will be held in Dublin in February next, particulars of which will be announced in due course.

We are happy to inform our readers that "A Process Wanted" has been found at last. In *The Times* of Wednesday last we read, in an "inspired" article on the monument to be unveiled at Cormeilles on Sunday next in honour of Daguerre, that "nitrate of silver has been discarded as the medium in favour of gun cotton and ether and uranium." We hope that the eloquent writer of this article will favour us with a formula, as from the tone of the whole, as well as the source from whence it comes, it is clearly impossible to imagine that there is any error. The article will be found in another page.

Some time ago attention was drawn to a peculiarity observable in emulsion produced when a certain earthenware vessel was used to contain it, at one stage of the operation, and we are reminded of the circumstance by the account of a phenomenon which, if it do not explain the effect produced, at anyrate suggests a possible cause for the decomposition of some easily-decomposable liquids, such as solution of gelatine, &c., through the existence of conditions that would not ordinarily be taken into consideration. At a sitting of the Paris Academy of Sciences, on the 15th instant, M. Perusson drew the attention of the members to the use, in chemical operations, of vessels glazed with lead, which, as he stated, was liable to be partly dissolved by the action of weak acids—so weak an acid as that, for instance, produced by milk turning sour having been found, in one experiment, capable of dissolving ·22 per cent. of lead salt. Borate of lime was suggested as a glaze in place of lead. The same experimenter had observed that some substances became acid more or less quickly according to the kind of vessel they were kept in, a glass jar being stated to preserve certain solutions many times more quickly than earthenware. The cause of this greater liability to decomposition was stated, on the strength of M. Perusson's experiments, to be the germs floating in the air being arrested in the pores or minute fissures in the surface of the earthenware. This seems a most reasonable supposition; hence we may advise that all earthenware utensils, before being used for containing decomposable liquids, should be first scalded with boiling water.

An easy method of determining the purity of iodide of potassium has been founded on a beautiful reaction between that substance and the bichloride of mercury. When pure, 332 parts of the iodide dissolves to a colourless solution 135·5 parts of the scarlet iodide of mercury. Absolute purity not being expected, a remedy of five per cent. is allowed. The method is as follows:—Weigh out exactly one gramme of the sample and dissolve it in thirty c. c. of water. These proportions correspond to 33·20 per litre. Measure with a drop measure twenty drops of this solution into a glass. Add to this liquid, with a drop measure like the former, a solution containing 13·55 grammes of mercuric chloride per litre, until a coloration appears. If the iodide be chemically pure twenty drops will be needed. If it contain five or ten per cent. of impurities, nineteen or eighteen drops will be respectively required.

A correspondent of *Nature* describes a curious phenomenon which he and the members of the party he was travelling with noticed while walking on a hill side. We do not doubt that, had the effect been photographed, many persons would have been puzzled to account for it on any simple grounds:—"Each member of our little company cast a double shadow on the upward slope of the hill—first, the usual, complete, well-defined shadow cast in clear sunshine; and, second, a longer, fainter shadow of the upper part of the figure, extending for some distance in the same line beyond the first." The explanation was as simple as convincing. The second shadow was caused by the sun's rays reflected from the loch beneath, and the phenomenon could only be produced in a very circumscribed area.

Silver is generally looked upon as a particularly white metal, but Professor Langley, when making his researches on the selective absorption of solar energy, found that where two pieces of polished silver were placed a short distance apart, and a ray of light sent through them so as strike backwards and forwards between the two plates a dozen times, the issuing beam contained ·03 only of the violet end of the spectrum, but 45 of the red end. This experiment can be easily repeated by anyone with a couple of pieces of silvered plate glass three inches long.

The new parcels post is beginning to be "understanded of the people," and ere long its invaluable services will be utilised by the photographer. Our readers are doubtless aware of the conditions of despatch, and already the philosophers have been reckoning up the dimensions in a variety of modes, one well-known *savant* having estimated by the "differential calculus" the proportions that, without contravening the regulations, will allow the greatest cubical capacity. The following details will be useful to many, and are well worth preserving:—The largest parcel of any shape that can be sent by post is in the form of a cylinder or roller 2 feet long and 4 feet in circumference; its content is over $2\frac{1}{2}$ cubic feet. The largest globe that can be sent is $17\frac{1}{4}$ inches in diameter; its content is not quite $1\frac{5}{8}$ cubic foot. The largest cube that can be sent has each edge $14\frac{2}{3}$ inches long; its content is nearly $1\frac{3}{4}$ cubic foot. The largest rectangular box that can be sent is 2 feet long, 1 foot wide, and 1 foot deep; its content is 2 cubic feet. If a parcel be of uniform thickness throughout, and its transverse section is any regular polygon, it will be most capacious when the length is exactly 2 feet and the girth 4 feet.

THE RECENT ECLIPSE.

In my previous communications to this Journal I have dwelt almost exclusively upon the travels and adventures of the English observers, devoting very little space to the subject they went to investigate. I now propose to put before your readers, in as popular a manner as I can, a concise account of our results.

Eclipses of the sun, as probably everybody is aware, are caused by the moon passing between the earth and the sun. Now there are three kinds of eclipses of the sun, viz., the partial, the annular, and the total. In the partial, only a portion of the sun is hidden from our view; it is produced by the moon passing above or below the line joining the centres of the earth and sun. The other two kinds are caused by the fact that the moon does not revolve round the earth in a circular, but in an elliptic, path, the world occupying one of the foci. The result is that our satellite is nearer to us at perihelion than at aphelion; and, as things that vary in distance appear to vary in size, at certain periods she seems larger than at others. If at aphelion she passes between us and the sun we have what is known as an "annular eclipse;" that

is, at mid eclipse the dark moon is for a few seconds over the centre of the sun, and is surrounded by a brilliant ring of sunlight. Such an eclipse takes place this autumn, and is visible in the western part of the United States. The total eclipse, however, is produced when the moon is closer to us and apparently larger in size; and the nearer the moon is to her perihelion position the longer will be the eclipse, and the greater will be the amount of sun covered at totality.

The ancients found out by their observations that eclipses are repeated about every eighteen years, and were, therefore, able to predict their occurrence. The exact period between the repetition of the same eclipse is nearly eighteen years and ten days, it was called the "Saros" by the Chaldeans.

The greatest possible time the sun can be hidden by the moon is seven minutes fifty-eight seconds at the equator. Eclipses of this duration occur but seldom; so we were exceptionally fortunate in obtaining a site for our telescopes off the central track, where the totality phase lasted for five minutes and twenty-five seconds.

Thus far for the cause of the eclipse. Now what are the phenomena we observe near totality? While the sun is being hidden from our sight a weird colouring sometimes lights up the atmosphere. Some observers have recorded a yellowish light appearing. In Egypt I saw everything in a practically monochromatic-violet light; while this year the illumination up to totality was almost natural. The instant the sun is totally hidden a most wondrous sight appears: the moon hangs, jet black, in a beautiful glory almost of a pearly hue, with curved or straight streamers coming from it. This appearance is known as the corona. It is not, however, the only object noticeable; for, in the year 1706, Captain Stannyan observed a blood-red streak of light close to the moon's limb just before the end of totality. This observation was confirmed by Halley and Louville in 1715. In the year 1733 Vassenius, a Swedish astronomer, noticed some pinkish clouds floating in what he considered was the lunar atmosphere. In the year 1842 an eclipse took place in the south of Europe which was most carefully observed, and these pinkish bodies—or solar protuberances, as they were then called—were again observed, and gave rise to an animated discussion. Some thought that they were solar flames, others favoured Stannyan's hypothesis; some referred them to the moon, and a few thought that they might be solar mountains. The next eclipse—that of 1851—satisfied many that these prominences were truly solar; but the question was not definitely settled until 1860, when photography removed all doubts as to their solar origin by showing them gradually covered on one side and uncovered on the other side of the sun by the progress of the moon.

Thus, by the year 1860, it was known that the solar atmosphere consisted of the corona and the prominences; still nothing was known of its composition. Eight years later there was another total eclipse visible in India, which was observed by many European astronomers, who were provided with a new instrument—the spectroscope. The result of their observations was this: that the prominences were masses of highly-heated gaseous matter, and that the chief constituent was hydrogen.

Dr. Janssen, who was one of the observers, was so struck by the brilliancy of the lines he saw during totality that he was certain they ought to be visible in the uneclipsed sun; so he straightway invented a new form of apparatus, and was able next morning to see the prominences and confirm the observations he made the previous day. Two years previously Mr. Lockyer (and Dr. Huggins independently) had conceived the idea that if the prominences were gaseous, and gave a bright line spectrum (I must assume that my readers know something about spectroscopy, otherwise this article would be interminable), these bright lines ought to be visible on the edge of the sun, and tried the experiment. His instrument, unfortunately, was not powerful enough, so he had another constructed. This was not delivered to him till 1868, when, before he had heard of Janssen's results, he saw a prominence and observed its bright lines. He at once wrote a letter to the Academy of Sciences in Paris, and, by a curious coincidence, his letter and that of Janssen were read at the same meeting within a few minutes of one another. Of course this new discovery was energetically taken up by astronomers, and very soon maps of the prominences were made daily by German and Italian observers.

At subsequent eclipses some observers asserted that they saw all the dark lines brightened, while others only saw a few lines; and, as a knowledge of this outer atmosphere is necessary before we can understand the constitution of the sun, it was needful to try to settle to which of the dark lines the bright ones belonged, and to note their order of appearance.

Before going further I must, to make myself understood, refer briefly to the theories of the constitution of the sun. I will not stop to discuss the early theories—such, for instance, as the one that the sun was a cool habitable globe with a luminous atmosphere—but pass at once to the great discovery of Kirchoff's that many of the dark lines in the solar spectrum coincided with bright lines in the spectra of metals vaporised by some suitable method—as, for instance, the electric arc. This coincidence was so close that Kirchoff enunciated the hypothesis that the sun is composed of the terrestrial elements in a state of vapour. Mr. Lockyer, some years ago, compared the solar and metallic spectra by photographing them on the same plate, and very soon found that lines, which were not due to impurities of the metals in one another, were common to several metals. He then suggested that, possibly, the metals were dissociated into other more simple bodies at the temperature of the sun's atmosphere. This theory has met with great opposition; but a fact which seems to lend great support to it is that the spectra of nearly all bodies vary with changes of temperature. The two theories brought forward in opposition to it are—first, that the luminous substance, without undergoing change in its constitution, vibrates differently and emits different rays under varying conditions, just as a violin string does according to the fingering; and, secondly, that the substance assumes allotropic forms, just as sulphur can be made to modify its physical appearance without undergoing any chemical change. There is another fact that seems to testify to Mr. Lockyer's theory, and that is the changes which go on in the spectra of sun spots and prominences. This question, however, is too large to be dealt with in this article.

From a study of the change in the spots and prominences, Mr. Lockyer came to the conclusion that three lines in the blue part of the spectrum would not behave alike in the sun's atmosphere. We knew, before starting for Egypt, that there would be a difference, but were scarcely prepared for the splendid confirmatory result he obtained. He had concluded that one of these lines—for they were all iron lines—was a higher temperature line than the other two, because it was seen in prominences which are ejections from the interior of the sun, while the other two were probably generated at a lower temperature, as they were frequently affected in sun spots, which are produced by the descent of comparatively cool currents. Although photography was not actually employed in this observation, yet its aid was obtained; for there was this difficulty to be dealt with: as soon as the sun was hidden we lost our standard Fraunhoferic lines, and it was necessary to have some scale to enable us to keep our place. Accordingly, little cameras were fitted into the eyepieces of the spectroscopes and photographs taken. The plate was then cleaned so that only a narrow strip of the spectrum was left on the plate, and the lines on it were then adjusted on the Fraunhoferic lines.

The result of the observation was that Mr. Lockyer saw the hot line some minutes before totality, and then when the sun was just hidden he saw the other two appear and extend to a much greater height into the cooler atmosphere.

Dr. Schuster had a prismatic camera turned on the sun during the totality, and obtained some very good pictures of the prominence spectrum, the H and K lines being especially prominent.

Professor Tacchini noticed that during totality the prominences were much higher than they were when measured by the process for observing them under ordinary conditions. This, of course, is quite natural, as, the glare being removed, we can see less brilliant objects.

So far for the observations of 1882. This year it was our wish to repeat, if possible, by photographic methods the observations of last year, because we should by that means be able to observe a great many lines instead of a few. This operation had never before been attempted, so it was quite an experiment. The first novelty was the backs; they were made so that only a portion of the plate would be exposed at a time, and also so that a slow motion could be communicated to the plate while it was exposing.

The instruments for dealing with the chromosphere and metallic lines were the prismatic camera we had in Egypt and a Rutherfurd grating spectroscope, with a camera on each side—one taking the first and the other the second order spectrum—attached to a six-inch equatorial telescope, and another spectroscope with a flint prism and camera fitted to a six-inch photographic lens by Dallmeyer. To enable your readers to understand the work that had to be done I append the table of exposures which, however, had to be slightly modified.

This table wants perhaps a few words of explanation. The five instruments—the Hilger, the two Rowland grating cameras, the prismatic camera, and the slit spectroscope—were arranged side by

side in a little hut, into which the light was reflected by a siderostat fifteen feet away. This nest of instruments was looked after by Mr. Woods. The next three instruments were all mounted upon the equatorial telescope, and the last two, which were managed

The other observations of the flash and chromosphere were made by Messrs. Rockwell, Upton, and Brown. Mr. Rockwell saw the magnesium lines just after totality; he was using an analysing spectroscope. Mr. Brown observed the hydrogen, the helium, and

SIDEROSTAT.						EQUATORIAL.			PHOTO-HELIOGRAPHS.	
		Rowland grating—				Grating.				
Time.	Hilger.	1st order.	2nd order.	Prismatic camera.	Slit Spectroscope, 2 prism.	F. Blue 1st order.	F. Blue 2nd order.	Dense prism F.	Large photo-helio-graph.	Corona Camera.
Before Totality										
Minutes										
10						expose	expose			
9										
8								expose		
7								expose		
6	ref. spectrum 30 secs.							expose		
5								expose		
4								expose		
3						expose	expose	expose		
2								expose		
Seconds.										
60								expose		
40		expose	expose			run ¼ in.				
20		expose	expose							
2	expose and start clock									
1										
Totality		expose	expose	expose col. plate	expose	expose	expose	expose	expose	expose 1 sec.
280										expose 20 sec.
230				shut						
220				expose gel. plate						expose
210								expose	expose	
200		expose	expose							
120				shut						
110				expose col. plate						
100										
90										shut
70										expose 3 sec.
50									expose	
40										expose 10 sec.
20										expose 2 sec.
Just before end		expose	expose	shut	shut	expose	expose	expose	shut	
After Totality										
Seconds										
1						run ¼ in.				
4		expose	expose							
10		expose	expose							
Minutes										
1		shut	shut			expose	expose	expose		
2	shut									
3								expose		
5						expose	expose	expose		
7								expose		
9								expose		
10						shut	shut	shut		
	refs. 25				2 sec.	10 sec.	10 sec.	1 sec.	run	run

by Lieutenant Qualtrough and Seaman-Gunner Yewell of the American Navy, were upon an equatorial stand made by Dallmeyer. Mr. Fletcher, another American officer, called out the minutes and seconds from ten minutes before till ten minutes after totality, and his calling a number was equivalent to his giving us the order to expose or close. The order "run quarter-inch," in the seventh column, meant that the plate was to be moved slowly through a quarter of an inch in order that a new portion of the plate should be constantly exposed, so that if the lines appeared gradually, as in Mr. Lockyer's 1882 observation, they might be picked up.

The prismatic camera gave fairly good results, but the photographs do not contain as much as they did last year. There are probably three reasons for this :—First, that higher dispersion was employed; second, that the light was reflected into the instrument instead of its being turned direct to the sun; and, lastly (but by far the most important), there was at the time of the eclipse a great diminution of solar activity.

With the Rutherfurd grating and dense prism spectroscope the brightest lines of the flash were caught; but, as the activity was practically *nil*, the chromosphere did not contain metallic vapours.

1,474 lines; and Mr. Upton, with a prismatic telescope, observed the flash, but could not, I believe, identify the lines that appeared.

H. A. Lawrance, F.C.S.

(To be continued.)

SPHERICAL (AND OTHER) ABERRATION.

I notice in an article by Mr. W. K. Burton on *Spherical Aberration* an allusion to a discussion which I had supposed to be finished, and to the part I had taken in it, expressed in terms which I am obliged to ask permission to reply to.

In general, men who are engaged in discussions on scientific subjects have no occasion for personal misrepresentation or discourteous language; and Mr. Burton in saying that I "violently" replied to any question accuses me of violating the proprieties of discussion. Though I notice in his article, in which this criticism is contained, such language—employed in reference to another correspondent's remarks—as that "they all seemed to indicate such hopeless confusion of mind that it seemed useless to criticise them." I suppose that

those who carry beams of that size in their eye would scarcely have been able to see the small stick (if it existed, which I do not accept) in mine. I will not retort in a manner which would encourage the habit I deprecate. If I wrote "violently" I violated either the truth or good manners. If the former, Mr. Burton should make a better case against me than he does; if the latter, my bad manners would be better reproved by one whose manner of discussion was more amenable. As I recall the discussion (not having my back Journals to refer to) I do not remember anything which was ill-mannered; and if there were such it was the office of the Editors to suppress or rebuke it, not of Mr. Burton.

The Editors had said that it was the best practice to focus with the aperture one wishes to expose with, or near it. I replied to this by saying that such a rule was contrary to theory and to practice so far as my personal experience is concerned. Mr. Burton says that I gave no reason for my denial except my personal experience. What more could any man give than I did? I repeat still, more explicitly, my opinion that the focus of a lens depends absolutely on the measure of refraction of the light passing through it, and this quantity depends absolutely on the distance from some point in the lens at which two rays coming from a given distance intersect each other and form a common point. That distance I hold does not vary in the least with the size of the aperture, or if it does in any particular lens it is owing to a fault of construction, and that the due corrections demanded by the theory have not been properly made. "The fault, however, is with the theory," says Mr. Burton. I had always understood in my scientific studies that the theory was absolute (if a sound one), and that our realisation of its conditions generally fails. It has never occurred to me before to find a practice more perfect than theory, and this proves an advance in mechanical conditions which is certainly encouraging.

Since, therefore, practice is more correct than theory, we may drop the latter out of the discussion. As to the former, that sound experimenter, Mr. Henderson, found that I had stated what agreed with his own experience. One of the most careful and capable continental photographers I know tried a series of precise experiments and found that most of his lenses agreed with mine. Mr. Debenham, "on the whole," sided with me. "*On the whole*" is very well, "Mr. Debenham's conclusion being that in a well-made lens there is no alteration of the focal length by the insertion of a stop," which is *precisely* what I maintained.

I don't undertake to say whose lenses are constructed on the least defective theory, but I have used many of them in a pursuit of photography during a period of over twenty years, and of all I have used I find those of Ross and Co. maintain what I suppose to be this theory with the most rigorous exactitude. I have seven of them (and have just parted with the eighth), and they all agree in supporting my contention. I have been this summer photographing with an English amateur who uses a Dallmeyer rapid rectilinear, and he agrees with me, and was rather amused by the opposite practice. Mr. Debenham's conclusion seems to me to indicate that though "in a well-made lens there is no alteration of focal length by the insertion of a stop," there is still the fact that "the various cemented lenses to which the title (aplanatic) has been given are none of them really aplanatic," which leaves open a loophole of return to the unfortunate *theory* left out in the cold.

I shall not attempt to follow Mr. Burton through his explanation of how that which ought not to be is, or the contrary, as he will have it, but beg to put the thing in a practical nutshell. I want to get as sharp an image in my photograph as is possible. I prefer the sharpest detail attainable throughout. I do not try the complicated experiment which Mr. Burton relates, as it seems to me a singular way of getting at an exact focus "by racking the lens first before and then behind the point which gave maximum sharpness, and then dividing by two the space travelled over in so doing as accurately as might be." If it were not for being accused of bad manners I would say that it was, from the practical point, a bungling way to find an exact point to get one foot each side of it and then measure for the middle, when one can get the exact point and may have it to measure from. Theory may demand this roundabout way of getting at it, but theory is put out of doors (it won't do her any harm if the weather be as hot as it is here). I focus on some object well into the distance which gives the sharpest detail to be seen. I do this with full aperture of my lens, because having a brilliant image I find the focus more readily, and because with a full opening the slightest change of focus is more evident in its effect on the screen. *This* practice will show anyone in a very few trials; and I suppose poor theory, if she were allowed in, would say that was agreeably to her. I then stop down generally very small. I have never found a change in the focus of the image focussed on. How is it? Mr. Burton is kind enough to give me the explanation:—"Suppose we focus for such an object with full aperture. Now let us insert a stop. *That object will probably be made somewhat sharper than it was* [*I* don't see how, for I made it as sharp as possible]; but an object farther away than it will be still more sharp, and the amount of want of definition in the foreground and the distance will not be equal as before [I am afraid there is a little dust in the distance, but it's probably all right]. The distance will now be more sharp than the foreground [which is quite possible, and I never said the contrary]. Nevertheless, the latter may be sharper than it was with full aperture" [certainly will be].

This is the solution of the problem *in practice*. I focus on a given object, which, as a rule, ought to be the most important object in the picture, using a strong focussing-glass, and making the definition as *sharp as possible*. I "focus for such an object with full aperture." Then I insert a stop. "That object will probably be made somewhat sharper than it was, but an object farther away will be still more sharp;" that is, as I gave the maximum of sharpness my eye and focussing-glass were capable of helping me to, the object I focussed on will be still sharper (maximum +) and something else sharper even than that. Hooray for practice!—even such sharp practice as that! But I never claimed half so much. I said only that if a lens were focussed on a given object with full aperture and then stopped down that object would not be thrown out of focus. Now, was it the manner or the matter that I was violent in? It appears, by Mr. Burton's own admission, that I was right in my practical conclusion; and if, when theory and practice disagree, theory is to be put out of court, theoretical conclusions have no value, and everybody may focus with the full aperture of his lens and not fear the consequences, for whatever was sharp in focus will be still sharper. And the only other conclusion is that my letter was an ill-mannered one, for which I beg the Editors' pardon.

Cutigliano, Pistoja, Apennines, August 13. W. J. Stillman.

INTENSIFICATION OF GELATINE PLATES.

The greatest drawback to gelatine plates has been the want of a proper intensifier after fixing. Many negatives are perfect in every respect except for the want of a little more density to bring them up to proper printing quality. Several methods of mercurial intensification have been put forward; but to no purpose, as the negative changes by light more or less. I myself have never liked mercury in any form, for the reason that when I attempt to alter a negative I never know how much or how little intensity I shall get after its application; and, again, there is always more or less clogging or blocking up of the fine detail, with the result, in nine cases out of ten, of absolute ruin to the negative. I have no doubt that many thousands of negatives have been sacrificed in this way.

I think photographers, both amateur and professional, by practice are more certain than formerly in the early days of the gelatine process in getting their negatives somewhere near the mark as to density. I can now judge pretty well, but at times one is apt to be a little out in judgment and fall a little short; and for the want of a ready and reliable system of intensification many stick fast. I have made innumerable experiments in this direction, and I was certain that the result must be gained by redevelopment with silver after fixing, as with a wet plate. It is now about six months since I set to work in earnest to find out some method that I could recommend without any drawback, and I now believe that I have accomplished it.

It is a well-known fact that to develope a gelatine plate with alkaline pyro. the developer must be much more powerful than we dare use to develope a collodion emulsion plate. In my own work I use a much stronger developer than that usually recommended. I generally use as much as ten minims of liquor ammonia in my developer, well restrained with bromide of ammonium; and, by being able to use such a powerful developer, it occurred to me that, to gain the desired end, we must work in the same direction as regards an intensifier, and I found my surmises correct.

Some years since I tried other fixing or clearing agents than hyposulphite of soda, as when this salt was used it was a risk to use silver and pyro. afterwards. I have employed cyanide of potassium with success at times, but I found the films were not alwaps in the proper condition. At one time I also used sulphocyanide of ammonium. This, too, had certain drawbacks, and it required a great deal of washing to get rid of it; but there was a slight gain over hyposulphite of soda, as the film did not stain nearly so much on the application of pyro. and silver. But with all this it was very slow work, and something was always wanting.

I never found the preliminary wash of iodine was of much advantage to a gelatine plate; it worked well for wet plates, but not so well for gelatine.

There is another defect that is very vexatious in gelatine plates; that is, some of the plates, especially the larger sizes, have a thin end to them, sometimes owing to the glass not being perfectly flat. With the intensifier that I am about to propose I find it very easy to get local intensity on such parts in just the same way as we used to do with wet plates, namely, by pouring the developer on and off the place that may require it. I am also able to intensify a mere ghost of an image to good printing density with but very little trouble, providing the shadows are free from deposit and quite clear. The slightest veil in these parts comes up with the image, and a favourable result is not obtained. If the shadows are only slightly veiled, allowing them to remain in the hyposulphite solution for half-an-hour may clean them; if not, recourse must be had to other reagents, such as perchloride of iron followed by hypo. Care, however, must be taken that its action is even.

Before attempting to intensify the negative all traces of hyposulphite of soda must be eliminated, and there is nothing better for the purpose than the alum and citric acid solution. I make a stock solution, consisting of a saturated solution of common alum, with one ounce of citric acid dissolved in every ten ounces. After the negative has been *well washed* place it in a dilute solution of the above (one part to four of water) and allow it to remain for about a-quarter of an hour; then place in a developing measure (supposing a half-plate is being operated upon) about two drachms of the stock alum and citric acid solution, and add to it about two or three grains of dry pyrogallic acid. Give it a shake round to dissolve; then drop in three or four drops of a twenty-grain solution of nitrate of silver, and apply to the plate, holding the latter on a pneumatic holder and pouring off from alternate corners. If the film repel the solution, just run the finger or a brush kept (clean) for the purpose over the repellent portion of the film. This is very energetic, and the alum in the solution keeps back any trace of our enemy, hypo., that may be lurking about. I find it is not satisfactory to work in a dish when intensifying, as the back of the plate gets very cloudy, and sometimes as the solution gets brown it apparently discolours the film, but that all comes right afterwards. Silver is added according to the density required. When sufficient density is obtained, well wash and place for about five or ten minutes in the hypo. fixing bath; well wash again, and place in the dilute alum and citric solution. This will remove all colour, and if there were any greenish-yellowy look about the negative before intensification it will be found to have all disappeared, and the result is a negative in all respects equal to the finest wet plate.

Care must be taken not to work the alum and citric bath too much, so as to foul it with the hypo. I allude to the one used before intensification. I am sure if this be worked fairly it will be found perfect and certain in its action. I have never heard of this system being put forward before, and trust it will be as useful to others as it has been to myself. WM. BROOKS.

SOME REMARKS CONNECTED WITH THE ENLARGEMENT OF NEGATIVES.

So much has been written very recently on this particular branch of photography that it is rather late in the day to expect to contribute anything new; nevertheless, there are a few points upon which a little may be said which have not been very prominent in the discussion. This has been confined principally to the consideration of those defects in enlargements coming under the heads of "loss of sharpness" and "increase of granularity"—more than the majority of photographers would be inclined to allow for when they put their small negatives out.

Now, to begin with: very few gelatine negatives are free from downright coarseness, and are usually a long way behind wet-plate negatives in respect of fineness of deposit. It may be possible to produce a rapid plate for the market which is free from granularity that may be easily perceived by the unassisted eye; but whether we shall get such a desirable improvement in the commercial plate must be left for the future to show. At anyrate there is plenty of scope for experiment with a view to making so desirable an improvement. Till something further in this respect has been obtained delicacy of focussing avails but little, and what can be accomplished on clouded glass with the aid of a simple magnifier or the naked eye (if a good one) will suffice for all practical purposes. Let an object be sharply focussed on a ground glass, or other substitute placed in the dark slide to ensure perfect register, then make some negatives of it by the various wet and dry processes; now, examine them with an ordinary seed magnifier and note how the definition suffers. Each will have a grain, but that on the gelatine plate, if of the very rapid kind, will look as though it were made up of "macadam" in comparison with an albumen, collodio-chloride or simply-iodised wet collodion plate, or even with one developed with a medium strength of solution of iron. Its lumps, particles, or whatever one chooses to call them, are very large aggregates of molecules; so there is no finality on our side of visibility to further reduction in their size. The great point is to know how to split them up and still get the bromide of silver in its best condition for rapid decomposition by physical action.

I wonder what sort of a thing a microphotograph on gelatine would look like when magnified a few hundred times. Judging from some of the negatives when only amplified a few times I should suppose that it would require a considerable stretch of imagination to make out any picture at all, for the want of any approach to continuity.

The grain being more or less "pronounced" in the small originals it remains to show how it may be exaggerated or ameliorated in the enlarged negative. Its prominence may be increased by the presence of fog, which necessitates a short exposure and some forcing in the development of the copied negative. The same is required if the negatives are thin and poor, although free from fog. Formerly it used to be asserted that thinness was a most desirable quality in a negative intended for enlargement; and so it was and would be when direct solar work of large size in carbon or silver were the method of proceeding. Now, however, things having changed, in consequence of the greater number of large pictures being made from negatives of like size, that dictum needs modification.

A negative that will give a good silver print, rich and brilliant and full of detail, is the most suitable for amplification; and, should it be too dense in the lights to yield anything but whiteness on paper, provided its lights and shadows have gradations and details it may be got through, and give an enlarged negative far superior in point of density to the original and, therefore, in quality, to one produced from a thinner negative. A transparency in carbon of such a one will produce a negative rich in colour and bloom, because it will bear a full exposure and need no forcing in development.

It is always well to use carbon for dense negatives in particular; for in this substance there is no fear of any abnormal distribution of deposit, each part being preserved in its true relationship, whereas in any and all of the silver processes there is always a tendency for the deposit or action to be attracted to some parts at the expense of others, especially where small patches of light appear in larger ones of shadow.

There is also the defect of irradiation, simply due in the wet process, I believe, to the superior attraction of the well-exposed parts, whilst exhausting their own silver, in making use of the rich supplies present upon those which have not been so much influenced by light, the phenomenon being usually most marked where the difference is greatest. This, by intensifying the light and shadow at the margins in juxtaposition, constitutes a fault of rather a serious and troublesome nature. Its presence at once stamps the picture as a reproduction, and also adds much to the coarseness of the result.

Fog and discolouration in the shadows of gelatine plates is another cause of coarseness, but in an indirect way. Everyone who has had a little experience in the production of wet-plate transparencies is well acquainted with the fatal influence of fog to anything like richness of shadow. The same fault is shown in paper printing, but not so pronounced as in collodion. Its presence destroys vigour, and the light it transmits appears to affect the silver in such a manner that it is deprived of that peculiar property of easy intensification. Carbon work from such plates partakes of the same sickly character. This class of transparencies, when employed for enlarging purposes, must only receive a short exposure in as brilliant a light as possible, or there will be no contrast.

The development must be conducted with an organic and well-restrained solution, and plenty of time allowed. This proceeding of short exposure and long development with iron is anything but conducive to fineness of deposit, bloom, and freedom from irradiation; but, on the other hand, the particles—both those reproduced and those newly deposited—are exaggerated in size and strength from the fact that the utmost intensity must be obtained from each, and without the softening effect of a more prolonged exposure. The better proceeding with thin, large negatives is not to attempt to get them fully up to printing density by chemical means, but to

back them with matt varnish and tracing-paper, and apply the stump and blacklead rather freely.

When the negatives are very vigorous and full of detail, even if granular, their successful enlargement is not difficult. They may be dealt with by almost any of the methods, and a good result secured. If carefully printed in carbon they may be put up and made many times larger without any granularity or messiness appearing. This arises more particularly from the softening influence of full exposure, and the free manner in which the development takes place till the required density is reached. Under a well-restrained and ripe developer each gradation of the negative appears in its proper order and acquires strength as the development proceeds, the result being a round and brilliant negative practically free from solarisation and irradiation, and in many cases an improvement upon the original. There is usually a wide difference in the ease with which qualities of this description are obtained from originals on wet and dry plates; the advantage, however, in most cases lies with the former.

On the score of definition it is often a positive advantage to sacrifice a little to get rid of crudity. Should a gelatine transparency be exposed for a negative to a cloudy sky, this mellowing will take place in consequence of the variations in the direction of illumination, proceeding from the shifting clouds being refracted to all points by the swollen and uneven layer of gelatine and varnish through which it is transmitted, but without constancy. A clear, blue sky, the interposition of ground glass between the transparency and source of illumination, and the employment of an unfluctuating artificial light, do not produce this effect in a sufficiently-marked manner to be perceived. In portraits the removal of the stop for a few seconds contributes to softness, and, provided the small negative has been very delicately retouched, admits of enlargement to four or five diameters, and be right for printing without further treatment. The effect upon the retouching is to remove the harshness from each dot of the stipple and give it more the appearance of bold stippling upon the print. Those photographers and retouchers whose *forte* consists in very fine and even retouching will, in most cases find it a saving to expend their care upon the small negative; then, as the enlargement of the stipple is still in the same proportion to the increased size of head, the tendency to insipidity from working up a large head with a fine touch does not show itself. Here again, and with very coarse examples especially, the intensity of the negative should not be forced with pyro. and silver, but the necessary reinforcement obtained with blacklead upon a backing of tracing-paper, as before remarked.

If it have been decided to treat a negative in this way a little thought should be bestowed upon the selection of the glass. When large surfaces are to be covered the glass may be moderately thick; but, if small, the glass is better as thin as possible. The edges of each patch of blacklead should be well softened off; and when a face requires such strengthening the lead should be distributed over the whole—of course in suitable proportion, to accord with the graduations it is intended that it should deepen. The skies of landscape negatives, when enlarged to sizes above 12 × 10, frequently require the application of tracing-paper or stopping in some way, lest in getting them up to depth the more isolated and important lights of the picture be hopelessly overdone. JOHN HARMER.

"DEPTH OF FOCUS."—"STANDARD DEVELOPING SOLUTIONS."

I CONSIDER apology due to Mr. W. E. Debenham in regard to one of the matters which has come under discussion with regard to lenses. I mean that of the alteration of focus by the insertion of a stop. I admit at once that I wrote without access to a file of THE BRITISH JOURNAL OF PHOTOGRAPHY, and that I trusted to my recollection of the article by Mr. Debenham, to which reference was made.

On reading more carefully the quotation from it which he gives I can find nothing to which I take exception, but, on the contrary, come to the conclusion that the matter is one on which we agree. It is, however, by no means so with regard to the other matter under discussion, namely, whether spherical aberration may or may not be a means of bringing about greater depth of focus, as the term is generally understood.

Mr. Debenham takes the definition of depth of focus which I gave—"*The quality in a lens which enables it to represent planes at different distances without any perceptible difference of definition.*" Mr. Debenham says, with regard to this:—"There is no such quality in any lens except it may be conferred by a small stop." Here I most decidedly join issue with Mr. Debenham. If he v perform the following experiment, or merely consider it, for I sure his experience is such that the actual performance will unnecessary, he will see that he has allowed himself to fall i an error:—Fix opposite a camera, and at about ten feet from a row of numbered cards, each one three or four inches fartl from the camera than another. Take a portrait lens of ab ten inches focal length with a stop one and a-quarter inch—t is $\frac{f}{8}$. Focus for the centre card. It will be seen that the ima of this one is much sharper than that on either side of it. Th is a *perceptible* difference in definition between it and any oth card. Now, substitute for the portrait lens a single-landsca lens of any of the ordinary types of the same focal length a with the same aperture—an excessive one for a lens of the ki mentioned. On attempting to focus it will be found that no ca can be made quite sharp, and that not only is it impossible to t which of two or three, but probably which of five or six is t sharpest. Not only is this the case on the ground glass but, if negative be taken, there will be no *perceptible* difference in defin tion between several cards; and unless those at the extreme end where the definition is very bad, be taken as a means of getting a average, so to speak, it will be impossible to tell which is truly t sharpest.

A further experiment:—The cards are reduced to three, and portrait lens having a diffusion adjustment is used. The cell screwed up, so as to have no diffusion whilst focussing is performe One card can now be made distinctly sharper than either of th others. *After focussing the cell is unscrewed so as to give diffusio* A negative is taken. I will defy Mr. Debenham or anyone els now to *perceive* which of the three cards was the one focussed for— that is, to *perceive* any difference in definition. That the differenc exists we all know. So does the difference between two stick one thirty and the other thirty-one inches long; but we do not pe ceive it unless we take special means to measure one against th other. We do perceive the same difference between two sticks, th one two inches and the other three inches long.

I am willing to stand so far corrected as to admit that "notable, "noticeable," or "evident," might have been a better word tha "perceptible."

As to the claim made for diffusion of focus: it is possible that a one time there was claimed for it the power of bringing planes int *better* definition than they would otherwise be. I, however, see n such claim made at the present day.

I am particularly pleased to see, by the article of your Editors that the adjustment for giving this useful quality was first suggeste by my friend Mr. J. Traill Taylor. The quotations which you Editors made from his original paper shows no claim which canno be upheld; nor is any such claims made either in the advertisement or the pamphlets issued by makers of lenses having the adjustment referred to.

Mr. Debenham says:—"As to the argument that, seeing that in certain cases absolute sharpness cannot be obtained, it is better to sacrifice some sharpness everywhere in order that there may be no sharp place with which the rest may contrast; that is a matter of taste rather than for scientific discussion, and I leave it." Here, again, I cannot agree with Mr. Debenham. I would ask whether it is not more useful to discuss a quality in an instrument which makes it of greater service to us in *making pictures* than to discuss whether or not this quality comes to be recorded under some particular technical heading or not?

That a certain quality *is* given to a lens by the introduction of a certain amount of spherical aberration cannot be denied, and that the quality is in certain cases a desirable one is proved by the fact that so many "dodges" have been tried to produce it in roundabout ways. I have been told that the late Mr. O. G. Rejlander preferred in certain cases that his sitters should move slightly during the exposure! Possibly this is going to an extreme. There is a medium in all things.

If Mr. Debenham will not accept the accuracy of my definition of depth of focus, will he give a better? I cannot think of one. The term is itself a misnomer, and even if we take the better one of Mr. Taylor—namely, depth of definition—I cannot see how we can limit it or give a definition to it much different from what I have given for depth of focus.

I do contend that in an image, no part of which is absolutely sharp, there *is* more depth either of focus or definition, as we like to call it, than in one which has one plane extremely sharp; but I do not think it is of the least importance whether we include the quality given under the headings mentioned or not. This fact remains, and is of vastly more importance than whether we do or

The quality is one which may be most useful under certain circumstances.

"Standard Developing Solutions."

"*Secundum Artem*" resorts to the objectionable and, indeed, somewhat despicable practice of writing anonymously and hitting anonymously; so that if answered by any individual he retains at command the rejoinder—"Sir, it was not intended for you;" or, "if the cap fits you—wear it." Despite this, in this special case as there are, so far as I can see, only two who can be referred to, and I am one of them, I make bold to reply.

I point out to "*Secundum Artem*" that I did *not* pose as the author, inventor, or anything else that you like to term it, of standard developing solutions," but that, on the contrary, I objected to another man being (if I may use the term) *posed* by the Editors as the inventor of something which I knew he had not originated, inasmuch as I knew for a fact that I had proposed it years ago and thought it likely that it had been proposed years before that.

The Editors explained that they had not desired to pose the gentleman referred to as author, but had merely taken the opportunity of the re-suggestion of the matter to urge it on the photographic public, and this was enough. They also pointed out that the thing *had* been proposed long before I did so. Possibly "*Secundum Artem*" will apologise or say "it was not meant for you." If he will attach his name to such apology or admission it will be doubly valuable.

What I do take just a little credit for is that I have continually *advocated* for some time a simplification of developing solutions, which is now being generally admitted as desirable and scientific. The fact that the subject is considered a thing worth advocating is shown by the fact of the Editors having devoted a leading article to it. The fact that it requires still to be advocated is demonstrated by the unnecessarily complicated formulæ for stock solutions and instructions for mixing the same which are sent out with many commercial plates at the present time.

W. K. Burton.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

TO THE WATERFORD COAST AND ALONG IT.*

Bidding good-bye to our jovial captain we left the "Rathlin" with sincere regret, having met with nothing but kindness and attention aboard of her. Our luggage was removed to the nearest hotel, and we ourselves rambled with our cameras over the old town. We were shown the spot where some English conqueror had landed; though whether it was Cromwell or Richard Strongbow seemed a mystery to our guide, and when questioned on the subject he seemed to have a general idea that they were one and the same person. We were also shown a hypothetical site where the first potato planted upon Irish soil was supposed to have been placed by Sir Walter Raleigh when he came over to hunt the Ormond to death. As ardent potatophagi we all photographed the place religiously, though I believe there are at least half-a-dozen places in Ireland which claim the same distinction, among which our ultimate destination, Youghal, claims a prominent place.

We slept that night at Waterford, and set off next day for the above-mentioned port. By the way, it was at Waterford that we first began to see those seditious notices of which we had so often read. Just opposite our steamer, I remember, as we came off there was a tremendous placard imploring the citizens of the county to assemble in their millions (the census returns only account for about a hundred and fifty thousand), and to hold their crops, whatever that might mean. We also saw the traditional Irish peasant, whom I had always imagined to be a myth invented for music-hall purposes. There he was, however, as large as life, with corduroy knee-breeches, blue stockings, and a high, soft hat with a pipe stuck in the side of it. The delusion was so strong with us all, however, that we always had an inclination to assemble round each one we met and wait for a song. Truly travel enlarges men's minds!

Youghal is only a short distance from Waterford as the crow flies, but it is a formidable journey by rail. However, even an Irish train reaches its destination at last, and we found ourselves next day in the old Irish seaport. Here the Blackwater river opens out into a considerable estuary, which in turn opens into the Irish Sea. The town itself is a quaint, old-fashioned place, with an amphibious population, who live principally by fishing for the salmon as they try to ascend the Blackwater, and capturing them in long drift-nets.

The cousin of our friend Smith had been as good as his word, and his yacht was waiting for us in the harbour, a fine, roomy, old-fashioned craft, broad in the beam, with a cabin which would hold the whole of us. She was well provided with nets and trawling gear, the latter being a favourite amusement of her proprietor. We only made an experimental cruise that day, standing off and on the land outside the harbour. We got several excellent views of the town from the sea face, but others were complete failures; for we soon found the difference in working on the broad deck of a steamer and on a tossing little cockle-shell. On landing, however, we were amply recompensed by a series of views of the antiquities of the little place taken in the evening, after which we adjourned to a popular concert, where the chief hit seemed to be a topical song with frequent allusions to "Buckshot Forster," which never failed to bring down the house. We put up at the "Crown" Hotel, where we met with the greatest kindness and comfort, and can conscientiously recommend it to any other of the fraternity who may find themselves in that quarter.

Next morning with "a wet sheet and a flowing sea"—Cunningham suggested "a wet blanket"—we scudded out of Youghal harbour, threading our way amongst fishing boats and drift nets. There was a slight chopping sea on, which made photography almost an impossibility for the time; so all hands devoted themselves, heart and soul, to drinking bottled beer and trawling. The great net with its big iron sinkers, or "otters" as they are called, was lowered overboard and we dragged it behind us for half-an-hour or so. Our worthy host, who was an accomplished yachtsman, seemed considerably amused by our complete ignorance of boats and everything pertaining thereto. As Mark Twain said—the information which we did not possess would make a good-sized volume. Ramsay was the most erudite among us, but even he seemed to have a general impression that the flying jib was connected in some way with the tiller. "It's been out long enough now!" cried our skipper; "haul away at the line." We all began to haul away at various lines with desperate eagerness until, by objurgation and example, he concentrated us upon the right one. There is an excited cry of "it's heavy—awfully heavy!" Up it comes through the blue water. We can see the bag of it flickering upwards, much distended apparently. "It's nothing but seaweed!" roars one. "I see a fish!" yells another. "Lots of them!" gasps a third. "Pull, boys, pull!" and then with a heavy splash down comes the net upon the deck, and next moment the whole place seems alive with flapping tails and waving fins and silver bellies and great red gills opening and shutting. It is a case of minding your ankles while a dogfish snaps at one side of the little deck and a conger eel both barks and bites at the other. However, all are successfully knocked on the head and we are able to classify our victims. There is variety with a vengeance—hake, ling, rockcod, gurnard, red and grey mullet, eels, skate, crabs, octopi, the dogfish, and molluscs galore. Now was the time for photography to assert itself and come to the front. The net is piled tastefully in the sheets for a background; then with a little judicious selection a graceful and natural pile of fish are arranged in front, and we have a triumphal plate to remind us of our great haul.

We had several more "scrapes," as they are technically called, but none so successful as the first. Then we stood in well under the basaltic cliffs which line the coast, and which are all hollowed out by the action of the waves. The water is calmer near the shore, and we succeeded in getting several very fair plates of these precipices, and of the fantastic gullies and fissures made in them by the action of the water.

By the afternoon we had worked round the rocky point which lies to the north of Youghal, and after passing several headlands had made our way into the beautiful bay of Ardmore, where we cast anchor and went ashore in the dingy, taking, of course, our cameras with us.

It was fortunate we did so, for we never had a better opportunity of getting some of those typical representations of Irish life which we had contemplated originally. Ardmore is a primitive village which has stood where it stands now for at least two thousand years without apparently altering very much one way or the other. It consists of a single line of whitewashed thatched cottages hung round with nets, and most of them possessing some sort of potato garden in the rear. These people really seem to have a grievance; for their bay is so exposed and the sea runs in with such violence that they are unable to have any boats except such as are light enough to be drawn ashore when the weather is threatening. Could they get the roughest and rudest breakwater it would be of enormous use to them; but they have no money of their own, and parliament has refused to advance them any, so fishing there is still exactly what it was when the ancient Britons went out in canoes with their rough nets. The people were a kindly, simple race, and looked on with much interest and delight while we took views of their houses and of their wives and families. They seemed to be in the last depths of poverty, but cheerful and cleanly, and very busy making ready for a descent of sprats which was expected every day.

Behind the village there is the most perfect specimen in Ireland of that mysterious edifice known as a round tower. This one was about seventy feet high, built very much like a modern lighthouse. Though its erection is entirely pre-historic, the mortar between the stones is as firm now as ever, and the stones themselves do not show the least symptoms of decay. We took several views of this interesting building. What the original object of the round towers was is a puzzle to antiquaries. Some have thought that they were temples erected in honour of the sun god; and this seems to have been the idea among the early Christians, for a church has been erected beside the tower, ap-

* Concluded from page 482.

parently to act as an antidote to it. The church, however, is now reduced to a crumbling ruin, while the old heathen tower is as erect and defiant as ever. Others have thought that they were watch towers, but that is negatived by the fact that this one is built at the foot of a hill, which would be rather an unnatural situation for a watch tower. Altogether the building and its uses were "the sort of thing no fellah could understand," so we contented ourselves with photographing it without indulging in further speculation.

We dined at the house of a hospitable medical man, and after dinner went over some of the other curiosities of this quaint, old place. Among these is the black stone of Ardmore, which is celebrated over the whole south of Ireland for its miraculous virtues. It is a meteoric stone with a large hole through the centre of it, and it is only on one day in the year that it possesses its strange powers. On that day the sick and lame of all the country round come down to the beach at Ardmore, and, forming a long line, they crawl in turn through the hole in the stone. Whether from the power of faith or the sea air or some other cause, many cures are said to result from this mode of treatment. Of course we all religiously took plates of this petrified physician.

We spent that night on board our yacht in Ardmore bay, and returned to Youghal in the morning. It had been our intention to run down the coast to Queenstown, but on coming back to our head-quarters we found a telegram waiting which summoned Ramsay back to Scotland on an urgent matter of business. Smith elected to accompany him, and the two left us for Waterford. As our little party was thus broken up we gave up our original plan, and on our hospitable captain inviting Cunningham and myself to come up the Blackwater with him and stay at his place for a week we very gladly availed ourselves of the invitation. What we saw and did in the Blackwater Valley I may reserve for another paper. Suffice it that the short excursion along the Waterford coast was a thoroughly enjoyable one, and that our only grief was that it should have been so curtailed.

A. Conan Doyle, M.B., C.M.

ON THE CONSTANT DETERMINATION OF GRADED (SCALED) PHOTOMETERS.

I have very recently shown how important in using scaled photometers is a pretty exact determination of their constancy. Meanwhile, some experiments which I have since made, and which I shall publish in detail, have shown me that that most-used method is decidedly defective for this purpose, and cannot produce reliable results. It was proposed to expose a plate under the photometer to the light of a certain quantity of magnesium wire, burnt at a certain distance, and then to expose a second plate at the same distance to a greater quantity of magnesium wire, the quantity of magnesium in the second light being a multiple of that of the first. When these plates are developed in the same dish different numbers are brought out, which may be designated respectively as m and n. Now if the second quantity of magnesium burnt were $\sqrt{}$ times greater than the first it was concluded that the same proportion must prevail between the intensities of the lights developed, and hence, the constant of the photometer being called X, the following equation was obtained $v = \frac{X^n}{X^m} = X^{n-m}$ from which for X is obtained $X = \sqrt[n-m]{v}$.

Now, my experiments have shown me that the intensity of the light is by no means proportionate to the quantity of magnesium wire burnt. The clouds of magnesia which are formed partly veil the flame, and the more so the longer the burning lasts. On the other hand, perfectly reliable results are obtained when equal quantities of magnesium wire are burnt and the distance varied—a means by which one can besides easily produce much greater differences in the light than by the other method; and, further, in order to be certain that in both cases the intensity of the light was actually the same, place on both occasions a second photometer at a constant distance from the magnesium flame and convince yourself, by developing the plates under the second photometer, that in both instances the same number appears. This was, without exception, always the case in all my numerous experiments. Of course the plates to be compared must be developed altogether in the same dish. Now, if the constant X be determined in this way, it is easy with the help of logarithms to calculate a table for the values of $X, X^2, X^3, \ldots X^{25}$, which then give the relative intensity of light of the fields of the photometer designated by exponent powers.

When once this labour, which must be executed with great care, has been accomplished, it becomes easier afterwards to find, by the aid of a single comparative determination, the constant of every other carefully worked-out graded photometer. For instance: if on the instrument already examined the number p appears, and on the other q, and if the constant of the former be X and of the second y, the value of the equation will be $X^p = y^q$ whence for y results $y = \sqrt[q]{X^p}$. Should one have computed a scale for the first photometer one may take away X^p without further ado.

I shall now show how I determined the constant of a photometer scale, with which I have made many and important experiments. I burnt ten centimetres of magnesium wire first at a distance of 0·5 of a metre, and then at six metres distance from the instrument the intensity of the light was as 144 : 1. On developing the figures 18 and 8 appeared; I had, therefore, the equation :—

$$X = \sqrt[18-8]{144} = \sqrt[10]{144} = 1·644.$$

With this value I computed a scale, which is given below under column I.

In order to determine the constant of a Warnerke sensitometer I exposed it and my normal photometer—for such it is for me—simultaneously at the same distance from magnesium light, without exactly determining the quantity of ribbon burnt and the distance. Upon my normal photometer the number 9 appeared; upon Warnerke's sensitometer 15 appeared on the principal scale, and 18 upon the small scale beneath. From the foregoing it will already be seen how faulty this instrument is. Though I had good reason to consider the latter the more correct figure, I calculated both scales, and they are given in columns II. and III. The results obtained were for column II. $y = \sqrt[15]{X^9} = \sqrt[15]{87·611} = 1·3474$, and for column III. $y = \sqrt[18]{X^9} = \sqrt[18]{87·611} = 1·2821$—values which, of course, are to be computed by logarithms.

No.	My Photometer. I.	Warnerke's Photometer. Principal Scale. II.	Secondary Scale. III.
1	1·644	1·347	1·282
2	2·702	1·815	1·644
3	4·441	2·446	2·108
4	7·301	3·296	2·702
5	12·001	4·441	3·464
6	19·726	5·984	4·442
7	32·425	8·063	5·694
8	53·299	10·864	7·301
9	87·611	14·540	9·360
10	144·00	19·724	12·001
11	236·72	26·577	15·386
12	389·12	35·810	19·726
13	639·62	48·250	25·291
14	1075·9	65·013	32·425
15	1728·2	87·610	41·572
16	2840·1	118·03	53·299
17	4669·6	156·04	68·335
18	7675·7	214·29	87·611
19	12617·0	288·74	112·33
20	20740·0	389·05	144·01
21	34091·0	524·21	184·64
22	56038·0	706·32	236·72
23	92113·0	951·70	303·50
24	151410·0	1282·30	389·12
25	248890·0	1727·90	498·89

As one sees at once, columns II. and III. represent very different values. In II., for example, No. 25 indicates about forty-two times as much actinic power as No. 10, while for scale III. the proportion between the same numbers is nearly twice as great, viz., about eighty-eight. When in one and the same instrument such differences can arise, its value is evidently of a very questionable nature, and, in the case of different individual sensitometers made at different times, will be *nil* should one desire to compare their degrees with one another. The above-named usual photometers do not at all raise pretensions to be actual normal instruments. With regard to Vogel's its statements are very reliable, as long as those of the same instrument only are compared; but with different instruments one has no guarantee whatever that their constants are the same, since tissue paper, with which the scale is built up, varies in colour even when always obtained from the same manufactory. Indeed, even more than that, the colour of the *same piece* of paper is changed by time, and gradually becomes less transmittent of the chemical rays. So long, therefore, as one does not succeed in finding a constant material for this purpose, one must resolve to determine the constant of each individual instrument separately, and to repeat this determination from time to time.

— *Wochenblatt.* Franz Stolze, Ph.D.

RECENT PATENTS.

PATENT SEALED, AUGUST 17, 1883.

No. 1,061.—"An Improved Process for Sensitising Photographic Paper and Developing Pictures Thereon." W. Robert Lake; a communication by Redfield Benjamin West and Benjamin Corey West, both of Guilford, Connecticut, U.S.A.—*Dated February* 27, 1883.

NOTICE TO PROCEED.

No. 1,870.—"Improvements in and Pertaining to Apparatus for Utilising Solar Heat." W. Lloyd Wise; a communication from La Société Centrale pour l'Utilisation de la Chaleur Solair, of Paris, France.—*Dated April* 12, 1883.

PATENT GRANTED IN THE UNITED STATES.

No. 281,660.—"Photographic Plate Holder." E. L. Bergstresser.—*Dated July* 24, 1883.

THE DAILY PRESS ON THE DAGUERRE MEMORIAL.

[The Times.]

Louis Daguerre has well earned the monument which is to be unveiled in his native village of Cormeilles on Sunday. Long before he commenced his experiments the principle of photography was known. Thomas Wedgwood had applied it in practice at the beginning of the century. For Daguerre it was reserved to launch it on its career as servant-of-all-work to art and science. The present generation has almost forgotten the pale forbidding spectres which scowled and squinted under the name of daguerreotypes. Not the less were they the lineal ancestors and the indispensable forerunners of the finished portraits which have annihilated miniatures and the delicate scenes which the landscape painter both fears and uses. Photography since the production of the first daguerreotype plates in 1838-39 has passed through many stages. Without Mr. Henry Fox Talbot's discovery, its present popular employment would have been impossible. Under the original process the subject had to be copied separately for each impression. A single impression is sufficient, by the aid of negatives, for indefinite multiplication. Nitrate of silver has been discarded as the medium in favour of gun-cotton and ether and uranium. An alternative has been found for the direct action of the sun when that luminary is sulking under clouds or hidden in night. Magnesium and electricity discharge its functions at second-hand. In every direction photography has become more certain of its effects, and more versatile in its manipulation for their production. Had Daguerre not existed photography would have asserted its power. Many minds were on the track. The fulness of time had arrived for its promulgation. There is nothing to show that Daguerre possessed the genius which leaps at a bound to a truth. But he was clear-sighted, and he was persistent. He perceived that the sun could be made to take portraits. That was his fixed idea; and he sold himself as a bond-slave to do its bidding. M. de Lesseps was not more the slave of his idea of the Suez Canal than was M. Daguerre of his daguerreotypes. For fifteen years he laboured to accomplish his object, and he succeeded. In the lengthened chain which will represent the innumerable achievements of photography Daguerre's work must always constitute an indispensable link.

Photography belongs to the fruitful arts which philosophy ranks the highest. Many considerable inventions end with themselves. About photography it can never be safely asserted when and where it will not be serviceable. It reproduces the eternal pyramids. It crystallises the spray of a wave. A baby's smile is not too fleeting for it. The last look of the dead before decay has set in is sacred for it. Justice avails itself of its aid to treasure up the villainous features of the habitual criminal. All the visible humours of a popular holiday it can instantaneously reflect and marshal. The depths of the sea are not beyond its reach, or the heights of heaven. Movements concealed from human eyes, because the agents are too minute or too distant, do not elude the photographer. Wherever light penetrates he can go. Whatever act is done in light he can fix and delineate. Light is all inquisitive and all pervading. In photography science has secured a mode of cross-questioning light, and obliging it to keep for leisurely perusal notes of all which it has glanced at in the flash of a ray. Nothing is so plastic as light. Of everything which it sees it takes a mould. Hitherto it has broken the die the next instant, and passes on to lend itself to a fresh impression. The photographer halts it on its march, and bids it leave its transcript with him. No limit can be assigned to the powers of photography, because no limit can be assigned to the curiosity and tell-tale minuteness of light. At one period it appeared marvellous that photography should be able to portray whatever human eyes can see. Much that is visible cannot be turned to use on account of the evanescence of the vision. Photography stamped it on the instant in ineffacable characters, and science was exuberantly grateful. Those boundaries to the art have been far transcended. Light which visits human eyes has been brought to yield up secrets to the photographer otherwise beyond human scrutiny. Through his art he analyses a sun's beam, as the naturalist analyses a bucket of sea-water dredged from the deep, and he levies on its invisible picture gallery a tribute of visible replicas. The uses of photography in war have long been acknowledged. Every campaign adds to their scope. Medical science is already beginning to avail itself as largely of the assistance of photography as astronomy. Photography will not be satisfied until it has devised ways of picturing the whole internal economy and the physical operations of organic being. Not impossibly the bitterness and gravity of the conflict between vivisection and its antagonists may be modified by the discovery of means for effecting by the observation of photography much which is to be learnt at present only experimentally by the help of the vivisector's knife. Photography has elevated itself to such a position that, whenever science is at a loss for an instrument to effect an object it craves for rather than discerns, photography is the auxiliary it instinctively summons. Photography does not murmur at the utmost importunities to which it is subjected. It goes to meet demands and suggests fresh ones. Like every active servant of the public, it creates needs that it may gratify them.

The process has climbed to such aerial eminences that, to a large body of its admirers and practitioners, its employment on the manufacture of *cartes-de-visite* seems a mere accident. For the majority of mankind its artistic qualities remain its true and distinguishing merit. From this point of view there are ungrateful persons who will meditate on Daguerre and his fellow-workers with anything but gratitude. The supposed necessity of being photographed, and the actual necessity of inspecting photographic portraits of others and their collections of photographed landscapes, and architecture and pictures and sculptures, are among the worst frictions which vex social life. Photography has on its conscience that its competition has killed the exquisite art of miniature painting. It has been instrumental in enforcing the popular modern conviction that art can be reduced to mechanism. Yet, when even the artistic merits and demerits of photography are balanced, it must be confessed that the advantages are in a majority. It has erected a standard of resemblance in features and obedience to the laws of drawing lofty enough to banish for ever the monstrosities of family portraits which abused the hospitality of respectable middle-class dining-rooms. In landscape art it has compelled painters to respect the veracity of nature, which formerly all but the greatest defied with effrontery. If it is a reproach to many excellent landscapes that they approach too closely to photographs, exhibitions of landscape art owe it to photography that few among the inferior works in them bear no trace of having been copied from nature at all. Like most of the powerful agencies in modern life, photography is a leveller. It tends to render the eye content in art with something below the inspirations of genius. On the other hand, it will not suffer daubs and scarecrows to placard themselves as creations of art with impunity. Since the world, in the nature of things, cannot afford to indulge freely in masterpieces, photography, which has relieved it from dependence for its artistic adornment on engravings without taste and paintings out of drawing, deserves to be hailed as a public benefactor.

[Daily Telegraph.]

In the matter of erecting a sculptured memorial to a person deceased, who has deserved well of his country, it is perhaps, on the whole, not unwise to act in the spirit inculcated by the maxim, "*Festina lente.*" Unseemly hurry in paying plastic honours to the dead is certainly to be deprecated. Samuel Rogers has recorded, in his *Table Talk*, a somewhat cynical remark of the Great Duke of Wellington, to the effect that, when his private correspondence came to be printed, a great many statues would have to be taken down. But, even when the memorial takes so modest a form as that of a bust, over-haste in its erection has its perils. We may set up a bust of him who, in a generation or so to come, may be unanimously adjudged worthy of a statue; and assuredly such would seem to be the inference in the case of the distinguished French artist, and one of the founders of photography, Daguerre, of whom a bust is to be unveiled next Sunday, at his native village of Cormeilles, near Paris.

Only a year or two since the good folks of Blois gratified themselves by the erection of a statue of that ingenious mechanician, Denis Papin, whom, rightly or wrongly, they hold to have been one of the inventors of the steam engine. He was, certainly, in the machine known as "Papin's Digester," the inventor of the safety-valve, and, consequently, a benefactor of humanity. When the worthy Huguenot doctor of medicine, and fellow of our own Royal Society, died in obscurity at Marpurg, in 1710, nobody thought it worth while to bestow so much as a profile medallion on his memory; but when he had been dead a hundred and seventy years his countrymen discovered that Denis Papin was a great man, and gladly subscribed for a life-size statue in his honour.

With this precedent before us, it seems almost a pity that the tribute of public recognition due to the merits of Daguerre should be after a manner discounted by the concession of so comparatively trivial a memorial as a bust. On the whole, however, perhaps it is as well that, by the modest festival of next Sunday, the achievements of Daguerre should be recalled to the public mind if only for the purpose of stating what was his real share in the invention of photography. Everybody knows that in 1802 Sir Humphrey Davy published, in the *Journal of the Royal Institution*, "an account of a method of copying paintings upon glass, and of making profiles by the agency of light upon nitrate of silver." Josiah Wedgwood was associated with Davy in these experiments; and they succeeded in obtaining copies, on prepared leather and on paper, of leaves, the wings of insects, and other small objects, as shown in the solar microscope. What were practically photographic experiments were also about this time carried out in a very furtive manner by Matthew Boulton and his friends at Soho, near Birmingham; but for some occult reason which has never transpired—the opposition of the Royal Academy of Arts has been absurdly given as among the causes—the experiments of the first English photographers, of whom the late Lord Brougham claimed to have been one, were abandoned.

Daguerre was a very clever French scene-painter, who, struck by the marvellous effects produced by the panorama which, if it was not absolutely invented by the American, Robert Fulton, was at least exhibited by that Promethean genius in Paris and Brussels late in the last century, improved on the device in conjunction with one M. Bouton, and produced the diorama which was brought over to England some sixty years ago, and domiciled in a building in the Regent's Park, afterwards converted into a Dissenting chapel. But, ever since 1814, a French chemist named Niepce de St. Victor had been making strenuous efforts to produce pictures by means of light. After some ten years he came in contact with Daguerre, and eventually went into partnership with him. In 1827 Niepce sent an account of his discoveries to the Paris Academy of Sciences; but, as he kept his processes secret, the Academy, in accordance with their rules, declined to deal with him. Niepce died in 1833, and it was not until 1839 that Daguerre publicly exhibited the exquisitely-beautiful pictures taken by his process. He made the secret known to all the world in July, 1839, the French Government having previously guaranteed him a pension of six thousand francs a year for life, an annuity of four thousand francs being also secured to the family of Niepce. Between Daguerre and Niepce, then, the honours of the discovery of Daguerreotyping on silvered plates may be equally divided; but the father of photography as it at present exists and flourishes was a private English gentleman, Mr. Fox Talbot, who, on the 31st of January, 1839, six months before the publication of Daguerre's process, communicated to the Royal Society an account of his photographic discoveries; while in the following February he published the details of preparing a sensitive paper for photographic pictures. Mr. Fox Talbot had been practising his method ever since 1834, and had devised it even earlier; but the patent fact of the communication of the Talbotype to the Royal Society six months before the publication of the Daguerreotype method in France at once disposes of the

strange statement made by a contemporary, that it has been conceded that the honour of priority belonged to Daguerre.

There are, however, yet more photograph honours which, in a modified degree, may be claimed by divers skilful operators. M. Claudet introduced the accelerating process, and his studio and that of Mr. Beard were the two first daguerreotying establishments set up in London. Then Mr. Collen adopted the Talbot or calotype as a means for taking portraits. Next came the waxed-paper process and the albumenised glass process; but both these methods were destined to be superseded by the collodion plan, discovered by Mr. F. Scott Archer in 1850.

If everybody had his due as having conduced to the development of photography, a claim could be set up to the award of at least a memorial tablet to Baptista Porta, who, in the sixteenth century, invented the camera obscura, without the aid of which instrument the most expert of photographers would labour in vain; and something might even be done in grateful memory of Dr. Wollaston, who in 1807 invented the camera lucida, incessant experiments with which incited Fox Talbot to the almost desperate endeavour to ascertain whether he could not draw as well with a ray of light as with a pencil. Nor, finally, should we forget the discovery made many years since by Herr Moser, of Koenigsberg, that light constantly emanates from all bodies, even in complete darkness; and that, when two bodies are put near each other, the one impresses on the other an image of itself. If a sovereign, for example, be placed on a piece of ground glass on a warm mantelshelf, and be left for half-an-hour, a beautiful image of the coin may be developed by simply exposing the glass to the vapour of mercury. Similarly the number of a watch on the inner case thereof will impress itself, although it does not come in contact with it, on the inside of the outer case. It may fairly be said that wheresoever there is light there is also in some shape or form photography apparent or latent; but of the photographic art the fathers and founders were, undeniably, Niepce and Daguerre in France, and Fox Talbot in England. There were indubitably many guessers at photography, just as Hero, of Alexandria, The Marquis of Worcester, and Salomon de Faux guessed at the steam-engine; but it was reserved for the French scene-painter and the English private gentleman to do practically for photography that which Watt and Stephenson did for steam.

When, in the year 1851, the Great Exhibition of the Industry of All Nations was held in Hyde Park, nearly all the photographic pictures exhibited were daguerreotypes, beautifully elaborate in their minuteness of detail, but lacking boldness of relief, and in general vapid and vague in facial expression. The Exhibition jury in their report remarked that photography was yet in its infancy; but that all which had been hitherto accomplished—marvellous and exquisite as it was—could be considered as nothing to what would be performed when the veil was removed which for the present obscured its scientific principles. The veil, unfortunately, has not yet been altogether removed. The deficiencies in the appliance of photography to artistic, scientific, and antiquarian requirements have long since been supplied. The surgeon, the naturalist, the archæologist, the microscopist, all find in the photographic operator one of their trustiest and most serviceable friends. The all-receptive lens transmits to the sensitive tablet of glass—now the text of a Shakesperian First Folio, and now the features of a convicted felon, now the presentment of a Greek coin thousands of years old, and now the image of a squalling baby to be sold for a penny as a birthday card. There is nothing too high, nor unfortunately too low, for photography to undertake in the way of producing apparently faithful transcripts of all kinds of objects—animate and inanimate.

Only a few years ago the illustrator of books—often an artist of the very highest merit—made his drawing on the wood-block itself, and his delicate lines and tints were ruthlessly but necessarily cut away by the engraver. At present the carefully-finished drawing is "photographed down" on the sensitive surface of the block. The engraver only cuts into the sun-drawing, and the artist keeps his own drawing to sell again another day. Photography has also been applied to the ceramic art, and imperishable enamels with a photographic basis may be seen in innumerable shop windows. A page of this journal has been photographed on a sheet of the diameter of a pea, and, under a film of enamel, may last as long as an Etruscan vase or an Egyptian lachrymatory—that is, to all time. The gallop of a racehorse, the running of a greyhound, the flight of a bird, the procession of the clouds in the sky and of the waves on the sea, can be instantaneously photographed. Even the blessed Sun himself, who is the patron of photographers, has had his own face photographed, spots and all. As a social benefactor, in bringing the ends of the earth together, and drawing all humanity into sympathetic intercommunication, photography rivals steam, the electric telegraph, and cheap postage. Still the veil is not wholly lifted. The laws of photographic focussing are yet imperfectly understood, and people continue to be presented with photographic portraits of themselves in which their hats are several sizes larger than their heads, while their lower extremities are apparently afflicted with elephantiasis, and their arms become as shrunken as the arm of crooked-backed Gloucester. No! the veil has certainly not been lifted, since, although announcements that photographs are about to be taken in natural colours have been made as frequently as that a navigable balloon is about to start for China, we seem to be as far off from the discovery of chromo-photography as from that of the "aerial machine."

Contemporary Press.

COPYRIGHT IN PHOTOGRAPHS.—PROPOSED NEW BILL.

[Morning Advertiser.]

The fifteenth of August is a somewhat late date for the House of Commons to order a bill to be printed; but when we mention that the bill upon which this exceptional honour has been bestowed is one to amend the law relating to the copyright of photographs, the urgency of the case will be universally admitted. It seems, from the preamble of the bill, that there has hithert been some doubt as to who is the true author of a photograph within t intention of the Copyright Act; and, therefore, this bill proposes to ena that the "author of a photograph shall mean the person at whose house studio, being a house or studio used for the purpose of taking and sellin photographs, or by means of whose instruments and materials the negati thereof shall have been made, and who shall have been permitted or em ployed to make such negative by the person on whose behalf such phot graph shall have been taken." This strangely-drafted sentence forms i fact the whole bill, and is worth examining as a specimen of parliamenta English. What is meant by "the person on whose behalf such photograp shall have been taken?" If it means the person who is photographed, wh not say so? It must be perfectly obvious that the person photographe may be entirely different from the person on whose behalf the photograp is taken; and assuming that, for example, a photographer were engaged b the proprietors of an illustrated newspaper to take a likeness of someon for the purpose of having the portrait engraved, there would be three pa ties to the transaction, and the bill in question would give the copyright i the photograph to the one least entitled to it. Again: it is quite open t discussion whether the bill would not exclude all copyrights in photograph taken otherwise than for sale. The house or studio at which they are take must be used for the purpose of taking and selling photographs, an although there is some security for amateur photographers in the followin clause of the sentence, which runs "or by means of whose instruments an materials the negative thereof shall have been made," this clause is evi dently intended to meet the case of one of the most valuable classes o photographs, namely, those which are taken, not in a house or studio, bu in the open air. It may be said that a copyright in a photograph not take for sale is worthless and need not be protected; but there may be cases i which the copyright would be used for the purpose of preventing sale Thus it is obvious that even if the principle of the bill be accepted, it language must undergo considerable modification. The intention, doubtless is that the person who takes the negative shall possess the copyright, bu that intention is by no means expressed with the absolute accuracy required in an Act of Parliament.

But what about the principle of the bill? It seems to us that it framers, in determining the principle, took account merely of the photo graphs of public men, actors and actresses, scenery, and the rest of th stock-in-trade of the photograph dealer. In all these cases the photo grapher obtains a sitting from his subject either by grace or for some mor or less valuable consideration. Thus we find that the real property in th counterfeit presentment of a face belongs originally to the owner of th face; and, therefore, it seems entirely wrong to establish a legal presump tion of ownership in favour of the photographer. If this bill becomes la a new terror will be added to photography. Already it has sufficien terrors for many people. Charles Dickens, if we can believe him to hav been serious, when he was really in one of his most humorous moods, ha left it on record that he preferred the rack to the instrument of tortur known as a photographing chair. The moment his head was fixed back i the iron crescent screwed up from behind, his limbs began to stiffen an his features to assume a deadly rigidity. He felt at that moment just a one might imagine a criminal to feel when he is being pinioned for execu tion. Most likely Dickens exaggerated the agony which the act of bein photographed occasioned him, but who has not felt in some degree the sam sensation of uneasiness? How many people are there who undergo th operation with perfect ease? Let anyone not an adept at the busines endeavour to do so, and the photographer will straightway tell him that, i thus taken, the result would be ridiculous. The head is always incline at the wrong angle, the hands wander aimlessly over the waistcoa or drop inelegantly at the side; the feet sprawl forward in a manne which would inevitably result in their appearing in the picture of colossa proportions. Your necktie is sure to be awry. In the case of ladies th dress always falls in ungraceful folds. Private Tommy Atkins, proud o his uniform, and with the martial spirit so strong in him that he must b photographed in the act of shouldering arms, is told, to his amazement, t hold his rifle in the left hand and to the left shoulder. Photography i indeed ruled by a set of laws that do not fit in well with a *négligé* style o sitting; and, hence, recourse must be had to screws, rests, and other appara tus, designed apparently for the purpose of firmly fixing the human fram in the most constrained and uncomfortable of attitudes. And then th awful moment when the photographer says, "Now, steady please;" whe the glittering eye of the camera fixes its glassy stare upon you; and whe your own eyes blink and quiver in the effort to remain motionless! Thes are the familiar horrors of being photographed, which we have hithert endured in obedience to the promptings of our own vanity or the crue solicitations of friends. But now a new one is to be added. Once let ou features be imprinted on the photographer's plate and they are ours n longer. By solemn Act of Parliament they are declared to have passed ou of our possession into that of the photographer. He may do with them a he will. He can exhibit them in every window in London, and sell copie of them for unholy gain. There is no remedy, for the law declares that th photographer is the author of a work of art, and that the right of its repro duction and sale is his exclusive property.

Of course this is not as it should be. If a person employs a photo grapher, and pays him, the whole product of the employment shoul belong to the employer. The correct principle on which legislation shoul proceed is that the copyright belongs, not to the person who takes th photograph, but to the person on whose behalf it is taken. If that perso chooses to part with the copyright, well and good; but certainly the lega presumption of ownership should be in his or her favour. It will, perhaps be remembered that a case occurred the other day in which a noble lady complained that her photograph was being extensively reproduced and sol without her consent, and even against her expressed desire. It was said a the time that the law ought to be altered in order to protect people fro annoyances of that kind; but here is a proposal to perpetuate and legalis them. The passing of that proposal would render it necessary for every

dy who employed a photographer to induce him to contract himself t of the Act. Of course we know what would follow. A watchful beral Government, anxious to protect photographers from the hard rms made with them by their patrons, would take them under its wing, id declare by a further Act of Parliament that the law would not recognise ontracts designed to frustrate the benevolent intentions of the Legislature. compensation to workmen for injuries and to tenants for improvements made compulsory, why should not the copyright of photographers in the orks of art they produce be made compulsory also? Here, then, is work or future Liberal Governments to do. Mr. Gladstone himself might orthily take it in hand. He of all men should know how valuable the opyright of a photograph may be. The celebrated likeness of the Prime linister, sitting in his shirt-sleeves under a half-felled tree with an axe in is hand, must have been a gold mine to its "author." How unjust to im it would have been had the subject of the photograph been able to veto s sale, or even to compound with him for its suppression! Clearly, if the resent bill is to pass, we must have a supplementary one, declaring that he taker of a photograph shall be deemed to be its author and the owner f the copyright, any contract, bargain, or agreement to the contrary otwithstanding.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 30......	London and Provincial	Masons' Hall, Basinghall-street.
,, 30......	Liverpool Amateur	Free Library, William Brown-st.
,, 30......	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on Thursday, the 16th inst., Mr. J. B. B. Wellington occupied the chair.

Mr. J. Smith showed a camera, with shutter for either instantaneous or ordinary exposures, made by a friend in Edinburgh for a trip in Italy. The shutter was a light flap working inside the camera, and was pivoted on its lower edge, so that the foreground should receive the maximum exposure. The axis of the pivot bore a short projecting arm; to this arm was attached a link, the up and down movement of which opened and closed the flap. The link itself was actuated by an arm attached to a spring-wheel contained in the camera front. A button fixed to the axis of this wheel appeared outside the camera, and by giving the button a half turn the flap was opened for exposure; a second half turn closed the flap. When an instantaneous exposure was desired the button was turned completely round, then upon touching a detent the spring brought the wheel back again, opening and closing the shutter in its revolution. An evident advantage in the contrivance was that there was no extra apparatus to carry, the little mechanism necessary being contained within the thickness of the camera front.

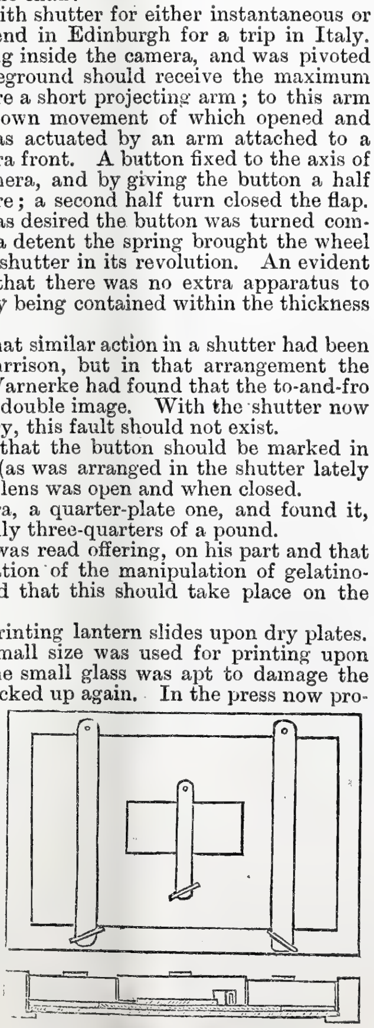
Mr. A. Cowan said that a somewhat similar action in a shutter had been shown some time since by Mr. Harrison, but in that arrangement the action was reciprocating, and Mr. Warnerke had found that the to-and-fro movement caused a jerk and gave a double image. With the shutter now shown, as the movement was rotatory, this fault should not exist.

Mr. W. E. Debenham suggested that the button should be marked in some way so as to show externally (as was arranged in the shutter lately exhibited by Mr. Cowan), when the lens was open and when closed.

The Chairman weighed the camera, a quarter-plate one, and found it, with the shutter and flange, to be only three-quarters of a pound.

A letter from Professor Stebbing was read offering, on his part and that of M. Hutinet, to give a demonstration of the manipulation of gelatino-bromide paper, and it was arranged that this should take place on the 13th of September.

Mr. Cowan showed a press for printing lantern slides upon dry plates. It was found that when glass of small size was used for printing upon from large negatives, the edge of the small glass was apt to damage the negative in being laid down and picked up again. In the press now produced the negative was laid upon the lower plate and adjusted to an opening of the precise size required, which had been left clear, all the rest of the plate being covered. The large back board was then laid upon the negative and kept in position by springs. The glass to be printed upon was held in the small inner backboard by a spring which pressed a strip of wood along one edge, and this inner frame or backboard was held always in one place by being pressed against one corner of the opening into which it fitted, while the spring which held it was being fixed.



Mr. A. Haddon said that he had lately been troubled with transparent spots all over the negative. Of course being transparent they were more evident in the high lights. He had succeeded in tracing their origin to the gelatine. This, although bearing the same brand—that of a well-known and much-esteemed maker—he had formerly used with success, gave the particular spots invariably, and upon substituting another make the emulsion made in other particulars in precisely the same way was perfectly free from them.

Mr. A. L. Henderson said that the spots known as "freckles" might be due to decomposed gelatine, and possibly the spots in Mr. Haddon's plates might have the same origin. He suggested a fresh thorough washing of the emulsion to see if that would cure the evil.

Mr. Haddon said that he had tried this, but without effect. He (Mr. Haddon) also stated that at the last meeting there was a discussion upon the alleged intensifying action of alcohol when used upon a wet gelatine plate. One of the negatives he had shown in illustration of the effect of a certain gelatine in causing spots certainly seemed to support this allegation, as when he was about to come to the meeting the plate was still not dry in one place. He had flooded it with alcohol, and the spot which was wet at the time now showed decided increase of density.

Mr. Debenham did not consider it as absolutely proved that the density of the moist portion of the plate was increased by the alcohol. It might be that the dry portion had been rendered more transparent and thereby reduced in intensity by the action of the spirits upon it. It was certainly worth further experiment, as either action might be occasionally useful.

Mr. Henderson then exhibited some plates and a negative taken upon one of them which had been coated with emulsion containing less than one grain of nitrate of silver to the ounce, as would be seen from the following formula:—

Gelatine	30 grains.
Bromide of potassium	30 ,,
Water	10 ounces.
Liq. am. to neutralise acidity of gelatine	2 minims.
Nitrate of silver	30 grains.
Water	10 ounces.

Mix cold and add liquor ammonia, 120 minims, put in one ounce and a-half of gelatine, then stand in a vessel of boiling water and allow to cool slowly. As after five hours the emulsion was not sufficiently firm to wash it was chilled with ice and with it was washed half-an-ounce more of sheet gelatine. When washed and melted the emulsion measured thirty-seven ounces.

A question was asked:—"Why do some plates develope more rapidly than others?"

Mr. Haddon thought that it depended upon the permeability of the gelatine.

Mr. Henderson said that he had some plates, which with the usual proportions of pyro., bromide, and ammonia, were fully developed in from twenty to thirty seconds. At the same time they would bear to be left in the developer more than a minute, and yet the shadows remained clear glass.

Mr. Cowan remarked that some plates prepared with a gelatine recognised as hard developed quickly, whilst with German and Swiss gelatine the development was slow.

Mr. E. Atkinson was elected a member of the Association.

Correspondence.

ALCOHOL AND THE DENSITY OF GELATINE NEGATIVES.

To the Editors.

Gentlemen,—The report of the meeting of the London and Provincial Photographic Association, which appeared in your last impression, throws some doubt on the fact that a gelatine negative becomes more intense when dried after being immersed in alcohol.

I am afraid that no facts really exist, as they are not proved to the satisfaction of every reader. I am aware that it is quite possible to find some persons who will believe that the moon is made of green cheese, yet the majority of persons doubt this, because it has "not been proved."

Leaving joking aside: this method of increasing the density is practised in my laboratory daily, and the best way to test the fact is to allow a negative to half-dry spontaneously, then immerse it in alcohol and dry as usual. "Seeing is believing"—at least it is to—Yours, &c.,

49, *King William-street, E.C.*, A. L. Henderson.
August 18, 1883.

ROYAL CORNWALL POLYTECHNIC SOCIETY'S EXHIBITION FALMOUTH.

To the Editors.

Gentlemen,—I beg to remind your readers that Tuesday, September 4th, is the last day for receiving exhibits at the Hall of the above Society. All articles must be addressed to the Secretary.

I do not think it is generally known that cases sent by goods train from London take about three clear days in transit; so to avoid disappointment care must be taken to send off in good time, as in former years I have seen cases arrive too late for exhibition, and great disappointment has been caused thereby. Cases by passenger or van train take about twenty-four hours for delivery. Van train is about twenty-five per cent. less than parcels rate by passenger trains.

I think this year, for small exhibitors, who sometimes only send one or two light, small frames, the parcels post might be utilised with advantage, taking care to have the frames packed in strong, light cases. If forwarded in this way a letter of advice must be sent to the Secretary, with the return postage enclosed, or at the close of the exhibition all exhibits will be returned in the ordinary way by passenger train.

I shall be most happy to forward prize list and forms of entry, on application, to intending exhibitors.—I am, yours, &c.,

WM. BROOKS,
Member of Committee, R.C.P.S.

Laurel Villa, Wray Park, Reigate, Surrey, August 20, 1883.

"VERY RAPID PLATES."

To the EDITORS.

GENTLEMEN,—Much has been written, both in the Journal and ALMANAC, during the last two years concerning the so-called "instantaneous plates," and several valuable formulæ have been published for their preparation; but, although I have carefully followed every instruction, yet in my hands I could in no case produce a plate to register more than 22 on the sensitometer. That there are *some few* commercial plates which will register 24, or even 25, I can vouch for, having of late given a good deal of my time and attention to testing those of the different makers; and while I say *some* will, I must, alas! add that, in most cases, to get 18 to appear is a difficult matter.

I cannot but believe there are some scientific amateur photographers who can produce plates as exquisitely sensitive as those of the *some few* makers I have alluded to, and if they would kindly publish in your Journal their formula they would confer a great boon on a large number of their photographic brethren, and, amongst them, on your humble servant.—I am, yours, &c., HENRY B. HARE.

Great Elm Rectory, Frome, August 15, 1883.

EXCHANGE COLUMN.

I will exchange a whole-plate combination and view lens, by Hermagis, in perfect condition, for a cabinet lens.—Address, M., The London Studio, Filey, Yorkshire.

What offers in exchange for Victoria camera, nine lenses, gem camera, twelve lenses (new), 10 × 8 bellows-body camera, two dark slides?—Address, C. P. GEE, Weymouth.

I will exchange a *carte* midget camera, with two lenses and repeating-back, for taking four pictures on a quarter-plate, also cabinet rolling-press, for a half-plate portable apparatus, or offers.—Address, A. NOCK, 29, Gower-street, Lozells, Birmingham.

I will exchange an empire cloth background, 8 × 8, and beautiful side slip in oil, by Kemp Edwards, for an outside scene, rocks, trees, &c. Those having such please send card of same (must be in oil).—Address, J. M'KENZIE, photographer, Burntisland, Fife.

I will exchange a photographic booth, almost new, photographic tent, on three wheels, good as new, and a whole-plate glass bath, water-tight pine case, for anything useful in photography, or offers.—Address, H. H., photographer, Fore-street, Abingdon, Berks.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

Fred Barber, 23, Chipping House-road, Sheffield.—*Photograph of an Iceberg, Taken off the Coast of Newfoundland.*

ANGLO-YANKEE.—Received.

DRY PLATE.—Evidently the gelatine was decomposed.

ELECTRIC.—Purchase a cheap manual on the electrotype process; that will give you the necessary information.

RURAL.—The longest-focus lens should cover a plate $7\frac{1}{2} \times 5$ with a small stop. The shorter-focus lens can hardly be expected to cover much more than half-plate size.

S. S. S.—You will find an article on the subject in the Journal a few weeks since. There is nothing new in your communication, as you will see if you read the article.

L. W. R.—1. We have no further information than that published in the proceedings of the Society.—2. The convex side of the lens should be next the ground glass.

CHARLES MORRIS.—We imagine there will be no objection to your working for the trade. If you have any doubt on the subject why not write to the firm who supply the materials?

B. O. Z.—We are not aware of anyone in England who produces that kind of photograph. Possibly Messrs. Marion and Co. could procure them for you, if you require a sufficient number.

A. RUTTY.—Unless you have a proper oven for "stoving" you will not succeed in re-japanning your metallic dishes. Two or three coats of good black varnish will serve to protect the metal for a time.

W. A. K.—Make a solution of Castille soap—one grain to the ounce of alcohol. Rub the prints over with a pledget of cotton wool charged with this before burnishing. You can have nothing more satisfactory or more simple.

L. LEVY.—The paper has been allowed to become damp. We fear that it is now of very little use. The mildew spots will certainly show in the prints; and, so far as we are aware, there is no means by which it can be avoided.

ANXIOUS.—The great drawback to all photographs which have been made transparent, and then coloured from the back, is that the material with which they are made transparent turns yellow, and thus spoils the picture. Wax, paraffine, Canada balsam, &c., will render the prints transparent.

V. C. B.—Precipitate the silver from the washing waters with common salt. If it do not quickly subside, stir in a small quantity—a drachm or two—of nitric acid. It will then soon settle to the bottom of the vessel.

R. J. WILLIAMS.—The sample of hyposulphite of soda inclosed is of very inferior quality indeed. It is, doubtless, the cause of the prints fading so rapidly. Throw it away at once and procure a fresh supply from another source.

A. C. H.—Two thicknesses of the paper in question will certainly not be nearly sufficient for preparing gelatine plates, with a window the size you mention. The toning bath should be made with thirty grains of tungstate of soda to each grain of gold.

ULLSWATER.—To enable you to photograph from the deck of a steamer you will require to employ very rapid plates and a very quick-acting shutter; then the motion of the vessel will not interfere. With any but the most sensitive of plates the thing will be quite impossible.

HERTS.—The two cases are totally different. They are not, as you surmise, on "all fours" with each other. If the holder of the copyright proceed against you there is little doubt that you will find yourself mulcted in heavy penalties. We should say the terms offered to you are exceedingly moderate, under the circumstances.

J. W. ROBBINS.—Another case of fading caused by the bronze powder with which the cards are printed. We have often advised that such cards should not be used for prints made in silver, as they are sure to become spotty in a very short period. If you cannot afford to have the address printed in gold you should be content with black ink.

MAJOR GUBBINS, R.A.—Give the cracks two or three coats of ordinary black varnish. This will probably be the best remedy. Several instantaneous shutters will be found described in our ALMANAC for 1880. We cannot afford space to describe the various commercial forms, which are fully explained in the trade catalogues of their different manufacturers.

"CROWDED OUT."—Our Special Correspondent's first notice of the International Photographic Exhibition at Brussels; also communications from E. Dunmore, E. Bradbury, J. J. Acworth, C. Brangwin Barnes, "Free Lance," &c. We are also compelled to leave over several "Exchange" notices till next week.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly Technical Meeting of this Society will be held on Tuesday next, the 28th inst., at eight p.m., at 5A, Pall Mall East.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday evening, the 29th inst., the subject for discussion will be—*On Defects in Gelatine Plates, Especially Surface Markings.*

POST-MORTEM PHOTOGRAPHY.—An amusing tale used to be told about a poor fellow whose death was recorded in the Portsmouth papers within the last month. He was one of the early workers in photography, and the writer remembers going into his dark-room in 1856, when albumenising the paper and compounding the collodion, if not making the gun-cotton, had all to be done at home. Well, this gentleman was called in to make a "likeness" (as it was called in those days) of a certain Captain S——, who had just died. The camera—an object of much wonder in those days—having been erected, the light arranged, the figure posed, the plate introduced, and the dark slide drawn—the operator with his hand on the cap, and a certain little pendulum set swinging with which he used to time his exposures. "Now quite quiet, please. I shan't keep you long!" Tableau!

COPYRIGHT IN PHOTOGRAPHS.—The London correspondent of the *Liverpool Mercury*, in the number of that journal of Saturday last, says:—Mr. M'Laren, the member for Stafford, and Mr. Lewis, the member for Derry, have taken up the cause of the master photographers, whose copyright in their productions has been taken away by the judges. They decided that the author of a photograph was the actual operator. Mr. M'Laren wishes to have it stated that the author of a photograph is the person whose instruments and materials have been used by an operator employed by him to take it. In any case, the right of the sitter is not acknowledged at all. His only protection is that he has not a face saleable to the general public. It is to be hoped, therefore, that before the bill passes this question will be raised. When one goes to a photographer one asks him to take photographs for oneself, not for himself, and he should have no right to multiply it without one's consent. If he gets a face the owner of which does something which makes it famous, why should the photographer have the increment which his sitter has earned? Besides, many husbands and brothers would object to the portraits of their wives and sisters being exhibited in the shop windows alongside of Mrs. Langtry's and Miss Kate Vaughan's. On the whole, there seems to be good reason for refusing to pass Mr. M'Laren's little bill.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1217. Vol. XXX.—AUGUST 31, 1883.

THE QUESTION OF COPYRIGHT.

As we surmised it would be, when writing last week, the Bill introduced by Mr. M'Laren on the 15th instant to amend the law relating to copyright in photographs has been dropped. We remarked that any Bill introduced so late in the session, in the face of the enormous pressure of more important public business before the House, even if carried, could hardly be expected to prove a very effective measure, owing to the brief period that could possibly be devoted to its consideration and discussion.

On the whole, however, we imagine that photographers are not in a very much worse position now than if the Bill had passed—unless, indeed, it had been considerably amended in its passage through the House. Indeed, it is very probable that the exceeding vagueness of the phraseology employed in framing the Bill—an example of which we gave in our last issue—would have rendered the confusion existing in the one it was intended to amend worse confounded. The sole intention of the Bill was to render clear the meaning of the term "author," which in the recent suit in the Court of Appeal had caused so much trouble to the sitting judges. We fear that had the projected Bill passed into law it might have led to litigation rather than otherwise, owing to the ambiguousness of its wording. There is an old saying that "a clever lawyer can drive a coach-and-four through the most carefully-framed Act of Parliament," and we imagine that in the case of the proposed Bill this would by no means have been a difficult feat.

Seeing, however, that the Bill has now fallen through, and that nothing can possibly be accomplished in the way of legislation on the subject until next session, it will be well to consider what should be done in the meantime. Whether Mr. Nottage and those with whom he is associated will take the case which was decided against them in the Court of Appeal to the House of Lords we are unaware. It is notorious that in the now celebrated case, Dobbs *v.* The Grand Junction Water Company, where the question turned upon the meaning of certain words in the Company's act arising from the ambiguousness of the language used, each court to which the case was taken reversed the judgment of the one below, and in the end the House of Lords decided in favour of the plaintiff, although in two other courts it had been decided against him, thus finally reversing the judgment of the Court of Appeal.

However, if an appeal be decided upon, some time now must necessarily elapse before it can be heard. The main question raised in the recent trial, and the one that caused most difficulty, was the meaning of the word "author" in connection with fine art generally. This point was very ably discussed, in our issue a fortnight since, by a correspondent who signed himself *Audi Alteram Partem.* Curiously enough, in the projected bill on copyright which has been before the House for some years, but crowded out, the term "author," which caused so much trouble in court, is very largely employed both in connection with paintings and sculpture, as well as photography.

There is one point, and to our mind a somewhat important one, which the learned judges did not touch upon in their judgment that we should have expected would have been alluded to, namely, the meaning of the term "valuable consideration." In clause 1 of the existing Act occurs the following passage:—"Provided that when any painting or drawing, or negative of any photograph, shall for the first time after the passing of this Act be sold or disposed of, or shall be made or executed for or on behalf of any other person for a good or a valuable consideration, the person so selling or disposing of or making or executing the same shall not retain the copyright thereof unless it be expressly reserved to him by agreement in writing." We should have liked to have ascertained their lordships' opinion as to whether the salary paid to an employer to carry out certain instructions does not constitute a "valuable consideration." Certainly there is a great want of definitiveness about the Act generally; therefore it is not altogether improbable that, if the case be taken to the House of Lords, it might there, as the case now stands, be interpreted in a different light generally, and the judgment of the Court of Appeal reversed.

It will be remembered that in the appeal case the question was put to the court, by the counsel for the plaintiffs, whether an assignment by an operator to his employer was necessary. This question their lordships declined to answer. It was unfortunate (as it is very important) that they did not give an opinion on that point, as their reticence appears to have cast a doubt on the minds of some as to whether, if a photograph be registered in the name of the operator who takes it and he afterwards assigns the copyright to his employer, it will be legally protected. We cannot see that any doubt should possibly exist on this point, provided the assignment be duly effected in writing. Certainly we should advise its being done in all cases where the work is actually performed by an *employé;* but it must be borne in mind that then the copyright will only endure during the lifetime of the operator and for seven years after his death.

In all cases, as the Act now stands—particularly after the recent ruling—it is advisable that the whole of the work of taking the picture should be done by one person. The reason for this is to avoid the point that might possibly be raised, if two persons have been engaged in the operation, as to which of them was the real author; for it appears that the authorship cannot legally exist in more than one person.

Seeing that so many loopholes exist for piracy photographers cannot be too careful when effecting the registration of their pictures, and should always register each individual picture when more than one negative is taken. Here is a case in point which illustrates the necessity for such precaution:—In a case connected with the piracy of a portrait a few years back, it was proved that a double negative was taken with a bi-lens camera, and only one half of it was registered, as each picture being, of course, in the same position and taken at the same time, it was considered unnecessary to register both. But, in court, it was decided that as two portraits were taken, although in the same position, they were from slightly different points of sight, and were, consequently, not the same; therefore the copyright could not exist in both.

As regards any new Act nothing can, of course, be done until next session; but, in the meantime, photographers should combine and take immediate steps to endeavour to secure an efficient measure to protect their interests. And we again express the opinion that

the well-considered Bill which has been before Parliament for some few years past would, with slight amendments, be quite sufficient as a protection alike both to photographers and the public generally.

ON THE USE OF GAS.

The Bunsen burners, and those of Fletcher's named "radial," possess such an infinite variety of uses that we should imagine few studios would be without them. Maughan's apparatus for the instantaneous production of hot water—the gas flame playing among metal threads over which the water flows—is ingenious and useful, as also is Fletcher's burner for effecting the same purpose in a different manner; but they do not appear to be in common use among photographers. To some extent the cause may be the extra cost. There are few studios which do not possess a kettle; and, when the only extra expense is about one shilling and ninepence when a burner such as we have described is to be purchased, the investment certainly commends itself over the other forms.

The next mode in which the employment of gas becomes of interest to photographers is in its use for what are properly termed "furnaces," which, since the days when Gore and Griffin each showed the capability of gas for producing intense heat, have undergone such vast developments that now the melting of a few pounds of cast iron is quite a simple affair.

The melting furnace, however, we must at the outset state, is not of the use to photographers that might be expected, as it is likely to be required for little beyond the reduction of residues, and the justice of our remarks will be seen when the space occupied by but a small quantity of silver residue, with its accompanying flux, is taken into consideration; in fact, half-a-pound of silver chloride would need a crucible of such dimensions that a most expensive supply of gas would be required to feed it and a furnace of great size to contain it. But for small test operations—the reduction of a small quantity of precipitate to judge of the proportion of silver contained in the whole—a melting furnace may be useful; though here the expert would use but a few grains to make the test with. We are aware that there is with many photographers, on the score of economy, a feeling in favour of reducing their own residues; but when the cost of fuel, broken crucibles, and value of labour engaged, the expense of carriage, and so on, is taken into account, it will be seen—when the two plans of reducing at home and sending away to be reduced are compared—that there will be little, if any, pecuniary advantage in the former method.

When, however, we come to apparatus of another kind—the muffle furnace—we find a complete adaptation to the needs of the photographer who desires to work in that beautiful but little-practiced process—the making of enamels. The old muffle furnaces with charcoal as a fuel were obtainable of comparatively small size, but were by no means inexpensive, several pounds being required for the purchase of the cheapest of its kind. Then, again, the time and labour required to lay the fuel, light it, and put the whole in working order was such an important item that it was quite sufficient to deter any but the most ardent experimentalist from essaying the production of enamels; while for those occasional moments only which a photographer in full work could well spare for tentative experiments, the requirements of such a muffle furnace were almost prohibitive. With gas as a fuel and an efficient furnace available all this is changed, and there should be no difficulty in any photographer turning to the making of enamels in his spare moments. A tap is turned, the gas lighted, time given for all to become heated, and then, without further attention or necessity for "stoking," a red-hot oven is ready, and remains so for hours, to receive the enamel already prepared for its baking.

We do not speak on the present occasion *ex cathedra* on the details of enamel work; but as in time past gas furnaces for muffle work have had a bad name, we think it but right to record facts as to the present state of perfection to which they have been brought, and this we are in a position to do from actual observation.

Our readers may be aware that the assaying of the noble metals, as performed at the few Assay Offices of the kingdom, is an operation on which great interests depend, and which, as thousands of assays are performed in a single week in one office, admits of no playing or tampering with its operations or processes. Hence, if it be found that gas muffle furnaces are employed in these establishments to the entire exclusion of coke or other solid fuel, it may be safely assumed that they have been brought to a state of complete practical efficiency quite outside those quasi-practical apparatus which, though they could be made use of, were continually liable to failures, and required an expert to watch them while in action.

Having seen these gas furnaces in action at an Assay Office, we, in view of their possible use to photographers in enamelling, made inquiries as to their use from the assay-master. He most courteously gave us all the information we required. He stated that he had had them in use for nearly twelve months, and that they were all he could desire in working. At their first introduction he only put out of use one of his old coke muffle furnaces; but, as he became accustomed to the new form, he gradually disestablished the latter, and now has dismantled them altogether and built up other laboratory arrangements to accommodate the gas. He is enabled to dispense with the services of the furnace attendant, whom formerly he had to engage for the sole purpose of lighting and attending to fires. His wages so saved pay for all the gas consumed, and there is thus a clear profit of the cost of fuel saved, not to speak of increased comfort and convenience.

In the first few months of using the gas furnace he met with expense in the burning away of the corrugated top of the burner; but he has now quite prevented its occurrence by slightly raising the body of the furnace from its support by means of small pieces of fire-clay about half-an-inch thick. The manufacturer, however, informs us that with a due regulation of the draught there is no need for this precaution at all.

We have dwelt somewhat fully upon this phase of the use of gas from a desire to see a larger number of photographers take up the beautiful process of enamelling, which from one cause or another has not attained the position it should. We shall, therefore, defer till our next issue the conclusion of these articles on the use of gas, when we propose to write of some of the minor difficulties which sometimes interfere to prevent the employment of gas with comfort and economy.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XIX.—Universal Landscape Lenses.

By "universal," in the above heading, is here meant adaptability or adjustability of focus. The photographer has his camera pitched at the one point from which alone the composition of the subject is perfect, but when focussed upon the ground glass it is found that either too much or too little of the scene has been got in. Then why not carry a battery of lenses, so that when one fails in delineating upon the ground glass just so much as is wanted and no more, it may be deposed in favour of another which will better fulfil the requirements of artistic composition? While such an expedient is to the individual possessing ample means the most satisfactory that could be adopted, it is open to the serious objection of great expense and much bulk—especially the former. Having one mount it is, of course, easy to adapt to it a variety of lenses set in cells, each lens either set far back or made to project in its cell according to its focus; for it is scarcely necessary to remark that the longer the focus of the lens the greater must be its distance, *cœteris paribus*, from the stop.

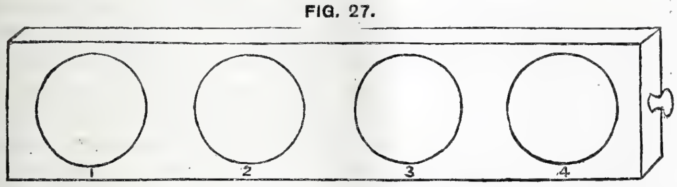
This system is much to be commended, as it enables the photographer to reduce his *impedimenta* to a considerable extent without having to sacrifice efficiency or convenience in any degree. During the series of discussions on landscape lenses which took place at the Photographic Club, the Chairman (Mr. J. T. Taylor), speaking on this subject, showed a mount of convenient dimensions to which he had, by suitable adapters, fitted lenses by Grubb, Ross, Dallmeyer, Darlot, and others. These packed into a pocket-case by themselves; and by making a selection he could have every focus, either singly or in combination, for which his camera was adapted. These were

not mere makeshifts, but each was adjusted according to strict rule. Many years since a continental manufacturer devised and executed a cabinet of lenses for a similar purpose.

Perhaps the most useful lens of all, should it ever reach the stage of being manufactured, will be that which was referred to by the gentleman just named as having been devised by him, but as yet in a too unfinished state for detailed publication, namely, one in which, by the rotation of a collar or the movement of a button in a slot in the mount, the focus of the lens—complete in itself—is susceptible of being altered to a considerable extent. That such really can be done there is no room for doubt, as we have made use of such a combination constructed somewhat roughly, but sufficiently well to show the action. The alteration of the focus is caused by the movement to and fro of certain lenses, more especially of a concave achromatic, so constructed as not to interfere with chromatic correction, no matter how situated. A principle analogous to this has for some time been applied to the low-power microscopic objective by M. Carl Zeiss.

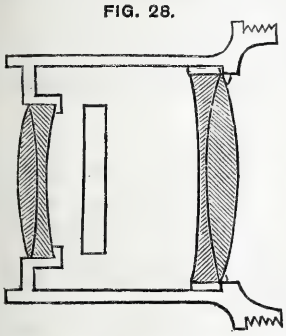
A convenient form of focus-adjuster, which we devised and had constructed several years ago, consists in a sliding piece of brass, made hollow in order to secure lightness, of the form shown in *fig.* 27. It contains four apertures, into each of which is fitted a thin

FIG. 27.



achromatised lens of a negative power. This piece slides through the lens mount, by means of an aperture, shown in *fig.* 28. There are a series of notches on the slide so as to ensure the lens connected therewith being kept quite central. The combination to which this system is attached is a doublet composed of two slightly-meniscus lenses which, when used alone, do not give a flat field. By inserting the slide the influence of either of the four concave lenses contained in it is to flatten the field and lengthen the focus—the marginal pencils being well corrected with a moderately-large aperture. With No. 1 lens the equivalent focus is seven inches, the other concaves increasing the focus respectively in the following proportions:—

FIG. 28.



No. 1	7 inches.
„ 2	9 „
„ 3	12 „
„ 4	15 „

When not in use this slide packs away in a neat, little pocket-case, six inches long by one and a-half inch wide, and half-an-inch deep. This forms a compact and useful appendage to a lens. If one of the lenses of the combination be removed an entire change of focus is produced; but in this case it is lengthened so much as to be useless when employed with a small camera. A series of three auxiliary lenses mounted in similar fashion was prepared and long used by us in connection with the Petzval orthoscopic system, the performance being so good as to have elicited from a clever manufacturing optician an expression of surprise at what he termed the great adaptability and elasticity of this system.

Everyone knows that there is a horn or shell pocket magnifier which can be obtained for a few shillings, and which consists of three lenses of different powers set in horn and hinged on a common pivot, so as to rotate in or out as required. These lenses being of different foci form a tiny battery of seven degrees of magnifying power, according as they are employed singly or in combination with one another; and something analogous in principle to this in photographic lenses is what we contend for as a tool that would prove highly useful to landscape photographers. There is much optical talent lying dormant among photographers. We trust that what has been here said will prove the means by which some of this inert power may be aroused.

In connection with this subject we may remind photographers who employ combinations of lenses, such as those of the rectilinear or symmetrical class, that each lens may be used singly as well as in combination. The focus will then be *about* twice that of the complete objective. But this is not always the case, as many lenses of this class are dissimilar, the front being of longer focus than the back. This is all the better as regards diversity, as it affords three changes. But when employing only one of the elements of this objective as a single landscape lens the best effect is not obtained if the lens be screwed into the tube in the usual way. It is then rather too close to the stop. But by having an adapting ring into which it can be screwed, so as to allow of a greater distance between it and the diaphragm, its full value will then be ascertained. The central definition will be good under all circumstances; but when the stop is close to the lens the marginal definition is bad, but will improve in proportion as the space between the stop and lens is increased, until it reaches its maximum extent of improvement. One such adapting ring (which we have had made to adapt to the single lens of a combination) of one inch and five-eighths in diameter, possesses a width of three-quarters of an inch. When the objective employed in its completed state is a double combination everything is right; but when the front lens is removed then the stop is found to be three-quarters of an inch too near to the remaining lens to produce the flattest field when using it alone.

Incidentally and *apropos* of what has just been said in relation to increasing the flatness of field by placing the stop at the proper distance in front of the lens, we may here remark that sometimes, even when making use of a *single* achromatic lens, a flare spot is found on the centre of the plate. This has been denied by some; but the fact remains that, under certain circumstances, some single achromatic lenses do offend in the manner indicated. It is an indistinct image of the aperture in the diaphragm. The cure for this consists in altering the distance between the stop and the lens. If the stop be pushed towards or withdrawn from the lens, in ever so slight a degree, the flare spot will vanish. This, at anyrate, has been our experience.

If the combination which is to be separated for the purpose of employing only one of the lenses be a wide-angle one, then the back lens may be removed and the front one left *in situ*, convex surface to the view. This is an entire reversal of the circumstances under which a landscape lens is usually employed; but in the case of the lens just indicated it will prove best, especially if the angle to be included is not great.

No better proof of the growing popularity of the gelatino-bromide paper could be found than the announcement which appears in our advertising columns this week. That it is worth the while of a large manufacturing firm like M. Hutinet's to turn attention to the production of an article which might be considered out of their "line," shows clearly that there must be a strong demand for gelatino-bromide paper; and with the immense resources at his disposal we may be certain that M. Hutinet will spare no pains in securing the nearest approach to perfection in the manufacture. Preparations have, we know, been in progress for many months for the commercial supply of the article in question, and the announcement of the approaching visit of M. Hutinet and Professor Stebbing to this country show that the arrangements are now complete. The object of that visit is to carry out a series of practical demonstrations of the process in London and the provinces, commencing on Monday next, the 3rd September, at the Golden Cross Hotel, Charing Cross, at 8 p.m., to be succeeded by visits to Newcastle, Edinburgh, Glasgow, Liverpool, Birmingham, and concluding with a final demonstration at the meeting of the London and Provincial Photographic Association (by special request) on Thursday, the 13th September, at 8 p.m. For all other particulars we refer our readers to the advertisement itself, which will be found elsewhere in our present number.

We this week publish the first of a series of articles entitled *Round the World*, by our friend Mr. Andrew Pringle, who is

equally well-known to our readers for his artistic skill and his power as a descriptive writer. When we said *au revoir* to our friend last December he promised to send us an account of his trip round the world—a trip which, with our modern facilities, is rapidly growing to be looked upon as a mere holiday tour. In Mr. Pringle's case, however, it will be no hurried race through the different countries he visits, and we may rest assured that, both with pen and camera, he will secure lasting observations of whatever of interest he may meet in his travels. Those who are acquainted with Mr. Pringle's work in the last three or four exhibitions will look forward with interest for the artistic results of the present campaign.

We are naturally all interested in any new discovery regarding substances sensitive to light; but we do not think that photographers are likely to make much out of the latest discovery in that direction. M. Guillard has been making a study of the properties of iodide of nitrogen, and, in a communication presented to the French Academy of Sciences, asserts it to be extremely sensitive to light. As, however, this chemical is one of the most dangerous explosives known—the lightest touch of a feather sufficing to cause its detonation—there is little doubt that photographers will admit its interesting nature, and leave experimenting with it to the "immortals."

The French Association for the Advancement of Science meets a month earlier than its British exemplar, and, opening on the fifteenth of this month, concluded on the twenty-fifth. The treasurer, in his statement of accounts, naturally referred to the British Association, and said that the expenditure of the latter, as found in the last published statement—namely, that of the York meeting—coincided within a franc or two with that shown in his own budget about to be brought before the meeting. The number of members in the French Society amounts to about four thousand, which is some five hundred above the British total.

There are few sciences which are not indebted to photography, and names familiar to photographers from their owners' knowledge of the science are often to be seen in connection with important scientific movements. Thus, we learn that the Abbé Moigno and Professor Piazzi Smyth — contributions from whose pens have enriched our pages — have been appointed members of the commission for the preservation and perfecting of weights and measures.

Again, too, Mr. F. Wenham, whose connection with photographic optics is well known, has, we learn, perfected an invention in connection with gas illumination which will shortly be made public. No details are yet given; but it is stated that the invention, besides other advantages, will enable threefold value to be obtained from the gas consumed.

Hydrochloric acid, which is an essential in the platinotype process, should be used perfectly colourless; and, as the commercially "pure" acid can be purchased at a very cheap rate, there is little fear of the cheaper, impure acid being employed. The latter kind is usually very strong and of a dark yellow colour, which is commonly understood to be caused by the presence of some ferric compound. A writer in the *Chemical News* points out that Miller, in his *Elements of Chemistry*, so explains the yellow colour, but that in the last edition of Roscoe and Schorlemmer's *Chemistry* the presence of organic matter is stated to be the cause of the colour. The writer above quoted, however, obtained a sample of commercial acid and tested it for himself. He found iron present in very decided quantity.

There is at the present time in the pages of the above journal an interesting discussion being carried on in which the power of ammonia to cause a precipitate in nitrate of silver is brought in question. We extract the following sentence bearing upon the subject:—"I took about $2\frac{1}{2}$ c.c. of a strong solution of silver nitrate diluted with water to about 50 c.c., and, after heating to boiling, added a drop of dilute ammonium hydroxide solution—no precipitate; two drops—no precipitate; three drops—no precipitate; twelve drops—none." We make no comments at present upon the facts here stated, but when in a scientific discussion such irregular nomenclature and such a loose method of stating quantities are given (these apparently very exact quantities represent nothing), it is by no means unlikely that disagreements should arise.

We have from time to time brought under our readers' notice facts in connection with nickel and nickel plating, and we feel assured that the time is not far distant when nickel will assume a very important position in scientific apparatus, as well as in more domestic implements. The "nickel silver," so long familiar to us, is in reality a nickel alloy containing varying proportions—sometimes small—of true metallic nickel. We learn from a paper, read at the American Institute of Mining Engineers, by Mr. Blake, F.G.S., that pure nickel—for many years a preparation unknown outside the laboratory of the chemist—has been, so long as ten years ago, through the experiments of Mr. Wharton, rendered a marketable article producible by ordinary metallurgical processes. It is now manufactured by several other firms, and promises to become an important industry. Dr. Fleitman, of Iserlohn, in Prussia, has further simplified and improved the process of manufacture, and now many establishments are engaged in it. It is found that iron can be plated with nickel just like tin plate; while the metal, being hard and ductile—very similar to iron, indeed, in its physical properties—can be worked into shape and is very lasting in use. Dr. Fleitman has already begun the manufacture at Schwerte, and has turned out a variety of vessels which the writer referred to states to be "very beautiful in appearance, resembling highly-finished platinum vessels more than ordinary ware. When planished and buffed off the surface becomes like a mirror, and will answer the purpose of one." From these remarks it is evident that there is a future before nickel, and there are many uses to which it could be applied in photographic work with great advantage.

PHOTOGRAPHY NOT A FINE ART.

And, first, for a word of explanation. At the last meeting of the London Photographic Club it was my lot to be placed in a honourable position, in which I would naturally be expected to say a few words by way of introducing the subject announced as that for discussion that evening, which was *Photography as a Fine Art*. The position I took in the argument was one which did not seem to be altogether in harmony with the opinions entertained by some others, and, as I believe that some misconception exists, I have considered it advisable to present the matter in a more public form, so as to have it ventilated.

Photography is not a "fine art," the averment of some to the contrary notwithstanding. Not only is it not so, but from the very nature of things it cannot be a fine art. "What, then, is it?" do you inquire. It is a *technical* art—a graphic means of delineation—and nothing more nor less than this. "Are photographers, then, not artists?" you ask. This question has really nothing whatever to do with the matter in the abstract, but I shall come to it presently.

At the very threshold I admit the extreme difficulty of pronouncing as to what is or is not fine art. A great deal has been written on this subject; but, after an extended course of reading with a view to obtaining a definition that would be satisfactory, I am compelled to admit my inability to furnish one. Fine art is something like poetry—a matter of feeling rather than one susceptible of a hard-and-fast definition.

The feeling of fine art exists quite apart from the means taken to give expression to that art. I can conceive of an individnal being a true artist who is quite incapable of expressing his ideas in an adequate manner. This latter belongs to technical rather than fine art. A man may be able to conceive fine artistic compositions, fine paintings, fine scenes, or fine music without possessing the technical ability to draw, paint, play, or even write. These gifts are technical, and of a lower order than the genius by which such feelings were conceived. By "technics" I mean the utilitarian arts—those which are industrial or necessary, embracing mechanical and chemical arts. Photographic art falls under this category. So, for that matter, does painting, drawing by the pen or pencil, and engraving.

These are only the means to an end, that end being the giving expression to certain feelings or conceptions.

Perhaps the following incident will afford a clearer conception as to the distinction I have in my mind between the artist and the technist:—A certain painting was executed by an artist of the highest eminence. With the exception of a small portion—and, as I think, one of secondary importance—that painting was a mere transcript of a realistic scene which was made under the guidance and according to the designs of the artist in a carpenter's workshop. This scene was erected in the painter's studio, and when everything was complete, but not till then, the artist set to work and made a literal copy in oil pigments of his conception, which had by the carpenter's aid been created and arranged in the studio. Where, in such a case, does the artist and the technist respectively come in? Both of these are contained (so to speak) in the same individual; but a line of demarcation can easily be drawn. As an artist he conceived and created the design, and when that was completed his function as an artist ceased and he then exercised technical art—an art of a different order; and by means of this technical skill he imitated with pigments on canvas that which his genius had evolved and brought into existence. I can conceive of his having entrusted the imitative or copying portion of the work to another—an apprentice or a pupil, or even to a photographer; but such individual would not be entitled to rank as the creator—the artist of the work.

St. Paul's Cathedral was evolved from the "inner consciousness" of Sir Christopher Wren, and he is rightly entitled to be designated the "creator"—the "artist"—of this undoubted work of fine art, but the execution of the work was entrusted to a master builder. The consideration of these things brings us a little nearer to that of photography as an art. I have said that photography, *per se*, is not, and cannot be, a fine art. It is a graphic, not a creative, art.

Are photographers *artists?* Not necessarily, by a long way! One man may be an admirable photographer—a first-class workman—but yet be entirely devoid of art feeling or art knowledge, or of a knowledge of a single one of the canons of art. He may be faultless as a technist, and produce photographs which elicit unqualified admiration on account of their fidelity to nature or to that original from which they were copied; but he is an "operator" only. Art has no place in his formation; he is a mechanic—nothing else. Another may have the true art feeling and employ photography as a suitable means of giving expression to his art conceptions; but, for lack of technical or mechanical skill in working with his chemicals, he may prove a very poor photographer indeed. There is no one who reads this who will experience difficulty in adducing examples of this class. The third class embraces those who possess not only artistic ideas but are acquainted with the rules of art, and possess such a technical acquaintance with photography as to make it subservient in delineating with the greatest possible perfection their art conceptions. These men are artistic photographers, or photographic *artists*, and the works they produce are entitled to rank as fine art.

Two photographers equally skilled as technists may go out "viewing," as it is termed in America; they may keep tolerably close together during their wanderings; both may produce photographs of equal merit *as* photographs, and yet the works of one shall be entitled to rank as fine-art productions, while the other cannot rise above the level of fine photography. It is the man—not the process he employs in delineating or giving expression to his ideas.

Photography, therefore, is not a fine art; but it may, and often has, become the medium through which works of art are produced. A celebrated scientist present at the meeting to which reference has been made informs me that this is a distinction without a difference. I think not. Like masonry, penmanship, or the engraver's art, it is the means by which ideal art becomes delineated art. It was a happy thought of my good friend, Mr. Henry Greenwood, to create for photography the term "art-science;" for this more fittingly expresses its true relation to both art and science than anything else possibly could.

From the facility of delineating art ideas by its agency, from the intimacy of its relation to art, and from the constant calls made upon the photographer to conform to the rules and conceptions of art, photography has done more than any other graphic art to develope art feelings in those by whom it is practised; and it is gratifying to find that so many real and true artists are now associated with the use of the camera. May their proportion still more and more increase, until in some "good time coming," but yet a long way off, the term "photographer" shall be synonymous with that of "artist" in its correct sense! J. TRAILL TAYLOR.

THE SECOND INTERNATIONAL EXHIBITION OF THE ASSOCIATION BELGE DE PHOTOGRAPHIE.

[FIRST NOTICE.]

AN account of the above Exhibition, which was opened at the Palais des Beaux Arts on the 15th instant, should be of special interest to our readers, if only that out of about 160 exhibitors 41 are English—that is, if we may be allowed to include Mr. Adam Diston, of *Levenfife* (as the catalogue expresses it), and Mr. Werner, of Dublin. The number of exhibitors for Brussels is 21, Paris 19, Austria 11, Berlin 7, the remainder being from Russia, Bavaria, Spain, Portugal, Holland, Switzerland, some of the Belgian smaller cities, &c., &c.

We may at once say that the English work will bear favourable comparison with any in the Exhibition, and it may be observed here that if the decision of the judges should not be satisfactory to *all* the exhibitors—a result by no means unlikely—the hanging committee cannot certainly be blamed for it, as there is not a picture in the Exhibition that cannot be thoroughly examined without the slightest effort by anyone of average height—a state of things we have no doubt the censors will thoroughly appreciate, as, frequently, gentlemen occupying this uncomfortable position are compelled to pass by many works of art because they are either "skied" or "floored," intentionally or accidentally.

Gelatine, of course, is well to the front, and many of the most successful examples, we are told, were developed with ferrous oxalate. Collodion, however, has not quite died out on the other side of the Channel any more than here, and both in its old form, and also as an emulsion, is well represented.

The pictures are arranged round the large room of the Palais, and immense screens, running nearly the entire length of it, take what will not conveniently go on the walls. A room to the left is kept especially for apparatus, transparencies, &c., an attendant being provided for the purpose of explaining the working of the former—an arrangement, by-the-bye, that should ensure the exhibits being returned to the owners in a less number of pieces than usual.

Although the number of exhibitors is mentioned as 160, it must not be supposed that the display is a small one, as most of the competitors send several large frames—some as many as eight to twelve. The pictures are not numbered, but a large card, bearing the name of the artist, is placed over his work.

As we enter the room, and turn to the left, we begin by noticing some fine interiors by Herr Hermann Ruckwardt, of Berlin. The prints are about 15 × 20, and one case, containing four views of the staircase of the Royal Palace of Bruhl-sur-Rh., are equal to anything of the kind in the Exhibition.

Following these comes Mr. Vandyke, of Liverpool, with six showily-displayed frames, containing portraits of good average merit. Some of the negatives are taken on Messrs. Mawson and Swan's collodion plates and one frame on dry plates prepared by the same firm. We conclude that Mr. Vandyke is determined there shall be no mistake as to the ownership of the copyright of his pictures should any cause of action arise, as on some of them we find the following in French and English:—

> "Photography by the collodion process. All executed by the exhibitor *personally*. Exhibitor has an aversion to much retouching, and seeks excellency in the general effect of posing and lighting. Taken with a Dallmeyer lens—no diaphragm used."

We presume the child standing on the drawing-room chair with his hoop and stick has merely been allowed to stand there because he is being photographed, and hope for the sake of the furniture it is not the position usually occupied by the little boys of Liverpool.

Herr Klein, of Baden, has some good portraits—those in national head-dresses being very effective. There is, however, more work on the prints than we should think everyday work would permit.

Following these we come to some of the best specimens of instantaneous work, by M. Charles Grassin, of Boulogne, it has ever been our good fortune to see. One case contains four pictures about 10 × 8. Two of them are of steamers going out and coming in. These are very good indeed; but one of a breaking wave, and another of a railway train at full speed—taken, not "end on" but "broadside" (we are told in the the two-hundredth of a second)—are simply perfect. The same gentleman sends six other frames, but the above is the most noticeable.

A case of excellent panel portraits by Mr. W. J. Byrne, of Richmond, similar to those for which he obtained a medal at the London Exhibition, is succeeded by some electric-light portraits by M. Liébert, of Paris, which are very effective, but not, in our opinion, equal to those by M. Dupont, of Brussels, to be found in another part of the room.

Messrs. Morgan and Kidd, of Greenwich, send several pictures to show the capabilities of their gelatino-bromide negative paper. On the merits of these opinions may differ, but as to the excellence of the two portraits of children on *plaques* exhibited by this firm there can scarcely be any question.

We now come to a frame that should interest our friend Mr. R. Faulkner; and, when we say we think that even that gentleman might learn something from the charming children's portraits taken (in from a-quarter to a-fifth of a second) by M. Otto Pfenninger, of St. Gall (Suisse), we have paid that artist the highest compliment of which we are capable.

The Woodbury Company send some good reproductions of engravings and concave *plaque* pictures. Their enlargements of Madame Modjeska and Mrs. Langtry are too darkly printed for our taste.

Herr George Brokesch, of Leipzig, exhibits the finest direct large groups we have ever seen. They are about 20 × 16, taken in the studio, about four or five o'clock in the afternoon, with exposures varying from ten to twenty-five seconds. It is not, however, on the score of rapidity we would notice these, but the posing, lighting, and expression of the various members of the groups are something wonderful. Let those who say photography is not an art see these pictures, and if they do not alter their minds we shall have no hope for them. *Going Up the Mountain* and *The Return* are very fine, but the *Amateur Photographer* is, perhaps, the best of them all. The comic, half-frightened expression of the native, who is holding the dark slide partially wrapped in a shawl, while the fair amateur is arranging the apparatus, is a study in itself. Some 20 × 16 portraits, by the same artist, are very lifelike—one study *(Titian)* being specially notable.

M. L. Salomon (Deassau) sends a variety of styles. The pictures are well framed and mounted, but they present a hard appearance, and the tones are too black.

Near these will be found some good solar enlargements, by M. Axtmann, of Planen.

Mr. John Ward, of Brussels, exhibits a few very fine photo-micrographs, some being up to 2,000 diameters. There is also a selection of this kind of work exhibited by the Societe Belge de Microscopie; the results, however, as a whole, are not equal to Mr. Ward's productions.

M. Groger (Silesia) has evidently some peculiar process of toning. There is nothing to explain the matter; we can only, therefore, say the results are more peculiar than pleasing.

Two Russian gentlemen whose pictures are to be found here seem to make a speciality of softness to such an extent that, as a rule, the eye finds no point to rest upon. These are Mr. A. Kareline and Mr. E. Solovief. The former exhibits *genre* pictures from whole plate to about 20 × 16. We are informed that each picture is printed from *one* negative only (wet collodion). The posing is in most cases unnatural and stagey. The latter gentleman is more successful in his posing, and the pictures are apparently taken "at home." Prints from some of the same negative may be found in the Amsterdam Exhibition.

Through the courtesy of M. Geruzet, Secretary of the Association Belge de Photographie, we are enabled to publish a corrected list of the jurors and their awards in connection with the above International Photographic Exhibition :—

Jury.—Dr. F. Stolze, Berlin; Captain W. de W. Abney, London; MM. L. Warnerke; Davanne, Paris; De Blochouse, Brussels; A. Geruzet, Brussels; De Pitteurs, Zepperen; L. Montefiore, Paris; L. Dommartin, Brussels; E. Smits, Brussels.

Grand Diploma of Honour (hors concours).—MM. Goupil and Co., Paris.

Diplomas of Honour.—Dr. Stolze, Berlin *(hors concours)*; MM. Geruzet frères, Brussels *(hors concours)*; *Photographic News*, London; Société Belge de Microscopie, Brussels; L'Association Belge de Photographie, Brussels; Campo and Colard, Brussels; Gauthier-Villars, Paris; Srczniewski, Petersburg; Leon Vidal, Paris

Gold Medal given by the King of the Belgians.—Mr. H. P. Robinson, Tunbridge Wells.

Silver-gilt Medals.—Messrs. W. Bedford, London; E. Grassin, Boulogne-sur-Mer; Solovief, St. Petersburg; Major Volkmer, Vienna.

Silver Medals.—MM. Frederick Bruckmann, Munich; G. Brockesch, Leipzig; H. Colard, Brussels (amateur); A. Diston, Leven; W. England, London; Dr. Fritsche, Berlin; W. Hoffman, Dresden; G. Hare, London; Hunter and Sands, London; H. Krafft, Paris (amateur); J. Löwy, Vienna; Abel Lewis, Douglas; A. Lugardon, Geneva; McLiesh, Darlington; Marsh Brothers, Henley-on-Thames; J. Maes, Antwerp; G. Pizzighelli, Vienna; H. Rückwardt, Berlin; G. Scamoni, St. Petersburg; R. Schuster, Berlin; Scolik, Vienna; H. Stevens, London (amateur); Taschler and Signer, Basle; Wurthle and Spinnhirn, Salzburg.

Bronze Medals.—MM. L. Aillaud, Albi; O. Anschutz, Lissa; E. Aubry, Brussels; Autotipie Verlorg, Munich; P. Arents, Paris; G. Balagny, Paris; Bonfils and Co., Beyrouth (Syria); Brauneck, Mayence; E. Brightman, Bristol; J. M. Brownrigg, Guilford; J. Chaffin and Sons, Taunton; J. Dupont, Brussels; F. W. Donkin, London; H. Dandoy, Maestricht; D. Ermakow, Tiflis; J. Hallez, Dinant; H. N. King, London; J. Kossak, Temesvar; D. Hutinet, Paris; Julien Laferriere, La Rochelle; L. Laoureux, Liege; A. Leisner, Waldenburg; A. Liébert, Paris; O. Pfenniger, St. Gall; Platinotype Co., London; G. Renwick, Burton; de Saint Senoch, Paris (amateur); Thury and Amey, Geneva; Van Bosch, Paris; John Ward, Brussels (amateur); Watson and Sons, London; Woodbury Co., London; West and Son, Gosport; York and Son, London.

Honourable Mention.—Naumann and Schroeder, Leipzig; W. Otto, Dusseldorf; P. Schahl, Berlin; Evely and Deron, Brussels; W. Gillard, Gloucester; E. Pirou, Paris; Kareline, Nijni-Novgorod; Van Ronzelen, Berlin; J. Moffat, Edinburgh; MM. Burato, Zara; Chmielewski, Poltava; W. J. Byrne, Richmond; Von Ayx, Mayence; Fabronius, Brussels; Kurkdjan, Eriwan; A. Petitt, Keswick; Storms, Antwerp; Von Staudenhein, Feldkirchen; Eckert, Prague; R. Slingsby, Lincoln; Harrison, Paris; F. M. Sutcliffe, Whitby; Just, Vienna; Batkin, Brussels; Keymeulen-Pettens, Brussels; Hofmans, Brussels; Corroyer, Brussels; Deneck, Brussels; Martin, Paris; Shew and Co., London; Bruno-Meyer, Karlsruhe; Girard, Paris.

THE RECENT ECLIPSE.

I HAVE considered one section of our observations, namely, that relating to the chromosphere or inner portion of the sun's atmosphere. We must now see whether any new facts have been ascertained about the corona. In order to do this I must first refer to the early observations of this phenomenon.

Drawings of it made by men at the same place showed the greatest discrepancies; indeed, Professor Young, to whose work on the sun I would refer your readers for pictures of this beautiful solar appendage, writes that in 1878 he found—"On comparing notes with the other members of my party, that about half of them saw the corona principally extended to the east and west, while the other half, myself among them, were just as positive that it brushed out mainly to the north and south. The photographs showed that the principal extension was, undoubtedly, along the east and west line, but that there were much better outlined streamers, though shorter and less brilliant, directed from the solar poles." Professor Young then points out that definiteness of form impressed some observers most, while others were more affected by size and luminosity.

Some observers have seen—or, rather, have thought they saw—the coronal rays rotating. Don Ulloa, in 1778, and M. Arago, in 1842, reported this appearance; and in 1870 an officer, in reply to a question by Mr. Lockyer as to why he had not drawn a picture of the corona, said—"How on earth could you draw a thing that was going round like a firework?"

Hence the aid of photography was soon invoked. The first photographic observation was made at Königsberg, with a small telescope during the eclipse of 1851, by Dr. Busch. The photograph is a daguerreotype, and is now preserved at the Strasbourg Observatory. An engraving from it will be found in Mr. Ranyard's valuable work on *Solar Eclipses.* M. Monserrat, in 1860, took four negatives of the corona; it bore a great resemblance to that of 1851, but the drawings are entirely different. In 1868 the photographic party were not successful, as the sky was covered by thin clouds.

Professor Wenlock was more successful in 1879, when he managed to take seven pictures during totality. In 1870 Mr. A. Brothers obtained a very magnificent photograph of the corona at Syracuse. This photograph is the first to show the coronal rays extending far from the sun. In the engraving I am looking at I can trace the streamers extending to a diameter and a-half away from the sun's limb. The year following very beautiful pictures were taken at Dodabetta and Beikul.

At the American eclipse in 1878 some splendid photographs were taken, which showed a very large amount of detail; and very soon now the British public will have before them the engraving made from the three negatives we took in Egypt last year.

By referring to the table given in the last number it will be seen that Lieutenant Qualtrough had to make nine exposures with his two photoheliographs. With the smaller instrument he obtained six beautiful little pictures, but, unfortunately, in changing the slides the larger instrument was shaken so that the details are blurred. The Egyptian photographs and those taken on the present occasion do not show any change in the structure of the corona during the totality. On comparing the photographs and drawings

together it has been found that the corona changes its character between the years of maximum and minimum sun spots, and even from year to year. The comparison of this year's photographs with those of last year will be very interesting, as last year the observations were made about the time the spot curve rose to its greatest height; now it is descending rapidly.

Now, what is the corona? Kepler attributed this phenomenon to the moon's atmosphere; and until it was proved that the moon had no atmosphere this was the accepted explanation. From then till 1869 it was assumed that it was an optical phenomenon. In 1869, however, Young and Harkness saw a bright green line in the spectrum of the corona, now known as 1474 K. This line proved that the corona contained an incandescent gas, and in subsequent eclipses this observation was confirmed.

With an integrating, slitless spectroscope—that is, one taking light from all parts of the sun—a continuous band was seen in 1871, with bright rings upon it—a very brilliant one in the green corresponding to the 1474 line, and three others fainter in the yellow, red, and violet, corresponding to the C and F hydrogen lines and the helium or D_3 line. In 1878 no rings could be seen—only the continuous spectrum. In 1882 the hydrogen and D_3 lines were much more brilliant than the 1474 ring, while this year the reverse was the case. Dr. Hastings traced the 1474 line to a considerable distance from the sun, and he also saw the D sodium line dark and double. This shows that there is something in the corona to reflect sunlight.

From 1869 until this year it has been assumed that the corona was a true solar atmosphere, and the idea that it was a diffraction phenomenon quite died away; but, as the great comet of last year almost grazed the sun's surface without experiencing any retardation, Dr. Hastings considers it just possible that, after all, the corona is purely a diffraction effect, and Mr. Lockyer is inclined to go partly with him. Indeed, in giving the following extract from a recent article of Mr. Lockyer's, I believe I am giving one of Dr. Hastings' arguments. He describes the corona as—

"A picture of surpassing loveliness, giving one the idea of serenity among all the activity that was going on below, shining with a sheen as of silver essence, built up of rays almost symmetrically arranged round a bright ring above and below, with a marked absence of them right and left, *the rays being composed of sharp radial lines*, separated by furrows of markedly less brilliancy."

After there had been time to examine the photographic records of the eclipse in connection with the above description, the enormous difference between the photograph and the eye picture was fully recognised, and in my lecture at the Royal Institution on the eclipse, after referring to the actinic corona, to the striking similarity in the details of the photographs taken at different times and in different places, I said:—"The solar nature of most, if not all, of the corona recorded on the plates is established by the fact that the plates, taken in different places, and both at the beginning and end of totality, closely resemble each other, and much of the exterior detailed structure is a continuation of that observed in the inner portion independently determined by the spectroscope to belong to the sun."

Passing from the photographs to the drawings I pointed out that in Mr. Holiday's sketch, for instance, we got an infinite number of dark radial lines extending down to the moon, with a greater extension than in the photographs, though in some places the shape of the actinic corona and some of its details were shown.

Thinking that this difference might be explained by different lights being superposed, so that of two superposed lights the naked eye used one and the photographic plate the other, I asked the question whether the facts might not be reconciled, and really harmonised with what was actually seen in the telescope, even by supposing that the visual image—this glare, let us call it—was sifted in the telescope by using greater or less magnification in the same way as it was separated out on the photographic plates and in our eyes by the different qualities of the light producing the visual and photographic images.

From this point of view, therefore, I regard Mr. Hastings' observation as one of very great interest, and I believe that it throws light upon a good many prior observations. I do not think, however, that any one will go with him when he proposes to abolish a true corona at the sun, for the reason that the observations to which I have drawn attention show that it is really a dual phenomenon, as I pointed out in 1870; and although diffraction at the moon's edge may be the cause of one part, it cannot be the cause of the other. It is, perhaps, almost too early yet to speculate upon the changes in our views of the chemical nature of the external boundary of the sun's atmosphere which may be brought about by a complete discussion of the question which these observations again bring to the front. I long ago pointed out that the fact of getting in the spectroscope an indication of a line at so many minutes of arc from the limb of the dark moon, was by no means a proof of the existence of a vapour or gas at that height above the sun. Maclear's observation in 1870 was of course the test, for the reason that if such a *caveat* were not available we must assume the existence of coronal matter between us and the dark moon. But in any case it is not too early to bear this in mind, that if in our spectroscopes we have been dealing with a true glare, from whatever cause produced, there will be an almost complete inversion necessitated, and in this way: the brilliancy of any particular wave-length of the glare may either depend upon the area of the surface at the sun producing light of that wave-length, or upon its inherent intensity. Now, if we assume that only the inherent intensity is to be considered, then obviously the region of greatest temperature will cause the brightest light. The brightest light will, therefore, be produced in the lowest level of the solar atmosphere; but because of the glare it will appear to extend to the greatest distance from the sun. It may therefore have been that the line 1474, instead of indicating, as it has been supposed to do, that a substance which gives a line at the part of the solar atmosphere most removed from the photosphere is really produced by that part of the atmosphere, was produced at that part of the atmosphere nearest the photosphere; and really at first sight—although this is by no means a matter on which one would wish to commit one's self hastily—it does seem as if this view would harmonise a great many facts which are very difficult of explanation in any other way.

I discovered the line 1474 in the chromosphere on June 6, 1869, and up to that time no bright line had been observed beyond those belonging to the spectra of hydrogen, sodium, and magnesium, with the exception of one line of barium, which was first seen in March, 1869. Now we know from the long-extended series of such observations, for which we have to thank the industry of the Italian observers, that the line 1474 is now seen more persistently than any line which is not recorded in the spectra of hydrogen, magnesium, and sodium. The eclipse of last year taught us, if it taught us anything, that the lines which are thus persistent are the lines produced at the temperature of the hottest layers; and, if subsequent inquiry strengthens the view that the height to which the line 1474 appears to extend is really due to the depth at which the substance which produces it is restricted, the persistence of 1474 in ordinary chromospheric observations will be at once explained.

I am under the impression that Dr. Huggins took a photograph of the corona, by his method, in England about the date of the eclipse; and a comparison of the two will go a great way towards establishing or condemning this new hypothesis.

I have omitted to make mention of Professor Tacchini's observation. He saw—so he told me—a spectrum somewhat like a cometary spectra on one of the streamers. This observation is very interesting, as, if such be the case, it would show that the corona was truly solar; but with a wide slit the spectrum of a faint light is rather apt to have this appearance. Mr. Lockyer saw what he considered was a banded spectrum in Egypt last year, so that it is possible the observations may be confirmatory; hence I shall await with great anxiety the publication of Professor Tacchini's results.

As regards the planet Vulcan I can say but little. I fully expect that photography has settled the question; but we must wait patiently until M. Janssen and his assistant, M. Pasteur, have had time to examine their photographs. I regret to say that M. Janssen, whom we left on the island, was taken ill and had to remain at Tahiti for some time.

If it be asked—What have we learnt? I should say that we have found a remarkable change in the course of a year in the sun's atmosphere; that the new methods we employed *this year* will, if the sun be at all active, give very satisfactory results at the next eclipse; and, finally, that we seem as far as ever from settling the true nature of the corona. H. A. Lawrance.

MARKINGS IN GELATINE PLATES.—SENSITOMETER TESTS.

In the Journal of August 17th, Mr. G. S. Penny, of Cheltenham, by what I can gather from his communication, has been annoyed somewhat by certain markings in the development of gelatine plates. I have also been "bothered" with the kind of markings he mentions.

This season I was doing a series of negatives, and I noticed the markings occurred in the plates that had been less exposed; but I think there is not far to look for the cause. For this series I purchased some sheet glass that had been polished by machinery, the same as patent plate. I noticed the fine lines appearing before I had developed half-a-dozen of the plates. I soon found the remedy which mitigated the evil to a very great extent. In my case they were fine, hair-like markings—sometimes parallel, sometimes zigzag, and sometimes curves. I found that if the plate were well-exposed they seldom appeared; but where a plate was found to be under-exposed the lines appeared—sometimes opaque and sometimes as fine transparent lines. I have not the slightest doubt that, in my case, the lines were caused by the rouge composition used in the polishing. I have never found it to occur on unpolished plates.

I remember some years ago I was troubled with a similar defect; at that time I was using a rouge composition for cleaning and polishing the plates. I gave it up as soon as I suspected it, and have used nothing since but plain methylated spirits for polishing. I have known some use very fine pumice powder for cleaning obstinate plates, but I find I cannot do better than with the methylated spirits. With rapid development I was not troubled so much, but with slow development I was.

There are other kinds of marking I have met with which I have noticed occurred when I have not rocked the dish. I am aware that some makers of gelatine plates say—"do not rock the dish." This I always considered a fallacy. I invariably find that if the developer be not kept slightly moving on the surface of the plate the development is very uneven at times, and causes markings with a wavy appearance. These I have noticed to occur in the reduced parts, such as the sky. For experiment: expose a plate, place it in a tray, and pour the developer on it, but do not move it. When the image is fully developed open the dark-room window, very gently rock the tray, look steadily at the developer, and the solution in contact with the plate is quite of a different specific gravity to the upper portion of the solution, as can readily be seen. There is not much doubt that this lower layer of the developer contains hydrobromic acid. It is a powerful restrainer; and, as this wanders about the surface of the plate, it causes these markings to supervene. I have found other kind of markings to occur in the hyposulphite of soda fixing bath. I have no doubt many still use glycerine and alcohol with which to make up their stock solution of pyro., but unless all the alcohol has been washed out markings will appear in the fixing bath; that is, if it be allowed to rest, but if rocked occasionally they do not occur.

SENSITOMETER TESTS.

I, like the Rev. H. B. Hare and many others, have made numerous sensitometer tests, but cannot say that I have profited very much by them, as I find the sensitometer test is of very little use where the luminous paint tablet is used as a standard light, as it only appears to register the blue ray as given off from the tablet.

About twelve months since I tested with the sensitometer about twelve different samples of plates. I then found the general average number that I could get was 15. With some I got as far as 21; and I was surprised to find that if I exposed the plate that gave 21 on certain subjects it was not more sensitive than a plate giving 15, especially on foliage subjects. I made several experiments at the time, using a standard sperm candle with much greater success, and the sample of plate that gave 20 or 21 would not give more than 15 when exposed together with another make of plate that only gave 15 with the luminous tablet.

The way I made the test was this:—I exposed a plate and found out how long the 15 plate required to give the 15 the same as it did with the luminous tablet. I then exposed another of the same sample and one of the 21, and with the candle they were nearly alike. I consider the test, to be reliable, should be made with a light giving a certain amount of the yellow ray. It appears, from my experiments, that it does not follow that if we make the plate more sensitive to the blue ray that it is more sensitive to the yellow ray. In practice there is nothing so good as to have a test subject to expose on, either in the studio or out-of-doors. It requires a subject with plenty of light and shade, and this is the only kind of test that I can find of any service to myself. WM. BROOKS.

"DEPTH OF FOCUS."

MR. W. K. BURTON, in your last issue, defends his new definition of the expression "depth of focus," and challenges me to give a better. Now, before any definition is allowed to take its place amongst the standard recognised formulæ, which in any science form a basis for reference and discussion, it should be capable of being shown, on the one hand, that the definition is consistent in itself, and does not require to be corrected by the introduction of any limiting expressions, without which it would imply a condition of things having no existence; and, on the other hand, that the definition is a true statement concerning the quality which it assumes to define. The wording also should not be of such an "opportunist" character, that persons holding totally different views may be liable to assent to it, each thinking that it expresses his own opinion. In these points I believe that Mr. Burton's definition can be shown to be defective.

The definition of depth of focus which Mr. Burton offers for acceptance is "*that it is that quality in a lens which enables it to represent planes at different distances without any perceptible difference of definition.*" This definition of depth of focus is objectionable, in the first place, because it requires the introduction of words greatly limiting its meaning before the condition which it assumes can be rendered even possible. "Different distances" would require to be defined as "*such different distances as will cause but slight variation of the conjugate focus.*" Mr. Burton will not, I am sure, say that this definition was intended for such different distances (say) as that of the length of focus of the lens, and infinity; and he will admit that without the limitation suggested the condition assumed is an impossibility. The case will still be an impossible one if we take a very much less extreme case than the difference between focal length and infinity; and, in fact, we must come down to some such limitation as that mentioned before the definition can apply at all. It then becomes a question of degree; because, to take an extreme case in the other direction, there is no photographic lens that will show any difference of conjugate focal length for objects situate at distances respectively of one and two miles, or (say) separated only a quarter-of-an-inch at a distance of a dozen yards.

Mr. Burton's definition also stands in need of the introduction of another limiting expression *along the same line.* A lens of large angle of view and round field may be capable of defining simultaneously objects at such different distances (say) as twelve feet, twelve yards, and infinity, simply by arranging that the objects situated at such distances shall fall upon different parts of the field. Of course he would not include such an instrument as one possessing "depth of focus."

The main objection to Mr. Burton's definition, however, is that it does not define that quality to which the expression "depth of focus" can most properly be applied, and which has always been generally understood; but that it sets out a something which, being carelessly read, may be supposed to refer to the said desiderated quality, and may therefore obtain assent from those who would certainly withhold it if they saw the meaning it is intended to convey. What has always been understood, and rightly, by gaining depth of focus, is an improvement of definition in the planes not focussed upon. Mr. Burton's definition means an equalisation of definition, however bad, and although everywhere deteriorated.

As Mr. Burton asks me to give a definition to the expression "depth of focus" I will do so, but without the smallest claim to originality, seeing that it is what has always been understood, and was accepted by Mr. Grubb and others taking part in the discussion as to whether such a quality could be obtained by the introduction of spherical aberration. I would say, then, that depth of focus—or depth of definition, as Mr. Burton prefers to call it (and I quite agree with him there)—is *the quality of giving better definition upon planes not focussed upon.* It is necessary to add that such planes must lie in one line from the lens or at an equal angle from its axial line. This quality *does* exist, and may be obtained in any photographic representation of a landscape or other subject, either by the use of a small stop, or, while maintaining the same ratio of aperture to focus, by using a lens of shorter focal length.

Mr. Burton says:—"As to the claim made for diffusion of focus: it is possible that at one time there was claimed for it the power of bringing planes into *better* definition than they would otherwise be," but that he "sees no such claim made at the present day." That "it is possible" implies that Mr. Burton is not aware that it was so in fact. It certainly was; and I am not aware that the claim has ever been renounced. It was claimed for what was called "diffusion of focus" by the introduction of spherical aberration that "by such diffusion objects in planes wide apart were defined better—not simply relatively, but absolutely." There is nothing ambiguous or uncertain in this statement, however mistaken it may be, and it was this claim that induced me to take part in the discussion which followed upon the paper read before the Photographic Society of Great Britain introducing the lens to which this property was attributed.

In that discussion almost alone I argued against the claim that was made. The then editor of your contemporary supported the claim very warmly, even to the extent of suppressing my observations in the report of the discussion. They were, however, included in the report which appeared in this Journal, together with a reproduction of the diagram which I put upon the black board in illustration. Mr. Grubb shortly afterwards* published the more complete and precise refutation of the claim to which reference has already been made. That we were right in contending that spherical aberration does not confer increased sharpness in the out-of-focus planes is now *generally* admitted by those who have investigated the subject in a scientific manner. I may mention your leader of the 17th instant and Mr. Burton's own statement in favour of this contention; but the contrary view having been disseminated amongst photographers is still held by a very large number of them.

If Mr. Burton has come much into contact with "practical photographers" it is probable that he will have met with several, as I have, who have some particular lens which they say has great depth of focus. They have a perfectly-clear idea of the meaning of the expression, and will tell you that that special lens will give the

* THE BRITISH JOURNAL OF PHOTOGRAPHY, February 8, 1867.

background and the figure and the accessories sharper at the same time than any other which they have seen. They are convinced that this property is something inherent in the lens—which is, perhaps, some "old French lens" which, for some reason or other, they don't often use—and will entirely refuse to believe that the matter is only one of proportion of aperture to focus. There are many such instances that might be cited of incorrect theory being set up by inaccuracy of observation, and such an idea as that which I have mentioned is likely to be sustained by definitions which are incorrect or capable of being understood in a different sense from that which they really rigidly include. This is one reason why definitions should be strictly examined before they are allowed to take place with axioms, and why, therefore, I have gone into the matter at this length.

Mr. Burton's definition of depth of focus as "the quality in a lens which enables it to represent planes at different distances without any perceptible difference of definition"—meaning, as he does, that the definition is everywhere worse—would also surely attach to any appliance that would produce the effect stated. Would he admit that an oscillating camera-stand gives "depth of focus?" or that this desiderated quality can be secured by a well-directed kick or two during the exposure?

In Mr. Burton's concluding paragraph he contends that "in an image, no part of which is absolutely sharp, there *is* more depth either of focus or definition, as we like to call it, than in one which has one plane extremely sharp." Well, on the other hand, I do contend that that image which has each of its planes sharper than those of some other image has the greater depth of definition of the two, and I cannot understand how anyone can maintain the contrary.

In conclusion: I wish to acknowledge the frank and candid manner in which Mr. Burton admits that, in his paper which appeared in your Journal of the 3rd instant, he was mistaken in imputing inconsistency in the two articles of mine to which he then referred. WILLIAM E. DEBENHAM.

ROUND THE WORLD.

No. I.

THOSE who remember the weather which prevailed over the whole of Great Britain during the month of December, 1882, will sympathise with me in the pleasure I felt at leaving behind me the snows of Scotland and the murky fogs of London for brighter skies and more genial climates. I cannot pretend that my pleasure was altogether unalloyed, for I left behind me for a year not only all family ties, but all prospect of being able to keep up with the times in case any important step should be made in the photographic journey towards perfection; but the "doctor ordered it," and his orders are imperative to all sensible people.

I started from London with a friend on December 14th, and went on board the Orient liner "Cuzco," being booked by Messrs. Anderson, Anderson, and Co. direct for Taranaki, where I have a near relative lately settled on a small freehold estate. As I had the intention of being away from home for a full year, and as my aim was to "put a girdle round about the world"—going to New Zealand by the Suez Canal and Australia, and returning by America and the Atlantic—it may not be uninteresting to my readers to have an idea of the "kit" I carried with me. I have now been nearly six months from home, and I have lacked nothing, nor discovered any superfluity, so far as I have gone.

I intended at first to carry two cameras, a 10 × 8 and a $7\frac{1}{4} \times 5\frac{1}{4}$, looking to my *compagnon de voyage* to help me in carrying the larger one when occasion presented; but finding my friend to be in extremely delicate health, and sufficiently taxed in strength with carrying himself, I relinquished the 10 × 8 camera and contented myself with the smaller one; nor have I had much cause to regret what at first seemed to me a vexation, as I find my small camera and eighteen plates quite enough to "hump"—a colonial expression for "to carry"—on my back either afoot or on horseback. I carried in a tin-lined box and in luted cases of five dozen each, a considerable number of plates (about twenty dozen), all gelatino-bromide; a portion of them being Wratten's "instantaneous" make, and a larger portion Rouch's ordinary manufacture. I do not, as a rule, carry far from home plates of my own manufacture, as I find that commercial plate-makers produce plates more free from mechanical defects—such as uneven coating, dust, &c.—than I can prepare at home. Some amateurs seem to object very little to a few spots and streaks on a finished negative; but when I find defects of that kind I am tempted to throw the negative away, however good it may be otherwise. I may at once say that both of the makes I carry have fulfilled my every desire. I have no anxiety at the time of exposure except to make the best of my view, and to hit off the proper time of exposure for a perfect result. The plates will surely do their part if I do mine.

Although I had no wish to encumber myself with heavy boxes or multifarious packages, and though I proposed to develope the greater number of my plates on my return home, I felt—as I always do—that I should be working in the dark were I not to provide means for developing a plate now and then. In Italy I had at first made such mistakes in exposure that this time I determined to try a "pilot" plate or two in every new country I visited, and in each succeeding season. Therefore I took with me a tent by Rouch, a bottle of sulpho-pyrogallol solution, besides ammonia, bromide, and other requisites for the completion of a few negatives. These things, with some sheets of ready-sensitised paper and a small printing-frame, constituted the larger portion of my "kit," and the whole—with my camera and stand packed into a box about three feet by one foot five inches by one foot eleven inches deep—was no great affair after all, and no great weight. As I said, I carried my plates in luted cases, and having my changing-box filled at home with eighteen plates, I did not require to open the fresh cases until my first long voyage (to Australia) was over. I also carried two travelling ruby lanterns—one an old favourite by Wratten, the other a new oil lantern by Rouch. These I propose to use when packing exposed plates—an operation not easily conducted in the circumscribed space of a tent. I have now (21st May) gained such confidence in my plates that I intend to send home my large box and tent, and carry only one lamp and two small phials containing chemicals for development, taking my chance of getting rooms with shutters at the Fiji and Sandwich Islands and in California and Mexico, if I go there.

After lying off Gravesend two days on account of fog, and remaining at Plymouth some hours taking on new passengers, we at last got fairly out into the ocean. At Plymouth I got letters telling of the snow lying two feet deep in Roxburghshire, N.B. We got tossed a bit, as usual, in the Bay, and a great many passengers suffered the pangs of *mal-de-mer*, but that is not one of the ills my "flesh is heir to." Amid weather now glorious we passed "Old Gib." about 3 p.m. on the 21st December, and arrived at Naples about 5 p.m. on December 24th. Being Christmas Eve Naples was in full *festa* and the streets crowded; but I took a party of our passengers ashore and introduced them to Neapolitan coffee and *capri bianco*. On Christmas day, after visiting my old friend Pompeii with a large party in three or four carriages, we sailed for Port Said about 5 p.m. Passing through the Straits of Messina early next morning I rose early to see the Sicilian coast and Stromboli, but the mist was too thick to allow of more than the outline of the mountain being seen. On our arrival at Port Said, a coaling depôt of the Orient Company, I took a couple of instantaneous views of the town, and then went ashore with a number of our passengers all intent on seeing the town and spending some money. Several of them effected the latter purpose by buying helmets, pipes, tobacco, &c.; others more speedily, and if possible for less value, at the roulette table. There was for some days a regular epidemic of helmets and scarlet fezes on board the "Cuzco," but a shower of rain soon decimated the pith helmets, and the dye of the scarlet fezes soon damped the ardour of the would-be Turks. After our coaling was done we got into the Suez Canal, which by a chain of accidents we were five days in traversing. Here I got a few instantaneous views, such as ships passing us, and some views of the desert and the towns on the bank of the canal; but none of these are developed as yet. Instantaneous views, which sometimes require coaxing in development, I shall keep till I get home, when I can work them up at leisure and with convenience.

Having passed Ismailia on December 31st, and Lesseps and Suez on New-Year's Day, we got clear of the Gulf of Suez about 3 a.m. on January 2nd. I had in the canal taken several groups of passengers, all of which have since been successfully developed. I found no mischief arise even from the vibration of the screw, though I was assured by the officers that I could not succeed while the propeller was in motion. Going at half-speed I got a perfectly-sharp negative after seven seconds' exposure. The heat in the canal was all the more oppressive because we had to travel very slowly (five knots), and the mosquitoes did their "level best" to drive me mad; however, as Mark Tapley might have said, it was a good thing to have some little unpleasantness.

I see from the occasional glimpses I get at the home papers that the canal is occupying a good deal of public attention. It would certainly be a great convenience to widen the canal, enlarge some of the basins, and light the whole by electricity; but this is not a suitable place for such dissertations. Nor do I intend here to dilate upon our amusements on board. Suffice it to say that we had dances, concerts, athletic sports, and an abortive attempt at the drama; and that I was heartily tired of the monotony long before we reached Melbourne. As we neared the "line" we were frequently put to flight from the quarter-deck by heavy and sudden showers of rain. When it does rain in the tropics it evidently means business! About 5° N. we began to see flying fish, which are interesting objects, but much smaller than I anticipated, being no larger than a small herring. They rise mostly in shoals, "fly" about fifty yards, and then, when their "wings" get dry, drop suddenly back into the sea. Of course we had often large convoys of porpoises, but there was no novelty to most of us in them.

On January 13th we arrived at Diego Garcia, a small island of the Chagos group, and almost entirely devoted to the cultivation of the cocoa palm. This is a coaling station of the Orient Line, and we found the fine steamship "Orient" at work coaling when we arrived. As she

was homeward bound and we outward, warm greetings passed between the ships, and a few of our passengers (I among them) went and dined on board the "Orient."

Diego Garcia, about 70° south of the equator and 73° east of Greenwich, is apparently of volcanic origin, of horse-shoe shape, with a laguna in the re-entering angle, and largely encrusted with coral. The coral, however, seems to be of inferior quality and of little commercial value. The whole industry of the place is confined to the growing of cocoas, and the subsequent manufacture of cocoa oil. The manufacture is sufficiently simple, not to say primitive, and consists chiefly of crushing the flesh of the nuts and squeezing out the oil; but I cannot go into the matter at this time. On the estate—where we were most hospitably treated by the manager and his family—there are, I think, 111 negroes, natives of Mauritius; and I may state briefly that it was most interesting to see the happy relations between the manager and the negroes, and the contented state in which the latter lived. The island is emphatically self-contained, as the people grow their food, rear their animals, and collect their water. Cocoa-nut is the staple article of consumption. Eighty donkeys, 800 fowls, forty or fifty pigs, and a number of goats feed on the cocoa alone; while the manager's family, as well as their negro dependents, use the cocoa largely as an article of food.

After we left Diego the heat became very oppressive, and I got a severe cold by being caught in a tropical shower—more like a waterspout—while trying to sleep on deck one night. On January 18th an A.B. fell overboard; but, being providentially seen by a quarter-deck man, was rescued after an immersion of twenty minutes, holding on to a life-buoy heaved overboard just in the nick of time. Between Diego Garcia and Australia nothing of any great moment occurred. We made less way than usual while we went against the currents prevailing in these regions, but getting clear of them we resumed our usual runs of about 290 miles per diem.

At midnight on the 30th January we arrived in the port of Adelaide, and there we lost some of our fellow-passengers, who were going to various parts of Southern and Western Australia. I did not go ashore here, thinking that I should not have time to run up to Adelaide—a distance of seven or eight miles by rail. Between Adelaide and Melbourne we passed some fine coast scenery; for instance, Mount Gambier, a double-cratered volcano now extinct. The craters are now lakes, one of which is said to be unfathomable. At last (8 a.m., February 2nd) we arrived at Williamstown—a port for Melbourne—and very glad I was to get to *terra firma* once more. I like the sea, but I object to the inactive life one is forced to lead during the greater part of a long voyage. We should have made the voyage some days quicker but for several pieces of bad luck, some of which I have already alluded to. This may never meet the eye of any officer of the "Cuzco," and my remark may seem *de trop* here; but I must place on record my appreciation of the care, tact, and amiability displayed by Captain Riddler and his officers, who not only performed their special duties to perfection, but won for themselves the admiration, respect—I may almost say love—of the passengers under their care. I parted from these officers with great regret, and with sincere hopes of renewing our acquaintance at some future time. All the plates in my changing-box were now exposed. I had a few groups (some instantaneous views, and some groups and views) which I omitted to mention as being taken at Diego Garcia. As there was a pretty stiff breeze when I was ashore at Diego my negatives of the palms, the crushing mills, &c., may not be first-rate, but a group already developed leaves little to be desired except a trifle more steadiness on the part of a child about six years' old.

Melbourne is certainly a wonderful example of what the skill and energy of man can accomplish. Though the city was commenced little more than twenty-five years ago, it is now an imposing and important centre of commerce. The streets are wide, the houses good, some of the public buildings very handsome, and the commerce extensive. The city has an abundant supply of water, a fine city hall and post-office, and several theatres. The suburban towns are in some cases pretty and healthy, and handsome carriages may be seen driven to and from these places. At St. Vilda (one of these suburbs) we stayed ten days. The country round Melbourne is, however, by no means prepossessing; in fact, I thought it ugly. The heat inland was oppressive and the dust most annoying. At St. Vilda there are very nice sea baths staked off on account of sharks, which are very numerous here, as I was told. We took several rides into the country round Melbourne; but the heat and dust prevented me from carrying the camera, and, indeed, the country presented little inducement to me to undertake the heavy load. Fern-tree Gulley is certainly beautiful, but it is twenty miles from Melbourne, and part of the road far from good for wheeled conveyances.

On February 13th we left Melbourne for New Zealand in the "Manapouri"—a fine ship belonging to the Union Steamship Company of New Zealand. The boat was overcrowded so that we had but little comfort on board, though the food was good enough—when you could get it—and the fittings were of the best. The saloon, smoke-room, cabins, &c., were all lighted with the electric light, Mr. Swan's lamps being used. My travelling companion here got seriously unwell, suffering from an attack of European cholera, which, as afterwards appeared, had been rife in Melbourne during our stay. We wished to land at Hobart Town and spend a fortnight amid the glorious scenery of Tasmania, but the shipp authorities would not permit us to break our journey, so we had to c tent ourselves with a cursory view of Hobart Town, which is itself a v pretty little town. Then we sailed to Bluff, the port for Invercarg the chief southern city of New Zealand, and, as I am told, one of earliest settlements in the colony.

On Monday, February 19th, we arrived at Port Chalmers in Ot Bay, the port for Dunedin, and going to the head office of the shipp company in Dunedin we got leave to remain there a week and proc by the next sailing ship of their line. Dunedin is about an hour train from Port Chalmers, and on the journey we had a curious perience of railway travelling. On the line there is a steep gradi about a mile in length, or perhaps less. As we had a very long train carriages and trucks our leading engine could not quite struggle up the top. The train was then allowed to run backwards down the and up another one further back, and then we started afresh taking better run, as it were, at the steep ascent. This time the front engi just managed to wriggle itself over the summit, the carriages follow easily, and then we ran down along the shore of Otago Bay at a sha pace into Dunedin. The views of the city and bay from several poir on the line are not easily surpassed in beauty when the tide is in.

Dunedin is, like Melbourne, a wonderful monument of human indu try and progress. What is now one of the chief thoroughfares of t city was a few years ago below tide mark. The public buildings, if n so large or costly as those of Melbourne, seem to me in better taste a of a purer style of architecture. From the heights above the city the is a splendid view of the bay and the smaller towns adjacent. Duned is eminently Scotch, as, indeed, is the whole province of Otago. dinner in Dunedin more Scotch accent may be heard than at a "ordinary" in Edinburgh; even colonial-born men speak with a mark accent. Round Dunedin there are some beautiful walks and drive and I specially admired a drive to what is known as the "Juncti Hotel," about half-way between Dunedin and Port Chalmers. T view of the bay and Port Chalmers is grand, reminding me rat forcibly of a view near Monaco. I made several exposures at this poi one day, as well as a view of Dunedin looking backwards down t North-east Valley. In Dunedin I made the acquaintance of seve very nice gentlemen, and found their hospitality and general kindne very great. One of these gentlemen took us for a walk to the tow reservoir. On this walk we—at least I—saw New Zealand "bush" f the first time—not very marked bush perhaps, but enough to give us idea of what to expect when we should come to thicker and mo extensive tracts. We also planned an excursion to a place of gre beauty called "Blue Skin," but a very wet day prevented the acco plishment of our designs. To give an idea of the progress of Duned during the last few years I may mention that a "section" over whi the tide used to rise was bought some twenty-five years ago by a la for £12 10s., and that she lately refused £25,000 for the same lot. T streets are not all macadamised, so that they are apt to be either mud or dusty, and some of them are very steep. Horse and steam trams p constantly, some of them going three and a-half miles into the count for the small fare of 3½d. per person.

Round Dunedin I saw some plants that interested me much, thoug I have since become familiar with them. First, in utility at least, noticed the New Zealand flax (*Phormium tenax*), the "leaves" e ceedingly tough and almost unbreakable. This plant furnishes su stitutes for rope, boot laces, horse tethers, cloaks for the Maories, a many other makeshifts of similar description. The fuschia grows wil attains a great size, and children are very fond of its berries. The ti-t or cabbage palm, is a handsome plant, and weeping-willows grow great perfection and size. Hydrangeas may be seen everywhere. A we known plant in New Zealand is called "tu-tu" (pronounced "toot"); has a darkish-green shining leaf. Sheep eating certain parts of it go ma and die; and I know of a case where a man nibbled, unconsciousl some of the young shoots and died delirious in six hours. Living Dunedin is very cheap. We got board and lodging, the rooms comfor able and the food good, for seven shillings a-day, prime butcher me costing only threepence to fourpence per pound. The vegetables an other garden produce are supplied chiefly by Chinamen, who seem be great gardeners everywhere, and are pretty numerous in Dunedin.

Taranaki, N.Z., June, 1883. ANDREW PRINGLE.

ON THE DETERMINATION OF THE DURATION O THE EXPOSURE.

ALONG with the spread of the use of emulsion plates and of the so called instantaneous shutters which they have brought into mo frequent use, the necessity of having a simple means of determining th length of the exposure given by different instantaneous shutters ha become more evident. Though, at the first glance, this may seem a easy task, yet a little consideration will show it to be more difficu than it appears. In the case of all instantaneous shutters, which eithe take the place of the diaphragm or are placed either immediately befor or immediately behind the objective, the full power of the lens onl comes into play during the middle part of the exposure, while bot

ore and after there is a gradual passage from this maximum to comte darkness. Now, as a certain preceding lighting is necessary in ler to produce an effect of light upon the plate, it is clear that in all thods of measurement, based upon a photographic representation of known movement, the exposure will appear so much the longer the re brightly the object photographed is illuminated, except, of course, ien the instantaneous shutter is placed immediately in front of the sitive plate, and so every state of transition eliminated. It follows eady from the foregoing that, for such a purpose, objects must be ed which are as brightly illuminated as possible, else one would be t to get results which would cause the lighting to appear briefer than would be in practice afterwards. I shall now proceed to the descripon of several of these methods, and, at the same time, attempt to assify them.

A.—The Object Photographed Moves.

A variety of means have been proposed for obtaining a motion the w of which is known as exactly as possible:—

(1) *The Swing of a Pendulum.* If one has a pendulum of known ngth (l), its relation to the duration (t) of the swing will be $t=\pi\sqrt{\frac{l}{g}}$, which $\pi=3{\cdot}14159$ and g is equal to the accelerating power of the eight, that is to say, in this region and with the ocean horizon 9·809. As is evident, in this formula no account is taken of the ze of the beat, and the fact is that the angle of the beat a, as ng as it is small enough for us to be able to set down $\frac{a}{2}=\sin\frac{a}{2}$, ay be completely neglected. Supported by this property, it has en advised that one should cause a pendulum to swing with a eady beat in front of a graduated arc, and that it should be photoaphed by means of an instantaneous shutter. By the distance has traversed in front of the arc one should perceive the duraon of the exposure. If the rapidity of the pendulum were uniform is would be a very excellent means. But, on the contrary, its rapidity as a maximum at the deepest point, while at the two highest points it = 0, while every possible transition lies between, so that it is not ossible to find the time of exposure from such a picture without either complicated calculation or complete calculated tables.

The formula, according to which the computation must be set on ot, runs thus:—

$$t=\frac{T}{2}\left(1-\frac{1}{\pi}\operatorname{arc}\cdot\cos\frac{d}{r}\right)$$

nd therein t denotes the time which the pendulum requires in order to each from the highest point to a point whose horizontal distance from e perpendicularly-hanging pendulum d is reckoned as *minus* towards e left, and as *plus* towards the right. T is the time occupied by a omplete swing of the pendulum away and back again; r is the horintal distance of the highest point of the swing from the perpendicular osition. Now, in order to show how one can construct a table from is and use it, I shall take T as equal to 1, and r as equal to 10, and en compute the corresponding t's of different distances from d; from 10 to + 10. The result is shown in the table given below.

If we examine the difference between these values of t, we shall see hat they become smaller the nearer the pendulum approaches the erpendicular position, and larger the farther it goes from it.

d.	*t.*	Difference between each two consecutive numbers.
−10	0	
− 9	0·0718	0·0718
− 8	0·1024	0·0306
− 7	0·1266	0·0242
− 6	0·1476	0·0210
− 5	0·1667	0·0191
− 4	0·1845	0·0178
− 3	0·2015	0·0170
− 2	0·2179	0·0165
− 1	0·2341	0·0161
∓ 0	0·2500	0·0159
+ 1	0·2659	0·0159
+ 2	0·2820	0·0161
+ 3	0·2985	0·0165
+ 4	0·3155	0·0170
+ 5	0·3333	0·0178
+ 6	0·3524	0·0191
+ 7	0·3734	0·0210
+ 8	0·3976	0·0242
+ 9	0·4282	0·0306
+10	0·5000	0·0718

hat is to say, distances having the same diameter correspond in the hotograph to longer exposures the farther they are removed from zero. or example: if the pendulum were visible in the photograph upon he extent which stretches from −9 to −5, that would denote an exposure of the duration 0·1667 − 0·0718 = 0·0949; if it were, on the other hand, visible upon an equally large extent, say from −2 to +2, that would indicate an exposure lasting 0·1820 − 0·2179 = 0·0641. In smaller extents the difference is still more surprising. Thus the extent from 8 to 9 represents the time 0·0306, the extent from 0 to 1 only 0·0159. At the same time, one sees from these examples how, with the help of the above table, one can find the exposure by using a pendulum. If the time of a whole swing of the pendulum, there and back again, is not exactly equal to *one* second, one must only multiply the resulting numbers with the whole time of the duration of the beat. If, during the exposure, the pendulum only traverses a fraction of one of the divisions of extent, then one divides the number correspondingly.

—*Wochenblatt.* Franz Stolze, Ph.D.

(To be continued.)

ON THE MANAGEMENT OF THE RECEPTION-ROOM AND STORAGE OF NEGATIVES.

In many studios the printer and his assistants are thrown into a helpless state of worry and excitement whenever a "repeat" or, as it is sometimes termed, "extra order" comes in. They wander helplessly and almost hopelessly from one shelf of negatives to another, turn out and examine numberless packages, and raise more dust than is congenial to either the welfare of the negatives or the temper of the employer, should he unexpectedly enter before the clouds have had time to disperse and settle down; they often finish up by declaring their utter inability to find the special negative which happens to be required.

Sometimes two or three breakages occur during the hunting-out process, and occasionally the monotony of the proceedings is agreeably enlivened by a pile of negatives falling pell-mell to the ground. Should this occur it is usually unnecessary to look further for the missing *cliché*, as it is almost certain to be one of the broken ones, and the chances of this being the case are materially increased in a corresponding ratio with the value of the order. Should the order be for one unmounted print—which seems, by the way, to be a very favourite order now, thanks to the popularity of the crystoleum process—the negative wanted will usually turn up number the first.

To those photographers who will have order and method in their establishments I have no doubt the foregoing sketch may seem to be highly painted, and I can even fancy some terming it "tremendously exaggerated." But I can assure these gentlemen that what I have roughly sketched is merely an everyday occurrence in many studios. Negatives are often—far too often—packed away in the most careless manner, and without any method or system in their arrangement. In some studios the naming, numbering, and storing of negatives is left entirely in the hands of the printer, and if he venture to suggest want of time to give attention to this extra work, he is curtly reminded that there are plenty of wet days when he can do little else.

With regard to the storage proper: I consider the printer is only doing part of his duty when he attends to it, but the naming and numbering should decidedly be done by someone else. Then, of necessity, comes the question—By whom? For what is everybody's work usually gets to be looked upon as no one's, and finishes up by not getting done at all. The system which I have seen to work the best is one employed in most of the principal studios in London, though its use does not seem to have extended far beyond the limits of what a Highlander amused me by terming "the sma' compact toun."

The sitter on entering that part of the premises known as the "reception room" usually, after an inspection of the specimens, gives his or her order, or, at anyrate, decides upon the style, which information is conveyed to the operator by a variety of different modes. Sometimes a reception-room *employé* is sent upstairs to convey the information, sometimes the aid of a speaking-tube is called in, and sometimes a gong is rung—once for three-quarter *carte*, twice for a vignette, three times for three-quarter cabinet, four times for cabinet vignette, and so on to the larger sizes. Of these systems the last is decidedly the best. But they all fall short of what is wanted, in that they afford no help towards numbering or naming the negatives; and we all know that after a busy day it is no easy matter to pick out each particular individual amongst some seventy or eighty, and there are studios in which even this number is exceeded.

If, instead of proceeding by any of these modes, the gentleman in charge of the reception room take the name as well as the style of *carte* desired, and fills up a card which the sitter himself delivers to the operator, we get a step in advance. The cards I have seen used run usually something like this:—

No.—1041.
Name.—Mr. Jones.
Style.—Three-quarter *carte.*
Positions.—3.
Remarks.—Mr. Jones prefers outdoor backgrounds.

The operator, having this card in his possession, is enabled not only to see at a glance exactly what is wanted, but also to number his negatives, which is easily managed by scratching the number through

the film, or simply writing on it with a blacklead pencil; that is, supposing the plates are not at once developed. If, as sometimes is the case, the plates are developed at once, the number may be affixed on a small label after washing; but in practice the system of writing or scratching it on the film preparatory to development will be found not only the best but the easiest. Labels are apt to become detached during printing, but a number scratched in the film or written upon it and then protected by the varnish is likely to last as long as the negative itself. Personally, I usually number the plate before putting it into the slide for exposure.

Now we have the plates numbered we are one step nearer to the goal at which we desire to arrive, which is, I take it, that we may be able at any time after the first order has been completed to lay our hand upon any special negative without disturbing or spoiling any others.

The next question is as regards storage. Most photographers have a favourite method of their own, the one most commonly in use being to pack the negatives (with a small piece of paper between each) into a brown paper parcel of 50 or 100, and then number the outside. None but wealthy amateurs pack away their stock of negatives in the grooved boxes which were originally made and sold for that purpose. The mode I use myself, and which I can recommend as being the safest and easiest, is to put each negative into an envelope and mark the number thereon, and then to stand them in fifties on shelves ranged round the negative-room. Of course each fifty are consecutive numbers, placed in their proper order to the right-hand of the fifty immediately preceding them. I can by this means obtain any negative I may require without any bother or worry whatever. If those photographers who still adhere to the old brown-paper parcel system, and its risk of scratches every time a parcel is opened, will only try the envelope method I am convinced they will speedily admit its superiority to any other.

A negative book should always be kept in every studio, for in very few cases sitters think of sending the number of their *carte* with the order, even if they know it. Most mounts have a place for the number on the back, but it is very rarely one sees it filled up. If it be not the usage of the studio to fill up the space it is surely an absurdity to have it there.

The negative book should contain the names and addresses of all clients, and the numbers and description of their various sittings attached thus:—

Mr. Jones,
Forest Hill. 489—Three-quarter *carte*.
490—Cabinet. 602—Mrs. J., three-quarter *carte*.
681—Baby.

If this book be properly and regularly kept it greatly adds to the facility with which a negative can be found. If it be not kept properly it had better not be kept at all, for nothing is more vexatious than to wade through all the J's to find an entry of Mr. Jones's baby, and, not finding it there, to have to go through all the Jones's family negatives to find out which is the baby's.

One thing needs to be specially seen to in the storage of negatives—gelatine more particularly even than collodion—and that is, that the room be free from damp. C. BRANGWIN BARNES.

ON THINGS IN GENERAL.

IT is some time since the once "burning" question of Photography *versus* Fine Art has been under consideration, and, as it is a pity to let such an interesting topic languish for want of a little fuel, I think I may quote a curious literary contradiction I lately came across, and that it will interest my readers. Mr. Philip Gilbert Hamerton is a copious writer on things artistic—in fact, he is an authority of some eminence. He tried photography some years ago as an aid to his painting studies, didn't do much at it, and took to calling it names. Hear him:—"Photography is the blackening and decomposition of a salt by *some* of the solar rays, and these not the luminous ones. If a photograph were really drawn by the luminous rays it would be far truer than it is." But, as regards fine art, a few pages further on he writes:—"Now, what is painting? It is an intellectual and emotional interpretation by means of carefully-balanced and cunningly-subdivided lines. Its powers of imitation are extremely limited." Then a little further on we have more depreciation of poor photography:—"It is not a fine art at all, and can never be made one." * * "It is false in local colour, putting all the lights and darks of natural colouring out of tune." This was published just ten years ago, and it is difficult to imagine anything stronger. Let us, however, see what another equally-eminent man says. Mr. Seymour Hayden, who has recently been lecturing before the Society of Arts, puts photography, at anyrate, before engraving, examples of which, as we know, find a place upon the walls of the Academy. After a few disparaging remarks upon engraving and engravers, he says—"*De mortuis nil nisi bonum.* A mechanical engraver greater than he, a better 'translator,' and even a better 'interpreter,' has arisen, with whom he will find it in vain to compete. * * * His great automatic rival, the sun, will outshine him at last."

Now, it is very interesting to closely examine the remarks of the two writers. Neither of them places photography upon any high pedestal, but the later writer certainly upsets the *dicta* of the earlier. I should think even Mr. Hamerton, if he could see the walls of our annual exhibition, would be now inclined to withdraw some of his supercilious strictures; but he is nothing if not verbose and grandiose.

I hope a similar quality is not going to characterise the matter of photographic writers, though I saw a strong indication of it the other day by a gentleman whose name is well known:—"The ancient process of colouring prints from the back under the modern patronymic of crystoleum" sounds passing fine; but I should really like to know who ever had a father named "crystoleum." "Patronymic" is a good word in a wrong place.

Inspired by thoughts of the monument to Daguerre that was unveiled on Sunday last *The Times* had a long article in which it is difficult to say whether power of uttering platitudes, bad grammar, or ignorance of its subject most prevails. I don't quarrel with it for saying—"Photography belongs to the fruitful arts which philosophy ranks the highest," but when we read such nonsense as that "nitrate of silver has been discarded as the medium in favour of gun-cotton and ether and uranium," the thing becomes appalling. Why will people write upon subjects they know nothing about?

At one of the meetings of the London and Provincial Photographic Association, a short time ago, a speaker stated that if a negative be left in the hypo. all night the image would be dissolved away by the next morning, and the report of the meeting gave no account of any other speaker contradicting this assertion. Now, as in my little experience nothing of the sort has ever occurred under such conditions, it would be interesting to me and, I doubt not, to others if the statement could be explained or substantiated, or the exact conditions of the dissolution stated.

Another subject brought before the same body was a photograph coloured by pigments removable by alcohol. The Chairman said the idea had been carried out with aniline dyes, but they were liable to fade. I can quite bear his statement out. More than twenty-five years ago I saw little bottles of spirit colours sold for the purpose; they were sixpence each, and as a halfpennyworth of dye would fill a gross or two of them there must have been a good profit somewhere, even after bottles, corks, and labels were paid for. The process was ridiculously simple. A dab of colour was placed on each cheek with a brush, and it spread abroad colouring hair and face alike, but the colour only showed on the face or wherever there was little tint beyond pure white. An extra dab with a smaller brush put a deeper tint for local colour, which spread itself very evenly and softly.

It seems to me that M. Scola's researches upon coloured lights in the dark room, as communicated to the Photographic Society of France, are so much labour thrown away. His communication, according to the esteemed correspondent of this Journal, was upon the means of "developing plates in full light." Well, that is rather a misleading way of putting the matter, when we learn that "full light" means a light coloured by means of some chemical. Before, however, a lamp made on any such principle is constructed, it might be as well to find a chemical which, "burnt" in the manner described, would give a monochromatic light. Every schoolboy knows that strontium does not give such a flame; it possesses a fair share of light from a very actinic region of the spectrum. I think photographers will stick to their coloured shades.

By-the-bye, can anyone tell me what is the great "Zenotype process?" I have heard of a great variety of new things photographic of late, but never before of this great discovery of the nineteenth century till I received from a friend the printed announcement of a provincial photographer that he was prepared to execute orders by it. I don't like to suggest the connection with a zany, but that occurs to me at present.

I see according to the report of the trip of the Liverpool Amateur Photographic Association to Southport that the proprietors of the Winter Gardens in that flourishing town (so called, I suppose, because it is not a *port* and is not in the *south)* allow photographers to pass into the grounds without payment. Now, that is very good of them, and also a capital thing for the resident photographers, I should say, who, in the slack season, could stroll about tripod in hand and camera in satchel. If there be really no reservation in the permission, I can only say—first, that I hope photographers will never do anything to cause the permission to be withdrawn; and, secondly, long life to the liberal proprietors! FREE LANCE.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

THE PEAK OF DERBYSHIRE.

"WHERE is the Peak of Derbyshire?" is a question I have often heard asked by people who have been spending a holiday in the very midst of

ts scenic charms. The title is a misleading one, if not altogether a nisnomer. The term would, in a Johnsonian sense, imply some isolated nountain standing, as does the Peak of Teneriffe, a lonely eminence ibove the cities of the plain. The expression, however, is a purely generic one. It points to no precise and particular Peak, but includes he whole of the picturesque North Derbyshire landscape, bounded by Yorkshire on one side and Cheshire and Staffordshire on the other.

If you turn to the ordnance map you will find in the north-east corner of Derbyshire a darkly-shaded region, with a white space in the niddle marked "The Peak." This is Kinderscout. It is a lofty tableand of moor and moss, rarely visited, save by the sportsman; but s full of wild, morose, and savage beauty, that you would think impossible outside the Island of Skye. The reason it is called "*The* Peak" is, perhaps, owing to the fact that the Scout is higher above sea-evel than the other Derbyshire hills, being 2,080 feet in elevation. But it is not a peak in shape, if a peak is to be regarded as "a sharply-pointed hill" with an individuality of its own. Kinderscout is a plateau everal miles in extent on the peaty summit, its sides broken with mmense "cloughs," and with one or two waterfalls that would be hought a great deal of if they were in Westmoreland or Scotland.

But "Where is the Peak?" Broadly speaking, it is the country which lies on either side of the Midland line from Ambergate to Marple. Let your Excellency alight at any station between those points and he may satisfy himself that he is fairly in the Peak of Derbyshire. With uch an important railway system intersecting from north to south this lluring country, the difficulties of access are reduced to a minimum. But, even with such exceptional travelling facilities, it is difficult to ecide where to stay and what to see, when so many charming "beauty-pots" send in their distracting claims. There is an *embarras de richesse.*

An old English cartoon represents a man standing naked amid a rodigious pile of garments, unable to decide which he should put on. The classic donkey of the old mythology perished between two bundles f equally-balanced hay, because it was such an ass as to be at a loss know which was the more toothsome; and there is a story told of De Quincey, who, having a few hours to spend in London when passing hrough the metropolis, exhausted the time by standing on the steps of is hotel, undetermined what to go and see amid such a profusion of verything that was inviting.

The artist with the camera in the Peak of Derbyshire is placed in a milar position, especially if his time be limited to a few days. Shall be Buxton or Dove Dale—the valleys of Miller's, Monsal, Darley? hall it be Haddon Hall and Chatsworth, Bolsover and Hardwick? hall it be Hathersage and Eyam, Grindleford Bridge and Millstone dge? Shall he devote his "plates" to rock and river scenery, or to e old castles and still older churches? The artist would find himself chained to Dove Dale if once he gets in that delicious glen, and all ther tempting trips would perforce be pleasures postponed. Haddon all, again, is the most painted and photographed place in the world; ut every time you see that quaint old story in stone—that ballad in attlements—it suggests fresh views and reveals new beauties. Happily, owever, the scenic interest of the Peak is pretty much concentrated, d not spread over diffuse distances. And, wherever the Knight of the amera may make his head-quarters, he will not be inconveniently mote from the place which captivates him most.

Presuming that he reaches Derbyshire from the south, he will pass rough Derby, where the revival in the manufacture of "Crown erby" porcelain is being carried on with surpassing success. The ctory is well worth a visit. The show-room is a perfect treasure-ouse of art; while the management afford every facility to visitors to e all the processes through which the porcelain passes—from its crude ate of felspar and Cornish clay to its finished perfection of painting d gilding. There has been a notable *renaissance* of the "old Derby" tterns. The "darkly, deeply, beautifully-blue" Mazarine colour has een recovered in all its pristine lustre and beauty; while there is uch that is quite new to attract the artistic eye. Apart from the ina Works there is not much that need detain one in Derby.

Duffield is the next station. A small branch line, eight miles long, ns up the softly-pastoral Ecclesbourne Valley, where green woods lour gentle slopes, to Wirksworth—a quaint old town, shut in with croaching hills. Famous for its lead-mining industry, it is the scene George Eliot's *Adam Bede*. Dinah Morris, the preacher of that ory, lies buried in the graveyard of the interesting old church. Now, is little town of Wirksworth may be made a centre for the camera's erations.

Half-an-hour's walk brings you to Stonnis ("the Black Rocks")—im, gritstone crags, with a background of those blue-black pines that rner loved to shade his pictures with. These rocks overlook the tire length of the Matlock Valley. Descending from here, another lf-hour's walk carries you to a deep and devious valley known as the a Gellia (named after the late Mr. Gell, who made the road that tersects the hills that grudge it space on either side). A dozen miles' lk up this valley will bring you to Dove Dale. Two miles' walk wn it will place you in Cromford or Matlock, from either of which aces Wirksworth can, of course, be visited without your leaving the in at Duffield, to which station I return after the *detour*.

Belper comes next—a little cotton-manufacturing town associated th the Strutt family. Its aspect is brightened by the reaches of the River Derwent, that runs down by the side of the line, which crosses it ever and anon, all the way from Rowsley to Derby (24 miles).

Ambergate, the next station, forms an important junction. The main line to the north conveys the traveller to Wingfield Manor House—historically interesting, and in its ruined beauty a tempting theme for the artist in photography.

Stretton is the next station. It gives access to the Ashover Valley, of which I have never seen a photograph. Eastwood Old Hall is a picture in its ivied ruin, and the crag scenery of the valley is full of picturesque variety. Ashover is three miles from Stretton and three from Matlock. The view of the whole length of the Derwent Valley, just after leaving Ashover for Matlock—as the visitor seems to drop into the latter place from the clouds—is a *coup de theatre* in its sensation of scenic surprise.

Continuing the journey in the north train, Chesterfield, with its crooked spire, is the starting point for Bolsover Castle and Hardwick Hall—the former a fine Norman fortress, built on a defiant "bluff" overlooking the Scarsdale Valley; the latter an exquisite Elizabethan mansion, with a magnificent picture gallery, and the seat of the Marquis of Hartington. From Chesterfield, too, Chatsworth may be reached in an hour's drive.

Back, however, to Ambergate. It is the line to Manchester that is really the avenue to all the places of scenic attraction. If your Excellency will take his seat beside me in the "bogie" carriage of the Midland train, I will tell you, as succinctly as I can, what is to be seen on the journey towards Manchester. Ambergate is worth pausing at to climb up to Crich Stand—a prospect tower on the summit of a huge cliff, the shape of an open umbrella. It is the result of a strange volcanic upheaval of limestone forced above a geological formation of millstone grit. Intervening between the two strata is a bed of clay. Landslips of alarming magnitude sometimes occur. Last year one of these limestone glaciers started down the cliff. The mountain was in motion for some hours, and fourteen acres of limestone, with a large house and its entire furniture, were swept over the clay bed into the valley. The panorama from Crich Stand is very comprehensive, including as it does Lincoln Cathedral, forty miles away. Near here is Lea Hurst, the Derbyshire home of the Crimean heroine, Florence Nightingale, and a very photographable building it is with its scenic surroundings.

Whatstandwell is the station reached after Ambergate. It is in the valley of the Derwent; and, like Cromford, the next place—the cradle of the cotton manufacture and the seat of the Arkwrights—is full of charming pictures of rock, river, and woodland.

Now comes Matlock—the Bath and the Bridge. The scenery needs pages of description; my space is limited to syllables. Lord Byron declared that there were prospects in Derbyshire equal to any in Switzerland or Greece. Eliza Cook has sung, in verses as flowing as their rivers, the Derbyshire Dales; while Dr. Johnson, after visiting Dove Dale, declared that he who had seen Dove Dale need not visit the Highlands.

A sojourn in Matlock will help to endorse this enthusiastic testimony. It is a place of hotels. The most comfortable house and the best situated is, without doubt, the "New Bath Hotel," whose proprietor has artistic tastes. But if you decide to make your head-quarters at Matlock and expect to find grandeur and sublimity in the scenery, you will be disappointed. Matlock is romantic. It is as picturesque as a painter's dream; but the poet Montgomery's lines beginning—

> "Here in wild pomp, magnificently bleak,
> Stupendous Matlock towers amidst the Peak!
> Here rocks on rocks, on forests, forests rise,
> Spurn the low earth, and mingle with the skies"—

are grandiloquent nonsense.

Darley Dale succeeds Matlock as we resume our train trip. Here the Derwent Valley widens from a ravine into a broad and green and gentle vale, best described in the lines of Lord John Manners.

Comes now Rowsley, the threshold of Haddon Hall and Chatsworth House, each about three miles distant—Haddon to the left on the western side, and Chatsworth to the right on the eastern. The "Peacock"—a quaint, gabled hostel, covered with ivy, a picture more than a place, on the margin of the glassy Wye, which here unites its waters with the Derwent—is an ideal hostel and a favourite house with artists.

Bakewell is the next station, five miles to the north. By all means get off here and take the camera to the lovely, secluded Lathkill Dale—one of the least known but most beautiful of the Derbyshire valleys. You continue your journey up the Wye—river, road, and railway running together to Buxton, past Monsal Dale and Miller's Dale, and wherever you turn nature has a vignette which you can only describe in notes of admiration. Buxton is another key-note; and Coombs Moss, the valley of the Goyt, Axe Edge, Lud Church, The Roches, and Errwood are emphatically spots "where to go with the camera."

From Dove Head, at the foot of Axe Edge, the Dove rises. You may follow that clear and voiceful stream, from rill to rivulet and rivulet to river, through all its wild and wayward wanderings to Dove Dale, than which place nowhere can a week be more pleasurably passed in storm or sunshine. Half-way, at Hartington, are capital quarters. The distance is about twenty miles. The best guide is the ordnance sheet.

Returning to the train at Miller's Dale, which station is the point whence to reach Tideswell and Eyam, we continue our railway journey past Peak Forest to Chapel-en-le-Frith—the latter the nearest station to Castleton (seven and a-half miles), with its wonderful caves and its Peveril Castle, its Shivering Mam Tor, Wind Gates, and Vale of Hope. From Castleton, by way of Edale, by a few hours' walking (rough for the most part), you enter the wild Kinderscout country—a region that belongs to Undiscovered Derbyshire. The nearest station to the Scout is Hayfield (three miles), which is on a little loop line branching off from New Mills, the station adjacent to Chapel. It is not a "far cry" from New Mills to Marple; and *after* that the streams are not liquid looking-glasses, where ferns and flowers and foliage are duplicated in the sheeny water. The hills are not "elevating" to the mind, and in the valleys you will not startle Pan, Apollo, and the Muses, as John Ruskin said you might in Miller's Dale! EDWARD BRADBURY.

FOREIGN NOTES AND NEWS.

PATENT METHOD OF RESTORING FERROUS OXALATE DEVELOPER.—ON RENDERING NITRO-GLYCERINE HARMLESS.

IT seems that the German patent office has thought fit to grant a patent to a certain Dr. Kötteritzoch for a method of restoring the ferrous oxalate developer by filtering it through a funnel filled with crystals of oxalic acid, tartaric acid, or citric acid in which a piano-wire is laid! Comment is superfluous. No doubt it makes a great difference to the reactions produced whether the iron be introduced as steel filings or wire or scraps, as proposed by Dr. Eder (was it not?), or whether it be worked up into piano-wire and protected by a patent!

Now that dynamite scares are leading restrictions to be placed on the sale of many chemicals hitherto considered harmless, and some others which are far from harmless in wrong hands, yet which are necessary to the carrying on of many trades, the photographer with his nitric acid, sulphuric acid, and drops of glycerine and other chemicals—the very names of which are sufficient to scare the ignorant—becomes an object of suspicion; it is comforting, therefore, to hear that there are means of re-converting such a deadly substance as nitro-glycerine into harmless glycerine. A contemporary writes:—"It may be of service to government chemists and local authorities to give publicity to an easy and safe process for re-converting nitro-glycerine into glycerine, by running it, in a thin stream, into a large volume of any one of the following liquids, which should be constantly stirred and kept cool:—1. Solution of potassium sulphide. 2. Solution of ammonium sulphide. 3. Cold solution of calcium sulphide, prepared by boiling slaked lime with flower of sulphur and water till the liquid is orange yellow after the sediment has deposited. The explanation of the chemistry of the process will be found in the *Chemical News* for April 13th." It is devoutly to be desired that none of us may need to handle nitro-glycerine at all, but it is always well to know a simple method of rendering a dangerous substance harmless.

RECENT PATENTS.

APPLICATION FOR PATENTS.

No. 4,152.—"Producing Prints or Transfers of Photographic Pictures." E. DE ZUCCATO.—*Dated August* 28, 1883.

No. 4,153.—"Producing Prints or Transfers of Photographic Pictures." E. DE ZUCCATO.—*Dated August* 28, 1883.

No. 4,154.—"Producing Prints or Transfers of Photographic Pictures." E. DE ZUCCATO,—*Dated August* 28, 1883.

AMERICAN PATENTS GRANTED JULY 31, 1883.

No. 282-111.—"A Method of, and Apparatus for, Transferring Designs." JOHN W. OSBORNE, Washington, D.C.—*Application filed June* 24, 1882.

No. 282-154.—"A Convertible Chair." E. H. BOLGIANO, Camden, N.J.—*Filed January* 24, 1883.

No. 282-182.—"A Camera Stand." MATHIAS FLAMMANG, Newark, N.J.—*Filed June* 10, 1882.

No. 282-451.—"Process for Moulding Hollow Articles from Celluloid and other Compounds of Pyroxyline." JOHN A. FURMAN, Newark, N.J.—*Filed June* 12, 1883.

BELGIUM PATENTS GRANTED.

No. 61,821.—"Bromo-Gelatine Paper for superseding Mirrors in Photography." G. A. BALAGNY, Paris.—*Dated June* 25, 1883; *French patent February* 10, 1883.

No. 61,962.—"A Photographic Apparatus with a Horizontal Dead Slab." J. DE NECK, Jun., Brussels.—*Dated July* 7, 1883.

No. 61,871.—"A Photographic Camera." E. T. STEBBING, Paris.—*Dated June* 29, 1883; *French patent May* 26, 1883.

GERMAN PATENTS GRANTED.

No. 23,808.—"Coating portions of Compressed Gun-Cotton by treating the same with a Solvent." W. F. WOLFF and M. VON FOERSTER, Berlin.—*Dated March* 9, 1883.

No. 23,914.—"Obtaining Designs on Glass, Vitrified or Enamelled Su faces." S. REICH and Co., Berlin and Vienna.—*Dated January* 9, 1883.

No. 23,790.—"Obtaining Albums of Photographs in Loose Leave E. PRERAUER, Berlin.—*Dated March* 3, 1883.

PATENTS VOID ON AUGUST 18, 1883.

No. 3,353.—"Improvements in Photographic Cameras." W. F. STANL Holborn.—*Dated August* 18, 1880.

GRANT OF PROVISIONAL PROTECTION FOR SIX MONTH

No. 3,800.—"New Process for Preparing and Painting Photographs Drawings so as to Resemble Oil Paintings on Canvas." ALBERTA MA FRANCES CASPAR, London.—*Dated August* 3, 1883.

SPECIFICATION.

"Improvements in the Application of Eosine in Photographic Processe A communication to me from abroad by Pierre Alphonse Attout, call Tailfer, and John Clayton, both of Paris, France.

Waterhouse's experiments in the year 1876 have shown the influence the introduction of colouring matters into the collodion film of photograpl He found that eosine (tetra-brominised phtaléine, a substance discover by Bayer, of Strasbourg) possessed in a high degree these photogenic p perties. Upon these facts MM. Ducos du Hauron and Cros have est lished their heliochromic process. The practical results of this proc have, however, hitherto not been so successful as anticipated. Mr. Sarrau without pretending to solve the difficult problem of direct photography colours, has recently occupied himself simply with reproducing, by mea of eosine, the relative values of colours, but in limiting his experiments the collodion process, which process is, however, at present almost u versally replaced by the gelatino-bromide process.

The present invention relates to the application of eosine to the s gelatino-bromide process. The difficulty experienced in this applicati arises from the fact that eosine gives no result unless it is introduced w ammonia as a vehicle, and it is the combined use of ammonia with eos that forms the essential feature of the present improved process.

According to the present invention the gelatino-bromide process of pho graphy is carried out by two different methods, according as it is desired prepare the gelatino-bromide or to use plates already prepared. In t former case eosine, by preference previously dissolved in ammonia, poured into the emulsion of gelatino-bromide of silver at the moment its formation. The proportion of eosine employed is about one part weight to one hundred parts of the compound. The eosinised emulsion spread as usual over the glass plate, and after exposure to the light treated in the usual manner for the development and fixing of the pictu

When gelatino-bromide plates already prepared are available it is su cient to pour over the dry film the ammoniacal solution of eosine to wh alcohol is added. The plate is then washed, without fear of the remo of the eosine, which becomes immediately associated with the gelati bromide.

This improved eosinated gelatino-bromide process produces very sa factory results. On the photographs produced thereby the relative val of the yellow, blue, and violet colours may be easily distinguished.

Although in what has preceded only eosine has been mentioned, it i be understood that other acid or saline colouring matters obtained with various fluoresceines of resorcine combined with metalloids, chlorine, b mide, iodine, may be included under the same generic term. Also, inst of ammonia alone being applicable as a vehicle for the eosine, ot alkalies may be used for the purpose.

Having thus described the nature of the said invention, and in w manner the same is to be performed as communicated to me by my fore correspondents, I claim:

In photographic processes of the gelatino-bromine kind, the use of eo applied with alkali as its solvent and vehicle either in the liquid emul or on the dry layer of a prepared plate.

In witness whereof I, the said Charles Denton Abel, have hereunto my hand and seal this second day of July, in the year of our Lord thousand eight hundred and eighty-three.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 4	Sheffield	Freemasons' Hall, Surrey-str
" 4	Halifax	*Courier* Office, Regent-street
" 5	Benevolent	181, Aldersgate-street.
" 6	London and Provincial	Masons' Hall, Basinghall-str
" 6	Leeds	Mechanics' Institute.
" 6	Bolton	The Baths.
" 6	Glasgow (Annual Meeting)	172, Buchanan-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held on Tuesday last, the th inst., the chair was occupied by Mr. H. Baden Pritchard.

Papers embodying the report of the Lens Committee, and containg details of the standards for diaphragms, flanges, and camera screws, were distributed amongst the members, and it was understood that a larger number of these papers would be printed for distribution to societies, instrument manufacturers, and others who might be interested in the matter.

Mr. Leon Warnerke said it would be gratifying to the Society to iow that the subject of standards of uniformity in these matters was citing attention in Belgium, from whence he had just returned. He ind considerable interest existed among those connected with photo-aphy, with whom he had there conversed on this subject of standard, d the idea was mooted that a congress should be held in Belgium, of an ;ernational character, to take the matter in hand. Captain Abney, how-er, had said that from his experience of congresses he thought no congress ild come to a satisfactory issue, unless it were taken in hand by Govern-nt. This rather threw a damper upon them. The next day, however, King of the Belgians came to the exhibition in state, and showed great erest in it, examining almost every picture, and, by the good offices of Montefiore, the question of standards was brought before the King; d it was announced that the Belgian Government would invite other vernments to send representatives to a congress to be held in Brussels xt year. Belgium was a country which, from its neutral position, was rticularly adapted for international congresses, as there did not exist ise international jealousies between it and other powers which prevailed ongst such other powers themselves. Although the Society's standards flanges and screws were not arranged on the metric system, he (Mr. urnerke) thought that this would not be an insuperable barrier to their ng adopted, as the Whitworth thread which they employed was generally ognised and used. Englishmen would also be pleased to hear that their ntry was brilliantly represented at the exhibition. The first medal was udged to Mr. H. P. Robinson, of Tunbridge Wells; and the King on his t independently selected the same exhibit as worthy of the highest place.

Ir. J. Dresser, having found a difficulty in obtaining hydrokinone, in-red where it could be procured, and asked the opinion of those members sent who had used it as to its advantages.

Ir. Warnerke did not find that it had any advantage over pyro.

Ir. A. Cowan expressed the same opinion, and added that although it said not to require any restrainer neither did pyro. if used with only the e small quantity of ammonia advised to be employed with hydrokinone.

Ir. C. Ray Woods considered that there was no benefit to be gained i using hydrokinone instead of pyro. It did not give green fog, but i it gave a grey fog instead.

he discussion then turning upon minimum quantities of alkali to be l in developing,

r. Valentine Blanchard said that he had received some plates to slope for an amateur friend. He learned that these plates (views) had ived as much as seven seconds' exposure with an unstopped, rapid metrical lens. Of course this was enormously too mnch; but simply ;eeping down the ammonia and bromide he had developed the whole vithout losing one.

ie Secretary reminded members that Friday, the 20th of September, ld be the last day for receiving pictures for the forthcoming exhibition

vo questions found in the box—one relating to peculiar markings upon ;ine plates, and the other to know why a rapid plate was found in a ain instance to dissolve away in the fixing bath, whilst one of ordinary d did not—were held over till the next meeting.

L[...]DON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

he meeting of the above Association, held on Thursday, the 23rd inst., J. Briginshaw occupied the chair.

. A. Haddon referred to the investigation which he was making into onstitution of green fog. He produced a tube containing a liquid i was of ruby colour by transmitted light, and of a dull greenish-white flected light, thus having very much the appearance of green fog—in he considered it to be green fog itself in a liquid form. The solution originally been an emulsion in which the bromide existed in a coarse olue condition. It had been boiled for some time with carbonate of h and sugar, and the result was the solution shown, in which the was by transmitted light of a ruby colour, and in such a fine state of on as to present no visible grain under the microscope. That it was romide of silver was shown by the fact that neither hyposulphite of ior cyanide of potassium had any effect upon it. On the other hand, nitric acid and hydrochloric acid failed to attack the silver, and, so he had tried, chromic acid was the only re-agent which affected it. precipitated it.

A. L. Henderson said that some meetings since reference had been to the hastening of the precipitation of sensitive bromide of silver an emulsion, in the course of manufacture, by dilution with water. ad found that if sulphuric acid were added to neutralise the nia contained in an emulsion the precipitation took place much more y. This he attributed to the decomposition of the gelatine, which n addition of acid brought about.

W. E. Debenham remarked that, although free acid would cause de-sition of gelatine to proceed more rapidly, it did not seem probable ich decomposition would take place in the presence of just so much s was required to neutralise the ammonia—that is to say, in the ce of sulphate of ammonia—more quickly than with the free am-itself in the solution; and he thought that the readier precipitation oned by Mr. Henderson must be referred to some other cause.

A. Cowan said that there was an advantage in the precipitation l of preparing emulsion—that the bromide of silver could be kept ready and made up into an emulsion with gelatine at any time, as d.

oles of unsensitised, pink albumenised paper, sent up by a provincial r, were handed round. Each piece had been half covered, and the alf exposed for four days to sun and daylight in a pressure-frame. sample the pink colour had been entirely discharged by this e to light, and in the other the colour had been somewhat lightened anged to a pale red, the pink character of the colour not being so nced as before the exposure.

The Chairman asked whether in the production of transparencies for lantern slides, considering that the image was to be enlarged, it would not be better to print them in the camera by reduction from large negatives than by printing direct from negatives of the same size as the transparency, seeing that in the latter case whatever grain existed in the original negative would be magnified more than by the plan suggested.

Mr. Henderson said that there was so much greater depth of focus in small negatives to begin with, that he thought their use preferable to large ones for the purpose proposed.

Mr. Frank Piper was elected a member of the Association.

Correspondence.

SPHERICAL ABERRATION.

To the Editors.

Gentlemen,—I appear to have given offence to Mr. W. J. Stillman. For this I am sorry, as I had no intention of doing so. Mr. Stillman has put his side of the argument on spherical aberration "in a nut-shell." I shall do the same with mine. I make the following statements:—

First. No photographic lens, unless it be occasionally used for axial rays, or portrait lens is without spherical aberration.—Second. In every lens which exhibits spherical aberration the result of inserting a stop is to alter the focal length.—Third. This alteration in some lenses, especially those of very large dimensions, is so great that a better result is secured by focussing with the stop to be used, and one not much larger, than by focussing with full aperture.—Fourth. In a lens which exhibits spherical aberration the result of inserting a stop is always to make the plane of maximum sharpness a different one from the one which was of maximum sharpness before the stop was inserted.

Taking the first statement as an axiom—and I think no one will deny it—the second and fourth are as capable of mathematical proof as a proposition of Euclid. The third is a matter of experience. I may state this as proof of it:—Two days ago I was using a lens by one of the first English makers—a double combination, not a portrait lens—of three inches diameter of aperture. I focussed with full aperture. On inserting a stop of an inch and a-quarter, which was the one I wished to use, I found the definition of the image distinctly capable of improvement by racking the lens a small distance further from the ground glass.—I am, yours, &c., W. K. Burton.

August 27, 1883.

MARKINGS ON DRY PLATES.

To the Editors.

Gentlemen,—One of your correspondents inquires as to markings, like wave-marks, &c. They are caused by the developer depositing on the surface of the film in the early stages of development a black precipitate, which, from the slight movement in the fluid caused by handling, &c., takes a variety of forms—sometimes marbling, sometimes wavy, and sometimes in bands—which prevent the developer from acting to the same extent as in the portions of the film where they do not exist. They are exaggerated, or more common, with bad pyro., and when the bath has not been cleaned after one development and before beginning another.

The remedy is to rub the film gently with a soft sponge or the fingers during the early stages of development when the developer discolours in the least, and to keep the developer in motion and pour it off and on occasionally. If good pyro. be used, and the tray carefully cleaned from the old developer, they are not very likely to occur, and they have nothing to do with the plate itself. I have never had them with iron development, but would not venture to say that they do not occur.—I am, yours, &c., W. J. Stillman.

Florence, August 24, 1883.

GELATINOUS SEAWEEDS.

To the Editors.

Gentlemen,—Would you kindly allow me to ask if any of your readers can inform me where, in England, to buy vegetable gelatines and gelatinous seaweeds, such as agar-agar and Japanese isinglass?

I have been trying for a long time to get them, but without success, except that in one instance I obtained two pounds of Australian agar-agar from a Fellow of the Linnean Society, and Mr. Leon Warnerke gave me some Japanese isinglass, which is made from another seaweed.

Thousands of tons of agar-agar are exported annually from Singapore; most of it goes to China. Some varieties of gelose are said to be the chief constituents of certain English jams.—I am, yours, &c.,

W. H. Harrison.

41, *Gt. Russell-street, London, August* 28, 1883.

EXCHANGE COLUMN.

Wanted, strong studio camera stand, in exchange for old stone balustrade, eight pieces; send photograph.—Address, H. J., care of 181, Kentish Town-road.

I will exchange Ross's No. 1 quick-acting *carte* lens for a Dallmeyer's wide-angle landscape lens, 8½ × 6½.—Address, M. Auty, Tynemouth, Northumberland.

I will exchange a large musical-box or other good exchange, for a background, wide-angle view lens, and other accessories.—Address, River, Drayton, Stourbridge.

Wanted, a first-class lens for portraits up to 10 × 8 or 12 × 10, in exchange for a cabinet and a *carte* lens. Difference adjusted.—Address, G. James, 23, Margaret-street, Hull.

I will exchange a Victoria camera, with nine lenses, or a Squire's extra-rapid *carte* lens, for a large single-view lens—must be four or five inches diameter.—Address, D., 46, Haverstock-hill.

I will exchange a half-plate camera, with two dark slides and lens, by Darlot, in splendid condition, for a half-plate portable camera and view lens for dry plates, in good condition, by a good maker.—Address, A. E. Smith, 39, Trafalgar-road, Burnley, Lancashire.

I will exchange three gem lenses, cost eighteen shillings, quarter-plate camera, lens, and tripod, cabinet embossing-press, made entirely of steel, without dies, hand rolling-press, for *cartes*. Wanted, posing-chair, with backs, landscape background, or open to offers.—Address, Fred. Rubbra, Stony Stratford, Bucks.

I will exchange a new 10 × 8 folding camera, brass bound, leather bellows, screw adjustment, double swing, rising front, double dark slide, extra extending front, thirty-six inches, for copying, and base-board, with lock and key, case, complete, for a half-plate modern tourist camera and lens.—Address, Jas. Collis, Chard.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Photograph Registered—
George Armstrong, Catchgate-by-Lintz-Green.—*Photograph of Interior and Organ of the Wesleyan Methodist Chapel, Annfield Plain.*

Yorkshire.—So far as we are aware no firm in London now supplies collodio-bromide emulsion plates.

Mr. F. J. Moody.—There is no work published on the use of stops. Surely sufficient has already appeared in the Journal to answer all requirements.

Arthur Whitham.—We have not had an opportunity of trying any of the lenses in question; but, if you will send us one, we will give you our opinion of its merits.

A. Davies.—If the facts are as you say, you can certainly proceed against the pirate and make sure of a conviction. It is "impudent bounce" on his part. The suit quoted by him will not apply in this case.

J. B. W., S. Blake, Doubtful.—Your copyrights are perfectly secure, inasmuch as all the work was done by yourselves and registered in your names. The late decision in the law court does not affect your title in any way. It is still perfectly secure.

Thos. Wicks.—So far as we can judge from the negatives received—most of them broken—all the plates have been very much under-exposed, and then forced with ammonia in the development. Light has also had access to them, either whilst being developed or, to a very slight extent, during exposure.

A. Z. B.—There is nothing surprising in connection with your experience. It is well known to every carbon printer that sensitised tissue will not keep nearly so long in hot weather as it will in cold. It may sometimes be preserved in winter for several weeks, whereas in summer it will often become insoluble in a couple of days.

A Young Amateur.—The triplet, though now considered old-fashioned, is still a very good and serviceable lens. By removing the central lens you will considerably shorten the focus, and consequently make it more rapid in action; but the field it will cover will be very small indeed compared with what it will do in its entirety.

F. H.—The deposit in your toning-bath may arise from several causes, the most likely of which is that your fingers were contaminated with the hyposulphite of soda. If the toning solution be subjected to a strong light it will frequently throw down a deposit. In such a case as yours it is difficult to give very definite information.

Pencil.—Without knowing the constituents of the varnish it is impossible to say what you can put into it to harden it. From what you say of it—"that any dirt or anything that comes in contact with it leaves an impression"—we should advise you to discard it altogether, and make or procure some that is of suitable quality, rather than attempt to improve what you have.

Oliver Twist.—We have a strong objection to any varnish, the surface of which can be easily abraded by rubbing with the finger, in order to obtain a retouching surface. It is far better, especially with gelatine plates, to have a varnish with the hardest possible surface, which should remain intact, and then to apply some medium upon which the retouching can be effected.

Advice.—There are plenty of openings in London for a thoroughly-good typographic process. If you can (as you say) prepare blocks in half-tone which can be printed with type in an ordinary printing-press you will find plenty of business awaiting you in the metropolis. We shall be very much pleased to receive the promised specimens, and promise that they shall not go out of our possession.

Residue.—The most practical way, in your case, of recovering the silver from the waste emulsion is to put it into a jar and then stir in sulphuric acid, in the proportion of four or five ounces to the pint of emulsion. After an hour or two the bromide will have settled to the bottom, and the supernatant liquor may be decanted. The bromide is then well washed, and the silver may be recovered, either by the zinc method or by fusing.

B. A. Austin.—Undoubtedly the gelatine has become decomposed, a the emulsion is now useless. As the quantity is so small we shou not advise you to waste time in trying to make it workable.

Deutschland.—The prints referred to as "untoned" were, we belie produced by development, and were not, as you appear to surmise, simp prints on albumenised paper which had not been toned. If you requi permanence, you had better tone and fix in the ordinary manner. Equal as permanent prints—possibly more so—may also be produced by develo ment, but then the colour is rarely so pleasing, according to prese taste. Developed prints also lack the albumen surface which is now much admired.

Henry Palmer.—All depends upon the photographer's terms. Some f photographers charge so much for the first picture and so much dozen for the after prints. The majority, however, charge the pictu at per dozen, and supply proofs, the latter being counted in the doz when the order is executed. In your case, probably, the artist charg for the proofs separately. On the whole, this may possibly be the fair way, because if the proofs are not satisfactory no further copies need taken, and therefore not be charged for.

Received.—G. W. Webster, F.C.S.; H. S. Starnes; &c. Thanks. In next.

Errata.—Owing to the non-arrival of a proof in time for correcti several typographical errors were allowed to pass in our article *Photomicrography* in last week's issue. In the first line, second colum page 487, for "tried" *read* "dried." The remainder consist of mista in the spelling of proper names, which our readers will most probab recognise for themselves.

Photographic Club, Ashley's Hotel, Henrietta-street.—At next meeting of this Club, on Wednesday evening, the 5th Septemb the subject for discussion will be—*The Slide Rule as Applicable Photographic Calculations.*——On Saturday afternoon next, 1st Septe ber, the members of the Club will have an outdoor meeting at K Bridge, and will meet afterwards at the Star and Garter Hotel.

The Daguerre Statue.—The bust of Daguerre, subscribed for photographers all over the world, was unveiled on Sunday last, the 2 instant, at Cormeilles (Seine-et-Oise), where an inscription marks house where he was born in 1787. The grand-nephew of Niépce, way of protest against this monopoly of honours, has published agreement between Niépce and Daguerre. This document establis a partnership "for co-operating in perfecting the said discovery, vented by M. Niépce and improved by M. Daguerre." Niépce enga to confide to Daguerre, under the pledge of secrecy, the principle of discovery, and to furnish the minutest particulars of the processes c nected therewith, in order to accelerate and combine the researches experiments for perfecting and utilising the discovery. The ceremo was presided over by the municipal authorities. The statue Daguerre, chiseled by the celebrated sculptor Capellard, has b erected in a little public place almost opposite the house where artist was born. On the pedestal are inscribed the dates 1787 and 1 Amongst those present were MM. Felix Hemant, representing Ministry of Fine Arts and Public Instruction; Antonin Pro Letellier; and Baron Cottu, Prefect of the Oise. Several speec were made.

LONDON GAZETTE, *Tuesday, August* 28, 1883.

Partnership Dissolved.

Charles Morris and James Logan, trading as Morris and Logan, Colne, La shire, photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,
For two Weeks ending August 29, 1883.
These Observations are Taken at 8.30 a.m.

August	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
16	30·03	NW	59	55	105	68	55	Cloudy
17	30·13	W	59	58	85	69	52	Raining
18	30·18	N	65	62	115	80	58	Overcast
20	30·17	E	60	58	115	81	53	Hazy.
21	30·18	W	66	61	106	82	59	Hazy.
22	30·18	W	68	64	—	—	62	Hazy.
—	—	—	—	—	—	—	—	—
24	30·31	E	62	57	113	77	54	Bright & Cl
25	30·23	E	62	59	108	78	55	Hazy.
27	30·07	W	65	57	106	78	57	Overcas
28	30·04	W	65	61	115	78	60	Cloudy
29	29·83	W	66	61	93	71	60	Cloudy

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1218. Vol. XXX.—SEPTEMBER 7, 1883.

PHOTOMICROGRAPHY.

"Photomicrography" and "microphotography" are so often used indifferently for the same application of photography that it is necessary to point out their distinction, which for many years has been settled by the leading journalists. Photomicrography is held to be the enlarged photographic representation of microscopic objects by the aid of microscope objectives; whilst microphotography is defined as the production of minute images of large objects, to be afterwards viewed by the microscope or a magnifying lens—thus, the life-size portrait of an individual was reduced to the size of a pin's head, to be afterwards magnified. Many will remember the little miniature-shaped opera glass, with a portrait at one end and the magnifying lens at the other, of M. Dagron—a French patent of about 1832. The apparatus for the production of these pictures is described and figured in Carl Roth's *Repertorium*, 1867; also figured and explained in a small pamphlet by Jas. Nicholls, published by F. Cox some years since. The definition of the above terms will be found in The British Journal Photographic Almanac, 1869, page 136.

The student will probably be puzzled about the required apparatus and its employment; hence it may be as well to state that the following explanations are adapted entirely for beginners, and, therefore, the amount of detail must be excused by those who have mastered its difficulties. For their guidance it will be most convenient to deal with the simplest form first, and which may be used either with solar or artificial light—as that of a good fountain, argand oil, or a paraffine lamp. Whatever form of apparatus be choosen, sundry points have especially to be attended to—as rigidity, or *freedom of vibration;* centricity, or *correct centering* of all the parts of the apparatus; and *good objectives.* The student will have to decide whether he intends to employ a rigid form of apparatus, such as a long, conical camera of fixed length, with the microscope arrangement at the small end, as in Eden's patent pattern for both micro- and photomicrography, advertised in 1864; or Highley's form of a long sliding-box camera, the back drawing out to some distance, the optical portion being attached either to the mount or to the front, or the plan by which the optical part was attached to a bar with a flange that could be fixed to the front of any strong camera or to a pierced shutter. A description of the former will be found in the pages of the *Quarterly Journal of Microscopical Science* for 1853. Both the latter and the former are figured in Hogg's *The Microscope*, and the cameras in Beale's work. Or he may select the plan specially advocated by Mr. Charters White, in a paper recently read before the members of the Quekett Club, of putting aside the camera and enclosing the whole of the arrangement of lamp, condenser, and microscope portion within a dark box, projecting the image on to the sensitised plate supported opposite the objective on a movable support, the room, of course, being only feebly lighted by a non-actinic lamp; or he may, as adopted by Wenham, Curtis and Woodward, Maddox, &c., utilise a room as the camera, and employ solar light; or the plan of attaching temporarily the microscope to the camera. Each plan will, doubtless, have its advocates, according to circumstances and the work to be done.

The strictly rigid forms are preferred by many as being always handy, but, for the want of increase of magnification by using the increased length afforded by a sliding body, are, by others, supposed to be defective. They can be arranged for either artificial or solar light, so that the mirror or prism shall throw its rays either directly upon the object or after reflection from a heliostat. Many advocate the rigid form of camera and a temporary light-tight junction admitting of motion with the eye end of the microscope, so that it can be racked in or out for rather more than the distance of the longest focus of the lowest-power objective employed. This method is very convenient, as if in examining an object it be desired to obtain a photograph of it, the slide is fixed, the eyepiece removed, and a well-fitting, black velvet-lined paper tube is inserted in the draw-tube, or the body-tube if this be at all narrow; and the microscope, arranged centrally, is attached to the cone, forming the connection between it and the camera.

If the base-board of the camera be prolonged in front the microscope can be placed on it, and the whole removed to a convenient window if sunlight is to be employed; or they may be left on the table, the room darkened, the mirror turned down or removed, and the lamp with a bull's-eye condenser fixed in front so as to direct its light through the object, a smaller condenser being placed in the path of the rays from the bull's eye so as to render them more convergent. If using sunlight, it is best to throw open the window and let the mirror project outside if possible; but in all cases it is well to cover the whole apparatus, including the stage, with a lined black cotton-velvet focussing-cloth. Sundry details which apply also to this method will be named when speaking of other arrangements, as the ammonio-sulphate cell, diaphragms, &c. In this capricious climate it is doubted if solar light will be much employed, especially as the rapid gelatino-bromide plates are now brought to such perfection, and are more or less readily impressed by the rays from a good artificial lamp-light; though, should the operator slide back to the good old days of collodion, he will need sunlight or the higher forms of artificial light.

Presuming that the student is provided with a monocular microscope having a steady stand and a fine adjustment, and that he has only a quarter-plate, perfectly light-tight camera, with a sliding or bellows arrangement, a bull's-eye condenser, and a good, large single or duplex wick paraffine lamp, and that he desires to make the arrangement of these inexpensively, the following plan will guide him:—Procure a base-board of well-seasoned deal, level, and smoothly planed, about (for all the measurements are given as conjecturally suitable), say, two and a-half or three inches wider than the camera or its base-board, and one inch thick, clamped at each end; the length may be thirty-six or a greater number of inches—say forty. Run a line down its centre from end to end, and mark the exact centre of the foot of the camera back and front; let a clean central slot be cut through the board the width of the screw that usually fastens the camera to the tripod head, so that it can slide easily in it. Let the length of slot be fourteen or sixteen inches, beginning at four inches from the left end. Fix across it, beneath, at two inches from each end, with long screws, two stout cross-pieces, one inch thick, three inches deep, and the length of the width of the board. The two

cross pieces will now form its two feet or supports. At the right hand end fix firmly an upright piece of board, tongued, of the same width, five-eighths of an inch thick, and nine or ten inches high; continue the central line up this board.

Place centrally the lamp on the base-board with its back against the upright at the end of the board, and, for facility of description, suppose it to be one of the good, ordinary single wick, or duplex bracket passage lamps, but capable of having the narrow or the broadside of the flame placed facing the microscope (such a lamp with shade is figured in Dr. Malley's book, page 39); then place the microscope centrally on the base-board, turn it down perfectly horizontally, its exact position depending on whether the triangle or horse-shoe spread of the stand be before or behind. There must be sufficient distance between the lamp glass and the stage to allow of the use of a bull's-eye condenser, and also a smaller condenser to be set in position if needed. Shut up the draw-tube, having previously fixed to it an objective, so that it comes about level with the surface of the stage, and mark on the base-board the distance of the eye end of the microscope. Set the camera centrally on the board at the left end; take two strips of deal, one inch wide and three-eighths of an inch thick, and the length of the board; place one on each side against the base-board or side of the camera, and fix them by screws; slide the camera centrally on the line up to the microscope, keeping the guides against it, and screw them down. Mark one of the guides on its upper or outer side into inches and half-inches, beginning at the lamp end, or from the exact position an object slide on the stage will be in when in use. This can be done at the last.

The different parts, though centrally placed, are not, perhaps, centered with each other, and either the camera or the microscope may need to be raised by an additional board; the lamp can be raised to the required height against the upright and fixed there, so that the centre of the flame corresponds with the centre of the stage aperture. Having obtained the perfect centering, about two inches from the eye end of the microscope, fix the upright to the base-board to the same height as the camera, and cut out a central aperture larger than the tube of the microscope, line it with a cone of fine black cloth, on the narrow end of which is fastened a piece of elastic web, so that when slipped over the microscope tube it shall clasp it tightly; this is preferable to closing the hole by sheet india-rubber, with an aperture for the tube to pass through. The tube of the instrument can now be racked out without any chance of displacement or strain upon the fine adjustment. To the camera side of the upright fasten one end of a long, but narrow, bellows portion, and fix the other end to an extra front that will fit the camera in place of the original one with the lens mount. The length should be such that when both bellows are extended the camera reaches the end of the base-board. If the narrow bellows be long, it may need to be supported in the middle to prevent bellying. Tubes sliding on each other may be used, if preferred.

Remove the focussing-screen, see that the surface is most finely ground, cross it diagonally by two fine pencil lines, and from the centre with a pair of compasses strike out three circles—two, two and a-half, and three inches; smear the surface with a little sweet oil, or vaseline, and wipe it carefully. Take three bits of good cardboard, of the same depth as the inside of the draw part of the camera but two inches wider, cross them with diagonal lines, and from the centre set out a circle upon each of one and seven-eighths, two and three-eighths, and two and seven-eighths inches; cut them out carefully, black each side of the card with Brunswick black, and fold over sharply to right angles, the extra inch on each side, so that when folded and pushed just inside the camera they will remain in an upright position. Take another piece of blackened card about sixteen inches long and ten inches deep; cut out on the central line, about three inches from one of the long sides, a hole rather smaller than the condensing lens, turn up each side at right angles to the width of the upright at the end of the base-board, and fix it by a couple of stout brass pins to the sides of the upright, so that the aperture coincides with the centre of the lamp when in proper position. This hood, or diaphragm, is best made of thin sheet iron after the exact size has been found by the card. Test the whole arrangement by lighting the lamp, attaching the cone of cloth the microscope, shutting up the camera and narrow bellows, removing the card diaphragms in the camera. The circle of li should be central with the circles on the focussing-glass, and image of the narrow edge of the flame when this is removed se centrally. When this is perfect and the proper position of microscope stand on the base-board determined, having regard what has been previously said, clamp it by three clamps or butt against the foot or stand, so that it will remain firm under use can be easily removed and exactly replaced. Upon extending camera, and racking out or in the microscope tubes, the light circ should remain central.

If the tube be a narrow one it may cut down the light circle much when fully extended; this can be altered by substituting body tube for the draw tube, not forgetting to line it with velv It will be seen that all the parts movable are free to move on ea other without deranging their centres, are readily separated attached, and can be entirely moved together without displaceme Also, it can be readily set upon three double stout legs that spre as a tripod, two being placed at the sides about a foot from the came end, and the other about a foot from the front end, thus formi altogether a close resemblance to the arrangement which a facetio friend called "Dr. Maddox's 'dandy' camera." There are so cameras of large size made with an extra expanding front, but th are costly, and scarcely meet the required length when drawn o It is possible that the reflector sold with the lamp may not be ve suitable, not of a correct figure, nor short enough focus; so, to effe the best compromise, select one that, when near the source of ligh will converge the divergent rays and form a cone that will about f the bull's-eye condenser when in position. Choose a good focussin glass—a Ramsden's positive eyepiece—set it so that the very fine markings that can be made with a pencil on the ground surface sha be in focus, and fix it at that correction. If possible, select a neg tive with delicate markings that has been taken upon a piece patent plate of the *same* thickness as the ground-glass screen, an test the focussing-glass upon it. The position at which it was pr viously set may require slight alteration. Some of the ordinar focussing-glasses are carelessly made.

P.S.—The following names were accidentally omitted in the pre vious article:—Hardwich, Towler (U. S.), Liesegang, Vogel, Roth Pumphrey, Anthony, Gayer, Beechey, Traer, Weightman, Nicholls Woodworth, Bransome, Moss, Price (U. S.), Johnson, Hitchcock (U.S.), Smith, Haner, Whitson, Walmsley, Kiaer, and, doubtless many others which should find a place amongst the foregoing.

DR. STOLZE'S METHOD OF BOILING EMULSIONS.

A FEW weeks ago, in our issue of the 18th ultimo, we published an article by Dr. Stolze, in which he recommended a novel system of boiling gelatine emulsions, by which he claimed that he secured a greater degree of uniformity than is possible when the ordinary process is adopted. Commenting upon the article at the time, we were of opinion that the newly-proposed method, while it offered no advantages, such as were claimed for it over the older plan, would prove far more troublesome in operation. Since then, however, we have been engaged in a large number of experiments which, though they have not shaken our first belief in the matter of uniformity, have proved the plan of steam-boiling to be one which may prove exceedingly useful in more respects than one, and will probably also turn out to be even less troublesome than the process it is designed to supersede when the necessary arrangements have been once made.

Before commencing to describe our experiments we may state briefly the conclusions we have arrived at. These are, first of all, that the introduction of steam directly into the emulsion does *not* raise it to boiling point, though it brings it to a higher fixed maximum temperature than we usually obtain by the old method, and that it, therefore, gives no greater promise of uniformity, though the few extra degrees of temperature may prove advantageous in producing sensitiveness with shorter boiling.

Secondly—and this is in Dr. Stolze's favour—that the original escription of the process appeared to hedge it round with difficulties hich do not exist, and precautions which are not really necessary. hus, the fragility of the glass vessels can scarcely be held to be ›jectionable, at least in England, for most emulsion operators— nateurs, at anyrate—are in the habit of using glass boiling flasks, eakers, tubes, and other easily-breakable glass articles; while the ethods of use under the old system are more likely to lead › fractures than under the new. Then, again, we have not found at all necessary to wrap up the emulsion bottle in wadding "to eep it warm;" for, as a matter of fact, whether wrapped or unrapped, the thermometer in a large number of experiments has variably given the same temperature under the same conditions as › size and shape of vessel and quantity of emulsion.

Thirdly, the method is not necessarily unsuited to any ordinary oiling formula, for we have not, in any case, found the increase in olume of the boiled emulsion to be anything like so great as that entioned by Dr. Stolze, for a reason which will be explained irther on.

We have said that the steam process does not, in our hands, ise the emulsion to the boiling point. Against this Dr. Stolze ay urge, first of all, that we do not wrap up the containing vessel as to prevent loss of heat. To this we have already replied in ie last paragraph. Secondly, that our thermometer may not be ccurate; but, as we have used several instruments of great elicacy and by the best makers, and have checked off our temeratures in degrees of Fahrenheit and Centigrade one against the ther without any discrepancy, this will scarcely hold.

But, to proceed. Our first experiments were made in the open boratory for the simple purpose of testing the practical details of ie method. The first detail upon which we desired information as the period required to raise the emulsion to boiling point or to bullition. Two glass flasks were taken—one being fitted with a ork through which was passed a glass tube about eighteen inches ng, bent twice at right angles so as to dip to nearly the bottom of ie second flask. This tube was wrapped securely in three or four iicknesses of lint, except where the ends passed into the flasks, in rder to prevent cooling of the steam in passing from one vessel to he other. In the larger or boiling flask about two pints of water ere placed, the cork inserted, and the flask placed on a gas stove. bout two ounces of water were placed in the other to represent he emulsion, and the other end of the bent tube, together with a ube thermometer (suspended by means of a perforated and chanelled cork into *the water*), inserted, and the whole left until "steam as up."

It may be well here to describe minutely all that went on during he next few minutes. The temperature of the water in the smaller ask was 17° Centigrade to commence with, and at that point it emained stationary until the water in the boiling flask was in vioent ebullition. Shortly before this, however, when ebullition was bout to set in, a rapid succession of bubbles commenced to rise n the small flask without any increase of temperature, and caused ierely by the expulsion of the cold air from the upper portion of he boiler. Immediately full boiling commenced these bubbles eased, the steam now passing being condensed in the cold water. 'he thermometer began to rise, as did also the level of the liquid, nd in exactly three minutes from that time the temperature stood t 98·5°, at which it remained during the remainder of the halfiour. Within a few seconds of the attainment of the maximum emperature steam (or, shall we say, "aqueous vapour") began to ssue freely from the small flask, and the volume of its contents eased to increase, while violent ebullition proceeded; in fact, the team from the boiler appeared to pass through unchanged, except y a degree or two in temperature, in spite of the fact that the boilig point was not reached in the intermediate liquid through which t passed.

There was but one natural conclusion, namely, that the thermoieter was inaccurate; another was substituted (graduated to 'ahrenheit's scale) which soon rose to 209·5°—a sufficiently close quivalent to 98·5° Centigrade to bring suspicion on both. Upon esting them subsequently side by side, by immersing them directly into the boiler, they were both found to be strictly accurate, and, as after-experiments showed precisely the same result, we were compelled to regard it as a natural, but so far an inexplicable, phenomenon.

The increase of volume after half-an-hour's boiling was much less than we had anticipated, but we were unable to estimate it in consequence of not having accurately measured the water at the commencement. To remedy this defect in the next experiment we proceeded differently.

In place of the small flask we selected a wide-mouthed bottle with a well-fitting cork, through which three holes were bored to accommodate the bent tube from the boiler, the thermometer, and an escape tube which was in turn connected with a Liebig's condenser. Into what we may call the "emulsion bottle" five ounces of water were carefully measured, and into the boiler (with equal care) thirty ounces. The previous operation was repeated, the process proceeding exactly as in the former case, and with the following results, as extracted from our note-book:—"Temperature (in 'emulsion bottle') at starting (3.27 p.m.), 60° Fahr.; 3.30 p.m., 120°; 3.33, 192°; 3.34, 206°; 3.35, 210° (the maximum). After [half-an-hour's] boiling, contents of emulsion bottle, $6\frac{1}{4}$ ounces; contents of boiler, $23\frac{3}{4}$ ounces; passed through condenser, $4\frac{7}{8}$ ounces. Memo.: loss of one drachm of water through leakage of steam."

Here it will be seen that the "emulsion" during the half-hour's boiling retained exactly one quarter of its bulk of condensed steam while exactly its own volume passed clean through it during the process. The temperature also never reached boiling point, but remained steadily at 210°. It will also be observed that the "emulsion" was cold to start with, which is never the case in actual practice, and this would palpably require the condensation of a larger quantity of steam to raise it to 210° than would be the case if the original temperature had been higher, and it would consequently increase more in volume.

The experiment was repeated with the same quantities and conditions, except that of temperature. The following is the entry in the note-book:—"Temperature at starting (4.30), 150°; 4·32, 178°; 4.33, 192°; 4.34, 210° (maximum). After boiling, contents of emulsion bottle, $5\frac{7}{8}$ ounces; ditto of boiler, $23\frac{7}{8}$; passed through, five ounces. Memo.: loss, 2 drachms."

A comparison of these two experiments, which are typical ones, may be interesting. It will be seen that, as might be anticipated, the increase of temperature rapidly accelerates as the process proceeds, and, as a matter of fact—deduced from other experiments—can be calculated to a nicety when the same quantities and same starting-point are in question. Again: where it requires eight minutes to raise five ounces of water from 60° to 210° it requires only four to reach the same maximum from 150°. In the first instance twenty-five per cent. of condensed steam is required for the operation; in the second only about sixteen and a-half per cent. Finally: in a certain time and under similar conditions a given quantity of steam is passed through the emulsion. All these facts tend to remove much of what we were inclined to look upon as elements of uncertainty, and as such likely to make the process a troublesome one.

Next week we shall give some account of the application of Dr. Stolze's plan to actual emulsion work, and show that it need not necessarily add anything to the bulk of the emulsion treated.

THE SLIDE RULE APPLIED TO EMULSION CALCULATIONS.

A most interesting exposition of the value of the slide rule in simplifying emulsion calculations was given by Mr. William Ackland, at the meeting of the Photographic Club, on Wednesday evening last. This application of the slide rule is, as we have said, a most valuable one, and when the improved instrument which Mr. Ackland exhibited is employed the strictest accuracy is readily obtained in all calculations, even where fractions are in question.

With the ordinary carpenter's slide rule it is a matter of ease to perform all the operations that are likely to be necessary in calculating the equivalent quantities of the salts to be employed in mak-

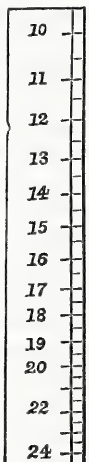
ing an emulsion; but, except for small quantities, strict accuracy can scarcely be relied upon, though the results obtained are quite near enough to truth for all practical purposes. It is not, however, everyone who possesses a carpenter's slide rule, to say nothing of the more elaborate instrument of Mr. Ackland; so we have deemed it desirable, for the benefit of some of our readers, to reproduce the diagram of a scale which was given in a leading article in our number for January 12, 1872, recommending the use of the slide rule for the very purpose in question. The diagram represents in its simplest form the ordinary "Gunter's scale," and, despite its simplicity, will give sufficiently-accurate results to satisfy all emulsion requirements on a small scale. It should be mentioned that though the block, as cut, is strictly accurate, the shrinkage of the paper in the printing operations will, of necessity, cause a slight departure from the exact measurements. Still, with all faults, the scale, as we present it, is sufficiently correct to enable us to calculate to a fraction of a grain.

In order to use the scale, we cannot do better than repeat the directions which were given upon the occasion of its first publication:—

The scale is one of logometric numbers, and enables us to perform any sums in simple proportion, with the aid of a good pair of compasses working rather stiffly at the joint. If we wish to obtain the fourth proportional of any set of three numbers it is only necessary to set one leg of the compass on the first number as read on the scale, and the other leg on the second number. Without disturbing the distances between the points, the compass is removed from its first position and one leg placed on the number on the scale corresponding to the third proportional in the statement of the sum; the second leg will then rest on the desired fourth proportional number. A few instances will make this quite clear. We want to find the value of x in the following—

As $10 : 20 \therefore 30 : x$

The legs of the compasses are made to coincide with the numbers 10 and 20 respectively on the scale; the points are then moved along until that which previously rested on 10 now coincides with 30 on the scale. On looking to the second point we find it to indicate, as nearly as can be expected on a scale printed on paper, 60, the true fourth proportional in the above statement, and, consequently, the value of x. Thus, when the proportion is correctly stated in the first instance, an answer is obtained without any of the trouble involved in the ordinary process of multiplying the second and third terms together and dividing by the first.



As the scale only reaches from 10 to 100, two points will arise in its use:—First, numbers lower than 10 may occur in the proportion; and, secondly, numbers greater than 100. In the first case it is only necessary to double all the terms, and in the second to divide all by any convenient number—taking care, however, in the first instance, to *divide* the product by two, and in the second case to *multiply* the product obtained by the number used in the primary division. In applying these rules in the preparation of emulsions we simply require to know the weight of nitrate of silver corresponding to any given bromide; and the following short table includes those necessary constants. *Seventeen grains of nitrate of silver correspond to—*

9·8 grains of bromide of ammonia.
11·9 ,, ,, ,, ,, potassium.
10·3 ,, ,, ,, ,, sodium.
13·6 ,, ,, ,, ,, cadmium (anhydrous).

Suppose, now, that we have a collodion we wish to sensitise with nitrate of silver, and that the composition of three fluid ounces is as follows:—

Bromide of ammonium	9 grains,
Bromide of cadmium	28 ,,
Pyroxyline	15 ,,
Alcohol and ether mixture	3 ounces,

we desire to know the amount of nitrate of silver to be added to the above, in order that only a slight excess of soluble silver may be present in the emulsion when properly prepared. We have first to find the weight of nitrate of silver corresponding to nine grains of bromide of ammonium, thus:—

$9·8 : 17 \therefore 9 : x$ doubling all.
$19·6 : 35 \therefore 18 : x$

Placing the points of the compasses on the numbers on the scale corresponding to the first and second terms, and then shifting the point to 18, the second will indicate nearly 31·2; but to get the answer required this number must be divided by 2, and we thus get 15·6 grains as the amount of nitrate of silver corresponding to 9 grains of bromide of ammonium. We now have the second proportion—that for the bromide of cadmium:—

As $13·6 : 17 \therefore 28 \therefore x$

We need not trouble in this case, as no number less than 10 is included in the statement. We leave the answers to be found out with the aid of the scale. This product added to that previously obtained is the amount of nitrate of silver required by the three ounces of collodion.

For the benefit of those of our readers who may be interested in this subject, we hope next week to give an account of Mr. Ackland's method of applying the slide rule to photographic purposes; both time and space prevent our doing so this week.

THE NEW PATENT LAW.

ALTHOUGH neither of the two bills on copyright brought before Parliament during the past session has become law, a very important measure was passed, namely, a new Patent Act. If we may draw a conclusion from the large number of patents in connection with the various applications and processes of photography applied for during the last ten or fifteen years, the Patent forms a very interesting subject to a large number of photographers. Therefore we propose to explain to our readers some of the more important features in the new Act, and wherein it differs from that already in existence.

In some respects the new Act may be said to resemble the patent law of America, particularly in regard to the small cost at which a patent can be secured, and also in the facility with which it may be procured. The Bill is entitled "An Act to Amend and Consolidate the Law Relating to Patents for Inventions, Registration of Designs and of Trade Marks," and takes effect on the 1st of January next. On the two latter subjects it is not our intention to write on the present occasion. One of the principal features of the new Act is the small expenditure at the earlier stages of the patent, which will give great facilities to the poorer classes of inventors, who in future will not be called upon to expend large sums for fees until they have proved the commercial value of their inventions.

Under the existing Act a provisional specification for six months costs five pounds for government fees, whereas under the new one provisional protection may be obtained for one year on payment of a fee of one pound only; and upon filing the complete specification and making a further payment of three pounds a patent for four years is secured. Hence it will be seen that, after the close of this year a patent for four years may be obtained for the trifling sum of four pounds, whereas under the existing law a patent for three years, including the stamp for the provisional specification, costs no less than twenty-five pounds. But this is not all: inasmuch as few inventors are at present able to take out letters-patent unassisted, they are, perforce, compelled to employ a patent agent, whose fees form, of course, an additional charge. By the new Act the form to be gone through in obtaining a patent is much simplified; hence the services of the patent agent may, in many cases, be dispensed with.

In the after stages of the patent the fees remain as hitherto, namely, before the end of the fourth year from the date of patent, which is reckoned from the date of making application, another payment of fifty pounds becomes due; and, in the case of a patent granted under the old Act, before the end of seven years, and in the new one of eight years, a further payment of one hundred pounds has to be made. It will not now be necessary that these amounts be paid in two lump sums, as they may be made by instalments. This will, doubtless, prove a great convenience to many who up to this stage have only realised limited profits from their inventions. The instalments must be paid in the following manner, namely, at the end of the fourth, fifth, sixth, and seventh years, ten pounds each respectively; at the end of the eighth and ninth years, fifteen pounds; and at the end of the tenth, eleventh, twelfth, and thirteenth years, twenty pounds. Thus the payments of the fifty and one hundred pound fees are distributed over the space of ten years.

Instead of employing an agent to take out the patent, as it is at present customary to do, it may be secured by the patentee himself through the post, without his personal attendance. Furthermore, he will be able to procure the proper stamped forms, upon which to make the application, at any post-office within the United

Kingdom. One novely—at least in this country—in the new Act is that the application for a patent has to go before an "examiner," who will examine it and see if the claims set forth are clear and explicit, and, at the same time, definite. He will also see that the application does not clash with any other that may previously have been made, but which up to this period is unsealed. In the event of its doing so, it is his duty to bring the matter under the notice of the Comptroller, who is the head of the Patent Office, and he will take action in the matter. The duty of the examiner is also to compare the complete specification, when lodged, with the original application, and see if they are in accord, and, in the event of their not being so, the Comptroller will order the specification to be amended before it is finally sealed. There is a provision in the Act by which the applicant for a patent may demur to the ruling of the Comptroller and appeal to the law officers.

If a patent be not completed by the end of one year from the date of application it becomes void, and the specification is then published, so that anyone may then work the invention as is now the case, under the present Act, at the end of six months. According to the new Act a patentee under certain circumstances—such as the invention not being worked in the United Kingdom, or owing to the public not being fully supplied with it—may be compelled by the Board of Trade to grant licenses on reasonable terms to others to work the invention. With regard to the prolongation of patents beyond the fourteen years, the Privy Council will have the same powers under the Act recently passed as they have under the present.

There is a clause (34) in the new Act by which, in the event of an inventor dying before he has applied for a patent, his legal representative may make application and have the patent granted to him; but the application must be made within six months from the death of the inventor.

In the foregoing we have given a brief outline of the chief points in the new Act. From this it will be seen that great facilities are now given for obtaining patents for inventions at a cheap rate. How the Act will work is, at present, of course, a matter of speculation. Already some authorities are prognosticating that on several points it will require speedy amendment; while a few pessimists prophesy that the granting of patents for such trivial things as will doubtless at times be patented may prove vexatious. However, the Act must prove advantageous to many inventors—photographers amongst the number—who may have valuable inventions, but whose means are too limited to pay the present heavy fees at the initiatory stages of a patent, or, having done so, to work the invention commercially.

On a future occasion we shall have some further remarks to make on the enactment in reference to the registration of designs and trade marks, and on the Act generally.

ON THE USE OF GAS.

We conclude our series of articles upon this subject by a few hints respecting some of the difficulties or drawbacks which are liable to beset its use by those who have had little experience in the matter.

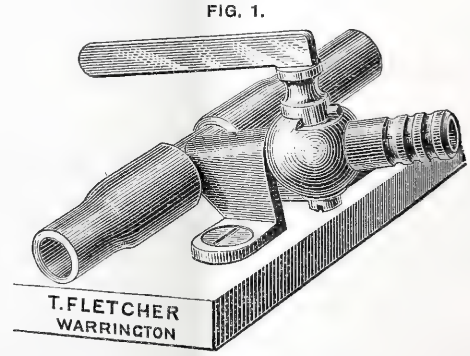
One very important condition for the successful employment of coal gas for heating purposes lies in the existence of a fair pressure at the main. For a single small Bunsen this is not very important; but when several are liable to be used at once, or when a large muffle furnace is under experiment, it is quite essential. Many gas companies, on account of the relatively small amount of gas required during the day—the time when photographers would be most likely to need its aid—reduce the pressure to so low a point that it is sometimes impossible to get a satisfactory value from it, the object of the company being to reduce to a minimum that waste in the underground mains which they can never entirely prevent—and the less the pressure the smaller the amount of gas so wasted. Anyone can easily test for himself the actual pressure by slipping a piece of rubber tubing over the end of a gas bracket relieved of its burner, and, after attaching a few inches of glass tube to its free end, placing the latter in a jar of water; then, after "turning the gas on," note how far from the level of the surface the gas pushes the water down the tube, the number of inches giving the pressure of the gas in inches. If this be too slight, a complaint made to the gas company would most likely result in an increase in the supply.

In making this trial the same precautions are necessary that require to be taken in using gas when any large supply is needed; that is to say, the supply pipe should be quite clear and free from dirt or any deposit that would check the flow, a very small deposit very readily producing this effect. We well remember on one occasion entering the laboratory of a gentleman who occupied the position of chemist to a certain county, and we found him complaining bitterly of the scant pressure of gas to his premises, which, he said, would not allow half-a-dozen Bunsens to burn at once; yet, not very many months after that occasion, upon passing into the same laboratory we saw not only a goodly number of large burners at work, but also a large gas furnace, evidently in excellent working order. We soon found out the cause. Convinced of the value and applicability of gas, he had a completely-new set of pipes laid down, with the result that at any portion of the day he could get as much gas as he needed for all purposes. We likewise could give the name of a photographer who, in rebuilding a portion of his premises, had a fresh set of gas pipes laid down, the chief one being an inch and a-quarter in diameter, expressly to be able to make use of it at any future time if a large amount of heating should be required, his idea at the time being to use it for heating the studio as well as to carry it to his laboratory with the view of utilising it for enamelling, &c.

It is, of course, quite unlikely that the photographer desiring to use gas for the few simple requirements of an ordinary studio would incur this expense; but, at least, he should make sure that the tube from which he gets his immediate supply does not in anyway impede the free passage of the gas.

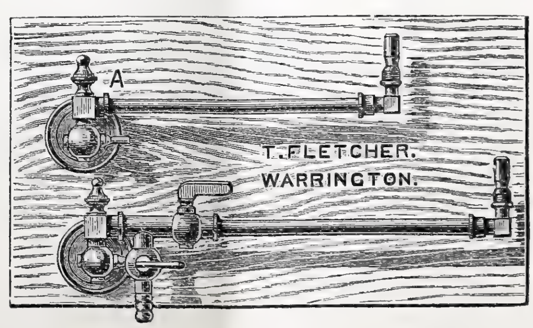
In eight cases out of ten, where an ordinary bracket is utilised for holding an india-rubber tube for connecting with the heating-burner, it will be found to be greatly reduced in bore by the presence of a deposit which is liable to occur in course of time; but to be warned of this possibility is to provide a cure when it occurs. A far better mode of having a burner constantly handy, yet without involving the necessity for calling in the services of a plumber, is to employ an ingenious arrangement of Mr. Fletcher's, who has devised a tap with a connection for attaching to the supply-pipe of the room for which the burner is required. We append an illustration, which almost explains itself (*fig.* 1).

FIG. 1.



After first turning the gas off at the meter the gas pipe in the wall is brought forward a little and a small length cut out of it; the

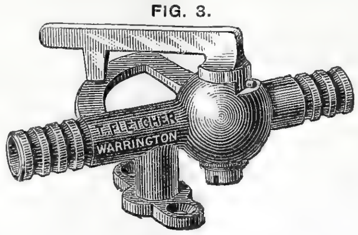
FIG. 2.



arrangement shown in the illustration is then fitted between the two ends by means of the small pieces of rubber tubing supplied

with it. A perfectly tight junction is the result, and any length of rubber tubing may now be added for supplying the Bunsen or other burner. Where the exigencies of the situation do not permit this arrangement a connection for letting into a gas bracket can be obtained. The illustration shows the manner of its employment (*fig.* 2). We also give an illustration of the quadrant tap, which can be moved with one hand and set in an instant, as we before explained, to any one point (*fig.* 3). We have found this arrange-

FIG. 3.



ment, with a small radial burner, very useful in working the platinotype process.

We have repeatedly mentioned rubber tubing. Let us recommend our readers to purchase that sort made of very thick rubber; the gas will not penetrate its walls as happens with the ordinary kind, to an extent, sometimes, that makes the apartment unbearable, and it does not kink. The thin tube fitted with a lining of spiral wire of course does not kink, but it should never be used on account of its ready permeability to the gas and the great obstruction it offers to its passage. The thicker tube costs more, but it is well worth the extra outlay.

When once a handy gas arrangement is established, be it only a simple radial burner for boiling and so forth, it is generally found so convenient by the *employés* that it will often be used, although a good fire required for other purposes may be available. We conclude our hints by describing a method employed by a chemist of our acquaintance, who uses gas for his occasional household requirements. He informs us he has seen the kettle merrily boiling on the gas burner, although the legitimate kitchen fire was all ablaze and unoccupied. He first tried locking the tap, but that was awkward at times, so he finally hit upon the expedient of cutting the india-rubber tubing into two and joining it again with a small length of glass tube. He retains possession of the glass tube except when the gas is actually needed, at which time he has to be applied to for the "connector," and this quite prevents any use of the gas except for legitimate purposes.

Mr. Cecil V. Shadbolt has sent us some prints, taken on the occasion of his recent trip in the balloon "Sunbeam," on the 7th ultimo. The day was a most unfavourable one for photographic purposes, and the start was late in the afternoon; but, nevertheless, Mr. Shadbolt obtained at least three favourable results at altitudes varying from 2,750 to 3,000 feet. The best is a picture taken from the lowest height named, while the balloon was passing over Bexley, Kent. This, in addition to the principal roads and rows of houses, shows distinctly the outlying fields and meadows. It is possible to distinguish between the different crops; indeed, in one particular field the rows of turnips can almost be counted. Another feature of this same picture puzzled us for some time until we read Mr. Shadbolt's explanation, from which we learnt, and could then recognise, that it was a lawn-tennis ground, with the courts newly and plainly marked. Mr. Shadbolt has, so far, produced better results than have been shown by any of his competitors in balloon photography; but he is not yet satisfied that he has attained the height of his ambition. He hopes—if not this, at least early next season—to utilise the experience he has gained in his various ascents this year, and to produce better work than he has yet done.

Messrs. Brown, Barnes, and Bell have scored a success if, as they claim, they have produced the first phototypographic block that—without any assistance from the engraver, by the way—has been printed in an ordinary daily newspaper, without any of the care usually given to that class of photo-engraving when merely specimens are required. In the *Bradford Telegraph* of last Saturday is a phototypographic engraving by Messrs. Brown, Barnes, and Bell's process, which does them credit when the circumstances of its production are taken into consideration. We hope next week to give a specimen illustration by the same process.

The British Association will meet, as our readers are aware, at Southport this year, and the proceedings will commence on the 19th instant, and continue till the 27th. It is now thirteen years since it met in Lancashire, the last occasion being in 1870, at Liverpool, since which time science has vastly altered the conditions of many manufacturing industries and entirely created others, and in no district in the country more than in Lancashire will its progress be more evident. In addition to the business proper of this meeting as carried on in the various sections, the evening lectures, which are always very popular, will be given as usual—that on Friday, by Professor Bell, the Astronomer-Royal for Ireland, on *Recent Researches on the Distance of the Sun*, being, perhaps, the only one in which matter specially interesting to photographers is likely to be found. The usual round of excursions, which form so attractive a feature of the programme, has already been arranged, the trips including visits to the Lake district, St. Helens, Wigan, Clitheroe, Chester, &c. The Earls of Derby, Crawford and Balcarres, and Lathom, and also Mr. Weld Blundell, of Ince Blundell, will throw open their grounds to members of the Association, and at some of these places garden parties will be given. The Winter Gardens have been specially engaged for the sole use of the Association, and the presidential address will be given there. It remains to say that Professor Cayley, M.A., LL.D., F.R.S., V.P.R.A.S., is the President-elect.

Apropos of the various aspects of copyright, moral and legal, we note an interesting communication from the Superintendent of the Indian Museum of Calcutta, who writes that the plates of a work he had published—*Mandalay to Mornien*—have calmly been made use of by another author without the slightest acknowledgment of their source. Such a question would have ordinarily only a remote bearing on topics germane to our columns; but in the present instance we may say the engravings in question owe their genesis to photographic products, some of them having been executed from photographs of objects specially brought together and arranged by the Superintendent for the purpose; and others, again, from photographs taken by an officer who accompanied that official in the journey which the engravings illustrate. As the securing of portraits of natives of almost unknown countries is usually a matter of no small difficulty and danger, it is not to be wondered at that some feeling should be expressed at this cool appropriation of results. We apprehend that the photographs themselves cannot have been rendered copyright.

A few weeks ago we alluded to a "find" in the shape of a set of apparently ancient manuscripts on sheepskins, containing almost the whole of the Book of Deuteronomy, they were being examined by experts, and their owner asked the modest sum of one million sterling for them. At one time they either could not be, or were not allowed to be, photographed, so that the interest was intense and concentrated for a time, while a conclave of learned authorities were sitting, according to the *Standard*, in "solemn farce." They are now pronounced, *ex cathedra*, to be ingenious forgeries.

On Saturday week it will be just seventy-one years since the comet of 1812 was in perihelion, and Encke determined its period to be about seventy and a-half years. Later investigations, however, showed this estimate to be a little too short, so at no distant date it may be expected to appear, when, no doubt, telescopes and cameras will be at work upon it.

One method recommended for extracting the nitrate of silver from old baths was to place the bath in a Winchester and expose it to sufficient cold to freeze it throughout its mass, and then to withdraw it

when all but a small quantity was solid. This residuum, it is stated, would contain all the nitrate, while the ice would be nothing but pure water. To all practical intent this is correct, but the outcome of the most recent experiments upon the freezing of salt water shows that the salt water of the sea is capable of freezing as salt water, and not as water *plus* the salts locked in its interstices. Dr. Pettersen, by a series of ingenious and beautiful experiments, conclusively proves this to be so, and he altogether throws quite a new light on the freezing of saline solutions. He shows, for example, that the chlorides and other salts which go to make up the "salt sea" do not get used up, as it were, in the ice in the proportion they are present in the ocean, as, to a great extent, the water in freezing seems to reject the chlorides but to retain the sulphates. He explains very cleverly the cause of the old belief that frozen sea water contains only frozen water with the salts occupying its pores, a condition which was supposed to be proved by the potable character of water from such ice that had partly melted. His words are (he has shown that sea-water ice requires a lower temperature for melting than does fresh):—"The salt-water ice of low melting point effectually prevents the intermingled snow from melting, which finally remains practically intact, and, of course, can be drunk on melting."

Our readers have been made acquainted with the fact of a statue to the memory of Daguerre having been recently unveiled at Cormeilles; it was on August 9th, 1839, that a daguerreotype was publicly exhibited by Arago at a *séance* of the French Academy of Sciences. At the present time only two of the members of the Academy who were sitting at that date survive. Their names are M. Dumas, the "Perpetual Secretary," and M. Chevreul, who occupied the chair on the occasion.

Photographic chemists would almost seem to have given a hint to the metallurgists, inasmuch as the use of both bromine and hyposulphite of soda is recommended in gold and silver extraction. The precious metal is found in rocks and sands, and bromine is used with them. Where ores containing sulphuret of silver occur they are first roasted, then lixiviated with bromine water, and, finally, the insoluble silver bromide extracted with "hypo."

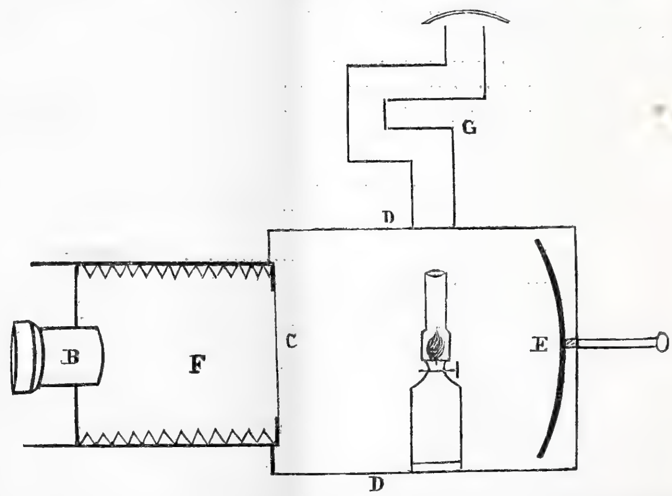
A short time ago the man who would have asserted that, by means of electricity, conversation could be carried on through a telegraphic wire would have been laughed at as a lunatic, and even when that feat was achieved few persons would accept the phonograph, by whose means speech was solidified, as it were, for future use, as an actual accomplished fact. So when we read that the same function of recording speech upon a tablet, in such a way that it can be made to give up its sounds whenever required at any future time, is now performed by means of photography, we are naturally inclined to be sceptical; yet the following facts are narrated in sober earnest:—"Another marvel of electric science has been perfected. Mr. A. St. George can record and reproduce conversations carried on through his telephone. His invention is not new as far as the result is concerned, but quite so in the means adopted to secure it. It may be thus described. A circular plate of glass is coated with collodion and made sensitive as a photographic plate. This is placed in a dark box in which is a slit to admit a ray of light. In front of the glass is a telephone diaphragm, which, by its vibrations, opens and closes a small shutter through which a beam of light is constantly passing and imprinting a dark line on the glass. Vibrations of the shutter cause the dark line to vary in thickness according to the tones of the voice. The glass plate is revolved by clockwork, and the conversation, as it leaves the telephone, is recorded on the sensitive plate, the imprinted words spoken being fixed as is done in photography. The plate can be brought forward afterwards, and when replaced in the machine and connected with a distant telephone will, when set in motion, give back the original conversation."

ENLARGING BY GELATINO-BROMIDE.

The crowds that on Monday evening last responded to the invitation given by M. Hutinet and Professor Stebbing to meet them at the Golden Cross Hotel, Charing Cross, and witness their demonstration of an alleged simple method of enlarging, bore testimony to the widespread interest felt in this subject. When the hour of meeting arrived it was found that not only was the room in which the operations were to be conducted quite filled, but that the passages leading to it were also crowded. Of course, under the circumstances, many had to depart without witnessing the demonstration. It is gratifying to be able to announce that another opportunity in a larger hall is soon to be afforded to those who were disappointed, as well as to many who could not then be present, for witnessing a repetition of the experiments.

The proceedings were formally opened by Professor Stebbing, who briefly explained the object of the demonstration, which, in effect, was to show by what simple means enlargements of satisfactory quality could be produced. M. Hutinet, with whose name they were all familiar, had, he said, spent much time in bringing to perfection a method of preparing paper by a gelatino-bromide process, which was not only well adapted for the production of enlargements and ordinary prints of fine quality and tone, but from the nature of its mode of preparation was so stable that every single sheet could be relied upon as being like another. He then exhibited and described the lantern by which the enlargements were produced, the construction of which we shall endeavour to make clear by means of a diagram.

A square metallic lantern, D D, of tolerably large dimensions surrounds an ordinary argand gas flame; on the back of this lantern is fixed a silvered-glass reflector, E, directly opposite which, on the other side of the flame, is a sheet of ground glass, C. Attached



to this lantern is a square camera, F, formed of panelled wood, at the back of which, and thus directly in front of the sheet of ground glass, is a receptacle for the negative that is to be enlarged; in the front being a light framework of wood to which is affixed the objective, B, by which the enlarged image is produced. This framework with the lens is made so as to be capable of travelling backwards and forwards under the control of a quick-acting, double-threaded screw by which the focussing is easily effected. A rectangular bent chimney, G, on the top of the metallic half of the lantern permits of an escape of the products of combustion from the flame without allowing any light to pass.

The function of the gas flame is to illuminate the sheet of ground glass, which thus, as Dr. R. L. Maddox observed to a friend at the meeting, becomes a radiant. It, indeed, proved a beautiful, bright backing for the negative to be enlarged. The object-glass in front is the means by which a large image (several diameters in extent) of the portrait is projected brightly and sharply upon a flat sheet of cardboard placed a few feet in front.

A sheet of M. Hutinet's sensitive paper was exposed by means of this apparatus, the lights in the room having previously been turned down. After five minutes the paper was placed in a vessel containing ferrous-oxalate solution, and a brilliant, sharp image was speedily developed, which, after being fixed and rinsed in water, was submitted for examination, affording much gratification. The blacks were vigorous, the half-tones good, and the whites pure.

What place is this system of enlarging to take among other systems and what will be its influence? No doubt the great facility afforded for practising it and the good character of the results, both as to appearance and permanence, will secure for it a large share of public favour. Having a supply of sensitive paper always ready at hand, together with a lantern and lighting appliances of the simplest

kind, an exposure of one minute will at any moment enable the amateur or professional to impress an enlargement which, when developed, will require little or no work to make it ready for framing. We have said "one minute." It is quite true that at the demonstration M. Hutinet exposed for *five* minutes; but the lens employed by him was four or five times slower than that which is found best for producing enlargements under circumstances of a similar character. When examining his apparatus the estimate made by us was that, by employing an ordinary good *carte* lens as an objective, an exposure of about one minute and a-quarter would amply suffice.

The permanence of the enlargements may be assumed, seeing the most stable form in which a silver image can be produced is that effected by development.

To those who do club work by the collodion transfer process this system will necessarily prove a great boon, as not only are they rendered independent of the weather, but get rid of troublesome and unhealthy operations. For colouring in oils the gelatine enlargement forms a good base on which to work.

The developer employed at the demonstration was composed as follows:—

No. 1.

Boiling distilled water	30 ounces.
Neutral oxalate of potash	9 „

No. 2.

Distilled water	10 ounces.
Protosulphate of iron	3 „
Sulphuric acid	1 drop.

No. 3.

Distilled water	10 ounces.
Citric acid	5 „

These are mixed, when required, in the following proportions:—

No. 1	$11\frac{1}{4}$ ounces.
„ 2	$3\frac{3}{4}$ „
„ 3	$\frac{3}{4}$ ounce.

The prints after being developed are rinsed, and then fixed in—

No. 1.

Water	8 ounces.
Hyposulphite of soda	2 „

No. 2.

Warm water	2 ounces.
Alum	$\frac{1}{2}$ ounce.

These are mixed together twelve hours previous to being used. The prints are immersed for a-quarter of an hour, and are then transferred to a fresh hyposulphite bath (one in five) for two minutes. The former solution may be used several times; the latter only once. After being fixed, the print is removed to a "hardening bath," composed of three and a-half ounces of alum in thirty-five ounces of water.

In conclusion: we bespeak for M. Hutinet and Professor Stebbing, during their tour of demonstration, the same measure of consideration in the provinces which was so liberally accorded to them in the metropolis.

VARNISHED DRY-PLATE NEGATIVES.

That "an ounce of practice is worth a bushel of theory" is a terse saying by no means of universal applicability in photographic pursuits; in fact, some branches of the science are founded upon theory, though, on the other hand, it is doubtlessly true that a vast amount of its practice is the outcome of what is termed "rule of thumb." There has of late been a great deal of theoretical discussion about the points that govern the compounding of a varnish which should be particularly applicable to dry plates. Certainly this is a very proper question to raise; but, at the same time, it may be remembered that, as dry-plate work has now had several years of trial, there should be available some records of practical data that might give sufficient insight into true practice.

In making use of such data certain plain facts must not be lost sight of. They are—first, that in many instances gelatine negatives have been in use for some time before being varnished; and, next, that gelatine negatives require so much more washing than collodion that it would doubtless be found, if a multitude of negatives were examined, that a large number of them were very imperfectly washed. In coming to the practical conclusion that I suggest it would be necessary to exclude any such from our purview, as it could not be of any real interest to find a varnish capable of use for half-washed negatives.

Some will, perhaps, say—"Use no varnish at all; simplify the matter in that manner." Truly, a gelatine negative will print quite as well without as with varnish, and may possibly store as well, though upon that point I should not like to be positive; but let it be given into the hands of the average printer and his assistants, and see where it would be in a little time after a few dozen prints had been "struck off" it. It *might* even then be intact. In all probability it would not be, but would be stained through damp causing the silver from the paper to set off and become discoloured owing to its chemical action upon the gelatine. In my own practice—though I only use my negatives unvarnished while I get rough prints from them—constant attention is needed to prevent the catastrophe of a piece of paper adhering to the negative, and, of course, at some critical part of it. My instructions are to make the negatives specially dry before printing from them, and to see that the paper is thoroughly dry also. Notwithstanding all this I have had a negative or two patched, and more than one where the paper has "set off," strange to say, just at its edges, forming a distinctly-outlined rectangle upon the surface of the film; I must confess I do not see why the staining should occur in this manner. *En passant*, I may say that in such contingencies I have successfully employed cyanide in getting rid of the silver stain, when it has not been too deep.

Coming, now, to the practice of varnishing: I have found collodion very good and hard, but I have never cared to utilise it for regular store negatives on account of the undoubted liability to danger from actual moisture—that is to say, not mere so-called "dampness." A collodionised negative put out on the roof to print in the sun on some special occasion and caught in a shower would be in but a poor plight if not quickly attended to, while I have seen varnished gelatine negatives so treated without the slightest ill effect.

I have now been in the habit for many years of making a varnish of mixed orange and white shellac with one-tenth their weight of sandarac added, and so far I have not, since I started the practice of using gelatine plates in my studio, observed a single case of injury to my negatives—some thousands in number—which I have since taken. I do not assert that I have examined every negative, but I have looked at many. Old portrait negatives are in constant request in my practice; yet, so far, not one negative damaged through the varnish having given way has been brought before me.

With regard to my mode of storing—though, of course, it may have something to do with the immunity from damage—I am not aware that there is anything in any way special about it. My negative room is fitted with racks open back and front, so that a complete circulation of air between them is permitted. This, I think, is a great point, as they are simply placed in grooves, and are neither wrapped in paper nor in any special way protected from the atmosphere. It is quite evident that if the varnish were defective it would have every opportunity of showing itself, but, as I say, so far no defect has been seen.

The only question I should like to put is—"Is this experience sufficiently long to enable me to feel perfectly secure as to future immunity from the varnish giving way?" I am inclined to think it is; but as a little positive evidence is worth any amount of negative, I should feel much obliged—and so I am sure would many other readers—if any one who has found his varnished negatives to give way would publish details.

G. Watmough Webster, F.C.S.

THE SECOND INTERNATIONAL EXHIBITION OF THE ASSOCIATION BELGE DE PHOTOGRAPHIE.

[Second Notice.]

Among the most noteworthy exhibits (more especially to those taking an interest in mechanical printing) will be found a very fine collection by Messrs. Goupil et Cie., of Paris. It embraces almost every variety of work—photogravure, heliotypie, phototyphographie, and nearly all kindred processes. The specimens are beautiful. Two large photogravure copies of oil paintings, *Un Deuil* and *Le Soir*, are very noticeable. The delicate gradations, from high light to deep shadow, are wonderfully reproduced.

While on the subject of mechanical reproductions we must not forget Herr Hoffman's Dresden collection. This gentleman contributes several volumes illustrated by lichtdruck, &c., that would well repay careful perusal. It is a great mistake, however, to exhibit in this form, if it can possibly be avoided, as bound books often lie for days untouched, except by those whose business it is to keep them free from dust. Fortunately, Herr Hoffman has several *cases* of work, and its variety and excellence will not fail to attract attention.

M. Brauneck (Mayence) has also very good photo-mechanical work on view; some of it, however, is flat and lacks depth and brilliancy. Yet one more exhibitor of this class of production should not be overlooked. M. Scamoni, of St. Petersburg, sends eighteen *entrées*.

The reproductions from negatives of antique swords, scabbards, &c., are very effective.

M. Vanbosch (Paris) has three cases of photographic studies. We have seen better work bearing this artist's name.

A Paris amateur, M. Saint-Senoch, exhibits two cases containing a large number of pictures. Some of the instantaneous studies of animals are very good. In one or two instances, however, a more suitable time might have been chosen for taking them. Each subject is mounted in a heavy black and gold frame, which gives them an over-weighted appearance.

With regard to the *framing* of the next exhibit no such remark can be made. On the contrary, M. Hutinet's gelatino-bromide enlargements (the largest possibly two feet six by six feet) would have been considerably improved in appearance had they been surrounded by something heavier than a narrow gilt bead. The enlargement of *An Actor*, and the *Boy in the Donkey Cart*, are particularly good, and show greater variety of tone and depth than has been hitherto considered possible by this process.

Mr. W. F. Donkin (London) contributes two good enlargements of Chamounix—one infinitely better than the other. Mr. W. England's mountain scenery is, as usual, so charming that we could wish the pictures were larger, so that no visitor to the Exhibition might miss them.

Mr. H. P. Robinson's pictures are so well known that it is almost superfluous to say anything about them—certainly too late to criticise them. If, however (notwithstanding the fact that Mr. Robinson has obtained the King's gold medal), in two or three instances the figures had been a little larger we would have willingly dispensed with some of the landscape. *When the Day's Work is Done* is a picture of which one does not get easily tired, and *Hark! the Lark!* and *The Old Boat* improve upon acquaintance.

Opposite Mr. Robinson's collection, Mr. R. Slingsby (Lincoln) tempts the visitor with his popular productions—*Alone*, *Brambling*, *Ready*, *Homeward*, &c. These also are well known and have been highly eulogised over and over again by both artists and critics.

M. Lugardon (Geneva) sends a collection of half-plate instantaneous work—horses leaping, standing on hind legs (*à la cirque*), men leaping over poles, divers "caught in the act," &c., the definition in most instances being very perfect. M. Anschutz (Lissa) contributes some subjects, enlarged six or seven times, of hussars on horseback engaged in sword exercise, horses running loose in a field, &c., taken by the aid of a shutter of his own invention. M. Lugardon's work, however, is by far the most successful.

Mr. Harrison's (Paris) instantaneous studies at Boulogne are excellent; the larger one of a vessel being "towed in" being particularly perfect.

Mr. G. Renwick (Burton) sends some of his well-known snow scenes. They are printed in platinum, and certainly show great artistic appreciation and ability. The poetical quotations, however, placed under many of them might certainly have been dispensed with. The person who could not appreciate the pictures would not be likely to read the poetry or understand it if he did. "Good wine needs no bush;" and it is not necessary to put "N.B.: This is a horse" under *every* signboard on which that useful quadruped is depicted.

M. A. Grenier's (Amsterdam) six 12 × 10 carbon heads are well printed, mounted, and framed, but otherwise not remarkable. M. Hallez (Dinant) sends three frames of very good landscape work.

Herr Josef Kossak (Hungary) exhibits six frames of very excellent portraits of various sizes. One frame is of special interest, and deserves more than a passing notice. It contains fifteen cabinets, the plates for which were prepared by five different formulæ, namely, four according to Dr. Monckhoven, three Dr. Heid, three Herr Obernetter, two Herr Haak, and three Mr. A. L. Henderson. The pictures are well retouched and finished, are *all equally good in every respect*, and are only another illustration of the fact that it is possible to produce good work by several formulæ differing considerably, if the necessary *quantum* of brains be added to each.

Captain Pizzighelli's reproductions and portraits in platinum are well printed. Some of the subjects, however, would have looked far more effective printed in silver. Near these will be found some good, effective portraits by M. Fabronius, of Brussels, and some excellent 10 × 8 views, principally cathedrals, by Mr. Carl Norman, of Tunbridge Wells.

We do not consider MM. Geruzet Freres have done themselves justice, as we have repeatedly seen better work from their hands than is to be found here bearing their name. The two large red carbon portraits (about 24 × 12) in rich velvet frames, however, are equal, if not superior, to anything of the kind in the room. Next to MM. Geruzet's specimens will be found some old friends—Mr. McLeish's *Misty Morning on the Weir*, Mr. A. Diston's *Gloamin'* and two others (which, by-the-bye, look all the better for being mounted in contact with the glass), and Mr. Gillard's admirable picture, *Reading to Granny.*

If the Platinotype Company do not succeed in rapidly making converts to their process now we are afraid they will never do so. Some splendid negatives by Messrs. Gillard, Valentine Blanchard, Payne Jennings, and Manfield have been laid under contribution for their present display (not forgetting Mr. Renwick's snow pictures, already alluded to), and these ought to convince the most sceptical of the value of the process for certain subjects. It should be quite possible, however, to produce better prints of some of the pictures than are here shown.

Mr. Brightman's (Bristol) prize medal photographs of 1877 are next on the screen. Then we come to some good 12 × 10 views of lake scenery by Mr. Pettit, of Keswick. No. 3 is particularly fine.

M. Chmielewski (Poltava), among other contributions, sends two fine enlargements, about 36 × 24, marked "*sans retouche.*" M. Chmielewski will, perhaps, be sorry to know that several visitors in our hearing seemed to doubt this—unless, of course, in the consciousness of its truth he feels complimented by such scepticism.

Another candidate for favour in the *genre* picture line appears in Messrs. Chaffin and Sons, of Taunton. If *My First Party* had not been printed so darkly it would have been much more effective. *Sisterly Intercession* is well conceived, and in some respects successful. We will not point out what we consider its defects, for fear of being considered ungallant.

Mr. John Moffat, of Edinburgh, has some good work; and Mr. Whaite, of Southport, sends about thirty good half-plate studies taken on plates of his own manufacture.

Included among the best landscapes in the Exhibition must be a number of large Russian pictures (principally mountain scenery), by M. Ermakow, of Tiflis. There are twenty-five of these, and most of them have been secured for the tombola, or lottery. They are very fine indeed, and well deserve more space devoted to their praise than we have to spare.

M. Grienwaldt (Bremé) also has some good landscape work, although rather darkly printed; and a frame of cabinet portaits by this artist, whether examined for posing, lighting, or finish, are simply perfect.

A few words about three more contributors—all English, by the way—will bring our somewhat lengthy notice of the large hall to an end. These are Messrs. Marsh Brothers, of Henley, with their instantaneous river pictures; Mr. Sutcliffe's Whitby seascapes; and, near to these, Mr. Henry Stevens' studies of flowers. Messrs. Marsh's pictures are well known. Mr. Sutcliffe's studies have been commented upon over and over again. The flower studies, however, of Mr. Stevens are among the most attractive things in the Exhibition, and certainly merit the recognition they have received.

In the side room, after passing a number of pictures that do not call for special mention, we come to a fine display of ceramic photography by Herr A. Leisner, of Waldebourg. Here we find portraits and views on vases, cups, and articles of all sorts and sizes, the other portions being finished in gold and colours in the usual way.

Good lichtdruck work is shown by Herr Schahl, and also by Herr Galliard, both of Berlin. A large space is taken up by specimens of printing in ferro-prussiate by M. J. Kymenlen-Pettens, of Brussels.

The best transparencies in the room are from Mr. H. N. King's Windsor Castle negatives. M. Burato (Zara) also exhibits some transparencies of his excellent portraits of children; these are on gelatino-chloride plates.

MM. Levy and Co., of Paris, have a large frame of lantern transparencies, which are among the best commercial samples we have ever seen. Messrs. F. York and Son are also exhibitors in this department, and their excellent work is well known. In this room we find a rather large collection of pictures, both plain and coloured, by M. Chauvigne, of Tours. A number of medals (or *facsimiles* of them) that have been awarded to the exhibitor on previous occasions are conspicuously displayed, so we suppose M. Chauvigne's work has at some time or other deserved these distinctions. His present specimens are, therefore, all the more disappointing.

The apparatus displayed consists of cameras, stands, dark tent and combination arrangements, and instantaneous shutters innumerable. M. Tochstein sends a variety of plate and emulsion washing troughs, plate-boxes, dark lamps, &c. Many of these seem to us very clumsy and heavy, while the action of others appears involved in obscurity.

Among the camera manufacturers Mr. George Hare is, of course, to the front. Messrs. Hunter and Sands, Watson and Sons, and Shew and Co. also exhibit a variety of things with which our adver-

tising columns and the technical meetings held in London have made us more or less familiar. The names of several foreign manufacturers may also be found in the catalogue. The cabinet work of these gentlemen, however, cannot be compared with their English competitors either for quality or finish.

We cannot conclude without expressing a hope that the Brussels Photographic Exhibition will be as great a success financially as it is artistically. The executive must be heartily congratulated on the excellent display they have been the means of bringing together, and their efforts deserve to be crowned with success. If we might be pardoned making a suggestion, it is that, on future occasions, they should not be so liberal with their distinctions. *Sixty-two* medals and *thirty-two* honourable mentions, to say nothing of diplomas of honour, seem a rather full allowance for about *one hundred and sixty* exhibitors. Such a state of things is apt to remind us of Artemus Ward's army, which, if we remember rightly, consisted principally of officers.

We are requested by M. Geruzet to state that in addition to the awards announced last week bronze medals have been awarded to Mdlle. M. Relvas, of Gollega, Portugal, and Mr. William Gillard, of Gloucester.

DEVELOPING AND INTENSIFYING GELATINE NEGATIVES.

It is well known that negatives developed with the alkaline pyro. developer are usually of a very non-actinic colour. In many cases this is a decided advantage, and, in conjunction with the facility with which the colour of the deposit can be altered or modified, forms one of the most valuable characteristics of pyrogallic development.

A negative which has been slightly under-developed, although apparently thin and weak, will often yield brilliant and vigorous prints on albumenised paper, owing to the insensitiveness of the chloride of silver to the yellow rays. On the other hand, in negatives which have been more fully developed, the yellow colour, which would retard the printing too much, is best removed. This can easily be effected, and the negative made similar in colour and printing qualities to a wet collodion negative by the following modification of Mr. Cowell's formula:—

Alum	1 ounce.
Citric acid	1 „
Sulphate of iron	3 ounces.
Water	20 „

After the negative has been fixed and slightly rinsed the above solution is poured upon the plate and the effect watched until the desired result is obtained, which will be in a few seconds; the negative is then well washed and dried in the usual way. The addition of the sulphate of iron not only improves the colour of the negative, but it also entirely prevents the reduction in density which would otherwise take place.

In practice I find it a convenient plan to make two stock solutions. The first consists of the acid and alum solution in the proportions given above; the second is simply a saturated solution of sulphate of iron. When required for use, one part of the latter is added to four or six parts of the solution of alum and acid. For negatives which require slightly intensifying the larger proportion of iron solution should be used. If further intensification be desired it is only necessary to add a few drops of a twenty-grain solution of nitrate of silver to the mixed solutions, when the negative can be intensified, locally or otherwise, as easily and safely as a wet collodion plate. There is no danger of staining the film, provided the negative has been well washed after fixing to remove the hyposulphite of soda.

B. J. Edwards.

ON THE REPRESENTATION OF COLOUR BY TONE.

Part I.

This question is, I think, the one least thought of or studied of any in connection with photography, and yet on it depends the success of every photographic picture—from the life-sized enlargement to the smallest portrait in a locket. Of what use is the most perfect emulsion and the most carefully-prepared and developed plate if the resulting picture has not a proper balance of light and shade and a picturesque grouping of lines? And yet these latter are questions hardly ever studied by the majority of photographers. There is something so interesting in the chemical experiments in connection with photography that I am afraid with many the question of pictorial effect is never once thought of. They look on the merits of a negative as a house painter looks on a flat, evenly-painted surface, namely, its perfect evenness of tint, &c., rather than as a carpenter looks on his tools, namely, as the means to an end and not the end itself. No carpenter can become a good workman who keeps altering the shape of his tools and the way of working them. Neither can a photographer who keeps altering his formulæ, &c., instead of getting one and thoroughly mastering its capabilities.

The greatest difficulty the average photographer has to contend with is to get "breadth"—that is, a harmonious balance of effect in the proportionate quantities of light and shade. He is aware there is something wrong, but does not know what. I have known a photographer throw the blame on his lens; but the generally-supposed origin of all the trouble is the commercial plates (how I pity the poor plate-makers!) The cause of the "something wrong" in more than half the failures is, I feel convinced, this want of knowledge of the translation of colour into tone, or, in other words, the depth of tint each colour produces on the sensitive film or print. Many a photographer will photograph a lady in a light dress with the same accessories and background as he would a lady in a dark one, and expect to get equally satisfactory results.

The painter can not only take of a view what he requires to produce a satisfactory effect, but, what is more important, the harmony of colour—or, if he be drawing in monochrome, the representation of colour—by tone is under his control; and he need only represent the colours of the view by tones that are carefully graduated from the high lights to the deep blacks of his manufactured picture. A light tint in his picture may represent either a light blue, yellow, or red. After he has secured the obedience of the trained hand to every thought of the mind, his work is simplicity itself compared to that of the photographer in producing an artistic picture. For the latter to produce a work of art, he has to trust not to the appearance of nature as seen by the eye, but to his *knowledge of the tone produced on the sensitive film* by the numberless tints of colours seen in nature.

The artistic eye for colour is of little use in photography, as a balance of effect—perfect as regards colour—is often quite lost in a photograph. The first knowledge required is to learn the photographic tone equivalents to all colours. Old professional photographers after years of practice gain this knowledge by a kind of "rule of thumb;" but at what a loss of time and money, which, I feel convinced, would have been saved if this question of tone equivalents had been thoroughly studied in the first place! This knowledge must also be gained by the landscape photographer before he can hope to produce such gems of art-photography as are exhibited by Payne Jennings, Bedford, Robinson, &c.

In my next communication I will endeavour to dissect these art pictures and point out the various causes why their effect is pleasing; and then I hope to prove that in the studio the photographer has almost complete control over the amount of light and shade in his pictures, and only requires the knowledge of a few fixed principles to make the result certain. Even the landscape photographer has far more control over light and shade than is generally supposed.

If the lecturers at our art schools, or the artists to the pictorial magazines, such as Cassell's *Picturesque Europe*, &c., could be got to read a series of papers *On Light and Shade*, *On Form*, *On Grouping*, &c., &c., and then if our leading photographers would show the application of those art rules to "practical photography," I am sure that our photographic exhibitions, and, in time, the free exhibitions—namely, the show-cases in the streets—would indicate a great improvement in pictorial effect.

Artists, when designing a picture, carefully build up around the principal object a number of accessories, every one of which is *put there for a reason*—either to obtain a proper balance of light and shade or to assist the grouping. If we carefully dissect a picture that pleases us we shall soon be able to discover the causes of the pleasing effect; and then all we have to do is to follow Captain Cuttle's advice—"When found, make a note of."

Herbert S. Starnes.

THE THIRD CONVENTION OF THE PHOTOGRAPHERS ASSOCIATION OF AMERICA.

[From Our Own Correspondent.]

From Indianapolis—in which city the Convention was held last year—to Milwaukee, which was selected for the seat of this year's Congress, the jump is great in more senses than one. One is a young, although large and rapidly-growing, city situated on a plain which extends westwards to the Rocky Mountains, and without any pretensions to beauty either of architectural construction or natural surroundings; the other, situated on the shores of Lake Michigan, is by universal consent acknowledged to be one of the loveliest cities in the United States, possessing every attraction that can conspire to make the weary photographer forget his cares and revel in fine scenes and æsthetic pleasures. The attendance of photographers, ladies as well as gentlemen, from every corner of the United States was excellent, no fewer than five hundred being present at the first meeting of the Convention this year. The precise number altogether I have not ascertained at the time of sending off this despatch.

On the forenoon of the 7th ultimo the meeting was held under the presidency of Mr. J. E. Beebe, of Chicago, who addressed a few words

of welcome. The calling of the roll was, on motion, dispensed with, and this, too, was the case with the reading of the minutes of the previous meeting, for the excellent reason, as the President dryly remarked, that the Secretary had not taken the precaution to provide any minutes of the proceedings.

The first business on hand was the hearing of the report of the Committee on the Progress of Photography. It appeared that no member of that committee—not even its chairman—had given any heed to the carrying out of the duties devolving upon them, with one exception, Mr. J. Traill Taylor, of the *Photographic Times*, New York, who, although absent in England for a summer's visit, had in his individual capacity prepared a report. On motion it was agreed to have Mr. Taylor's report read the following day, as, owing to its length, it was believed that it could not receive ample justice before the hour at which the Convention was to start, by special steamer, on a picnic excursion.

The Executive Committee (Messrs. Ryder, Armstrong, Beebe, Sherman, and Reed) then officially reported that the Association was yearly growing in strength and membership, over a thousand members being at present upon its roll. Its value as a means of progress, in an educational sense, could hardly be estimated, while as a promoter of good fellowship it was invaluable. The death of two members, Mr. J. H. Fitzgibbon, of St. Louis, and Mr. T. Charles, of St. Catherine's, Ont., was announced as events of the past year. The President then addressed the meeting as follows :—

There is a certain place where dry plates would be comparatively useful that they say is paved with good resolutions. I am afraid that I shall to-day have to apologise for not having prepared carefully and thoroughly an address for this year. But I shall endeavour to present rather facts and photographs than words. The Association, as you know, a year ago, when I was elected President, received an address from me. I told them and assured them that I would do all that I could to advance the standard of photography as far as we could possibly take it this year, and, thanks to the noble efforts of the Executive Committee I have had behind me, I have succeeded in presenting to you an exhibition that we certainly all are proud of.

As to the progress of photography, that rests more with your eyes and brains than with my mere words. You can see yourselves in the other room whether photography has advanced in the past year or not. The work is certainly going on, and I need say nothing of the dry plate, since we have the wet plate, for the first time since the dry plate came into existence, before us, and you can compare them side by side. Though, personally, I do not see that the dry plate suffers very much, I cannot help but admire the wet-plate work as well. All that we expect of the new means and appliances is that they will equal the best wet-plate work, which, I think, never can be excelled in black and white.

The work is going on amongst the members. Cordiality, good feeling, kindliness toward each other exists, and, better than all, true friendships, that are standing the test of years, are being formed every year. Personally, I would say that what I owe to your kindness, and what we owe to each other, can hardly be estimated at a money value. I have gained many friends—many dear and warm friends—since I entered photography eight years ago, and they are to me very dear and very valuable.

The only other matters that I think I would like to speak of are for the good of the cause and in the nature of a caution, namely, that the last three years we have exhausted a great deal of time, and, I cannot help feeling, with no good results, in what is called parliamentary practice. With a little patience on all sides, and a little forgetfulness, and with the remembrance of the fact that we are more a band of workers than a band of talkers, I think we can get along this year without any trouble at all.

The members then, to the number of over 450, marched in procession to the railroad depôt and took the train to the ground chosen for the picnic. Here the hours passed swiftly amid mirth and glee, the "feast of reason and the flow of soul" not being unknown. Beautiful lawns, rich gardens, and pleasant drives form leading characteristics of the Soldiers' Home, and many cameras were brought to bear upon its lovely scenery.

The second day's proceedings commenced at 10 a.m., when suggestions by committees as to the names of officers for next year were received. A subject, of a nature not at all likely to prove one for general discussion, was introduced by the reading of a letter by Mr. J. P. Blessing, of Baltimore, who strongly urged upon the Convention the necessity for stopping the cutting down of prices practised by some person whom he thought to be a "foeman worthy of his steel," by whom the prices of cabinets in the "Monumental City" had been reduced to $1.50=6s. a dozen. This was considered a subject not capable of being dealt with by the Convention, some leading members of which, it was elicited in the course of conversation, had been in the habit of reducing prices a good deal below those considered an adequate *quid pro quo*, the other element in this commercial equation being a good photograph. The apparently hard-headed Mr. Aitken put down his foot in an unmistakable manner. "I think," said he, "that this subject is one we cannot as a body consider. If a man can afford to make photographs for the good of the community let him do it. I think, further, that if a man makes good work and asks fair prices he will get them." Other members followed in the same strain, the result being that prices were considered a matter between the individual photographer and his clients, regarding which a hard-and-fast line could not be drawn.

The report from the Committee on Progress was next in order, and was then taken. It turned out, as hinted, that the report emanated from one member alone of that committee, the others having been asleep, or, as in one instance, dead. The report, as given by Mr. J. Traill Taylor, and read by Mr. Sherman, the Secretary, was as follows :—

Report on the Progress of Photography.

It has been suggested to me that, in the fulfilment of the duties devolving upon me as one of a Committee of Reporters on the Progress of Photography during the past twelve months, I might fittingly adopt the same method approved of last year, when I was honoured with a request to undertake a similar duty and, in accordance with this, such remarks as I have now to make will please be accepted as emanating from myself as an individual member of that Committee, I bearing the sole responsibility for them. Unable as I am to enjoy the great privilege of being present at this Convention, my action in this report must be taken alone, and hence it should be considered as supplementary to what will emanate from my colleagues in their corporate capacity.

This at once suggests the sudden passing away of one of the members of that committee. Good old J. H. Fitzgibbon! Who did not know him and who does not miss him? His genial countenance, sound, practical common sense and the goodness of heart were features of the last Convention. I will not here anticipate the many kind expressions which will be elicited at this annual meeting regarding our deceased friend, but may fittingly say of him that "he died in harness."

Since arriving in England on my summer holiday, where I write the present jottings, and where I have met numerous Americans who, like myself, do not take kindly to the summer heat peculiar to so many parts of the Great Republic, I have been asked—"How is it that American photographs are so much clearer than English ones?" This question, you will perceive, savours of a considerable degree of self complaisance. The first stage in the inquiry is to ascertain whether or not the alleged fact be correct. I am fortunate enough, through the courtesy of several American photographers, members of this Association, and others, to possess specimens of American photographic work, and upon comparing these with similar productions by artists of reputation in London am compelled to admit that there exist good grounds on which to base the opinion implied. The popular idea, as we all know, is that the climate is clearer, which is about as valid a way of accounting for differences in the quality of portraiture as the equally popular excuse of old-time daguerreotypers of too much or too little electricity in the air. The first difference that strikes me as existing between the Old World and the New World photographs (by the Old World, in this connection, I mean London) is the greater depth to which the New World portraits are toned. The English seem to prefer a warm, brown, sunny tone for both portraits and views; and the Americans go in for strength and vigour—delicacy on the one hand, bold effect on the other. In addition to the richness imparted by the deep, purple-black tones arising from strong printing and a generous use of gold in toning—these being doubtless enhanced by ammonia fuming, which, while universally practiced in the New World, is but little employed in the Old—there is no doubt left in my mind that the fading of the prints is arrested, to a degree not thoroughly realised, by the quantity of gold deposited on the image. I have had ample opportunities for studying this question. Some years ago, when I was Editor of The British Journal of Photography, I was in the habit of receiving photographs of various nationalities and in almost every variety of style. An examination of these proves highly instructive and suggestive. Some which elicited the encomiums of the world on account of their rare beauty are now poor, sickly, faded things, despite of the pretensions with which they were ushered in—prints having the imprint of the foremost men and most eminent firms on their mounts. Several years ago—how many I do not at present recollect, but probably eight or nine—I received from an eminent American firm a large collection of stereographs of American scenery, and within a few months of the same time I received a similar collection of English scenes from an English firm. While I write this I have both spread out upon an adjoining table, and give it as my unqualified opinion that those of the American production have not changed or become deteriorated in the slightest degree, while those of the Old World are badly faded.

Still, silver prints being liable to fade occasionally, even when produced by American photographers and when toned in the most liberal manner, any advance in the perfecting of processes which are theoretically as well as practically permanent will be gladly welcomed by the advanced photographers whom I am now addressing. In 1874 I had the pleasure, in my capacity as a journalist, of giving to the public the first description of a process emanating from a very talented and modest amateur chemist, Mr. William Willis, Jun., who I was aware had invented and perfected a process of printing in which the image was formed of one of the most stable compounds known in science—platinum black. This process fulfilled all the requirements of performance, as its images were not affected either with cyanide of potassium, nitric acid, or prolonged exposure to a moist and impure atmosphere. Of the platina printing process in general I need now say nothing, but it certainly falls within the scope of a report on progress to describe an improvement which has been made by the inventor since the last Convention of this Association. The improvement to which I refer is in relation to the colour of the prints. Although a warm engraving black commends itself to the taste of most, yet there are some who prefer some warmer tone, such as sepia. Mr. Willis has recently introduced a sensitised paper for contact printing, which, when developed in an ordinary oxalate bath to which has been added a small quantity of a special solution, the nature of which will be eventually published, gives prints of a very rich sepia brown and matt surface. The prints that I examined had good detail both in the shadows and high lights. Large portraits and landscapes in this colour are handsome. The tone harmonises with a large number of the tinted mounts in common use, but French grey, delicate creams, and, above all, the now fashionable "yallery-greenery" grey are the most suitable. For the general artistic quality of its results I have rarely seen any finer process, and, when the permanence of the results

are considered, I see every reason for expecting a great future for it. Specimens of the new departure may be expected to be seen in the United States before long. Talking of platinotype printing, I am impressed with the great advance made by the English company who control it in its method of printing on fabrics, such as linen, sateens, and fine cotton stuffs. These seem to be largely manufactured in the sensitised state, and are employed for a variety of decorative purposes. I saw them sewn into banner screens, d'oyleys, antimacassars, &c., and then worked around with ornamental needle or crewel-work. I saw working plans for engineers and architects, and also maps. These, when soiled, are amenable to the detergent influences of soap and water. As a basis for oil painting on canvas it will prove available. I notice that, whereas in America this process has been used almost exclusively for the production of enlargements, it has in England been up to the present time employed almost entirely in the production of small prints by contact printing.

It will be expected that I should refer to that process which has recently effected such a revolution in our methods of working the gelatine emulsion. The advances to which it has been subjected during the past year belong more to commerce than technics; that is, as regards the preparation of plates. Having a start of a couple of years in the general making and working of gelatine plates, European photographers had for some time a higher position in regard to them than their American brethren, but it may now be pretty fairly conceded that in no respect whatever do plates manufactured in the Old World now display any preponderating advantage over those of the New. I observe that there is a disposition evinced by a few to supplant hand labour in the preparation of plates by automatic machinery. This, if carried out in every department, will be the means of securing such unfailing similarity between one batch of plates and another as to insure that great desideratum, uniformity. To give an idea of what may very easily be attained: I have just had constructed a case (although for other than a photographic purpose) in which I can prepare a gelatine emulsion and keep it any desired temperature for eight days, if necessary. The source of heat is a kerosene lamp, and such is the regularity of the automatically-controlled temperature that an emulsion placed inside by way of experiment five days ago has, without being touched, remained up to this moment at a temperature of 100° Fahr., from which it has never deviated more than one degree, notwithstanding great and sometimes sudden changes in the temperature of the room in which it stands. Those of you who are conversant with the subject of incubators, and the various forms of thermostats by which their temperature is regulated, will not have difficulty in seeing the application of the thermostatic principle to the automatic regulating of the temperature in connection with an equally-delicate operation—the preparation of gelatine emulsion. Automatic machinery is not merely labour-saving; it effects a more important purpose, viz., eliminates the chance of misadventure through the carelessness, inadvertence, or malice of an assistant.

Previous to making any remarks of an æsthetic nature arising out of gelatine, I may here allude to an improvement by way of intensifying and clearing stained gelatine negatives, which has just been worked out by Mr. B. J. Edwards, of London. He makes a decolourising solution of citric acid and alum, as already well known, but to these he adds a large proportion of protosulphate of iron. Now this solution possesses a two-fold property—it decolourises a stained film with absolute certainty and great rapidity, and also, provided the image be found to be too thin, it serves as an effective intensifier by the addition of a few drops of a solution of nitrate of silver. There is no staining, provided a moderate degree of care has been taken to remove the hyposulphite fixing solution by washing but the intensification proceeds with regularity and yields a negative possessing all the quality of a fine wet-collodion negative.

What will be of the highest interest to the practical photographers whom I now address is the inquiry—"How stands the relative position of processes after the flush of the brilliant successes of rapid gelatine, unaccompanied with its original shortcomings, such as the want of brilliance and sparkle? The regrets that accompanied the change from the old and well-tried collodion process to gelatine I now find to have ceased; for, with improved working, every desirable quality previously obtained by wet collodion is now readily secured by gelatine. Further: the regrets for the collodion process are not now as they were, for the enormous convenience of having the plate always ready, and the capacity of indefinitely postponing the development, together with the larger margin for correction of errors of exposure which educated practice has communicated to even average operators, raises the gelatine process to an altitude which, for practical purposes, no negative process has previously attained. This is not the experience of mere enthusiasts, but of solid hard-headed men, who have much at stake, and who have reluctantly changed their processes, and at an early period regretted the change because of the vagaries of gelatine. But all this is surmounted. Simultaneous with this, and in a degree explanatory of it, is to be borne in mind the fact that the manufacturers of plates (for here in England, where I write, many who have large establishments never manufacture their own) have so improved the process of plate-preparing that plates from makers of repute can now be depended on for certainty and uniformity, so that the early troubles of frilling, and red, green, and grey fog are things of the past, being never found in the productions of makers of reputation.

In consequence of this, the aims of the photographer are higher than they have ever been before. Subjects are attempted, and successfully so—such as instantaneous or semi-instantaneous representations of objects, scenes, and conditions—which previously were entirely beyond the capacity of the average photographer.

In consequence of the ability of our sensitive surfaces to embrace a greater range of colours, including those previously deemed non-photographic, photography has now become more truthful in its representation not merely of form but of colour.

The outcome of all this is that photographers stand in a more elevated position, because instead of being, as in wet collodion days, the slaves of their plates, the plate now takes its proper position as being the subservient servant of the photographer.

But in our laudation of the new let us not entirely lose sight of the old. While the wet-collodion process stands very much in the same position it occupied when we last met together in Indianapolis, dry collodion has been subjected to an advancement which only three or four years ago would have been hailed with rapturous acclamation, and even now cannot fail to elicit warm interest. I have in my possession negatives taken on dry collodion plates with an exposure only one-fourth of that which would be required for wet collodion of the average degree of rapidity. Mr. William Brooks, by whom they were taken, finds that if two such plates be exposed alike, and one be developed by the alkaline pyro. process, while the other is developed by the ferrous oxalate, that by the latter will be fully exposed, showing every detail in the deep shadows most plainly, while with the former developer there is a very marked appearance of under-exposure. I have beside me negatives clearly illustrating this. From this we learn how much depends upon having a suitable developer to meet the requirements of the different physical conditions under which silver bromide films exist. The process referred to is scarcely yet ripe for presentation to the public, but I expect that it will be so long before the Convention of next year.

In the literature of our art-science, apart from serial literature, which is progressive as of yore, a large number of handbooks of the gelatine process have been issued both in Europe and America. The chief of the manuals which have been published during the year is the new edition of Hardwich's *Photographic Chemistry*, the preparation of which was entrusted by the proprietors to a member of the Photographers' Association of America.

No lenses which involve any novelty in principle of construction have appeared since our last meeting; but, owing to the greater sensitiveness of plates, lenses of a slower character than portrait combinations are being more and more imported into the service of portraiture, with marked advantages as to including greater range of subject with more depth of defining power.

With regard to the application of the electric light to portraiture, while this may be expected to come more into use than it has been, I can only report—judging from an inspection of specimens on exhibition at an establishment in Regent-street, London, where a speciality is made of this class of portraiture—that it is apparently an inferior substitute for daylight. International justice demands that I should say that, judging from such specimens as I have seen of the work of both countries, the American productions are rather superior to those of England. My standard of comparison in the Old World is confined to the work of one specialist, and he the longest established in this branch.

I conclude by again expressing regret at not being able to be present with you in person.

The President said:—Gentlemen, I think in view of the fact that the gentleman who was appointed as chairman on the Committee of the Progress of Photography—I don't know whether he is in the room at present or not. Is Mr. Hall, of Chicago, in the room?—in view of the fact that the chairman of the committee, a very important committee, and a member of one of the standing committees, has not presented to us any indication of his existence, and has absolutely given us no report, I cannot help but feel that we are under great obligations to Mr. Taylor for his very carefully-prepared outlook with regard to the future of photography. His report is very valuable, and we cannot appreciate it too highly. By-the-way, what will you do with the report?

Mr. Carlyle, of R. I.: I move with you, Mr. President, that the thanks of this Convention are due and are hereby tendered to Mr. Taylor for the very valuable paper he has given us upon the subject of photography. Agreed to.

Mr. Cramer moved that the word "committee" be struck out and the name of Mr. Taylor inserted. Agreed to.

Mr. Fuller: I am glad to say, on behalf of the *Photographic Times*, that printed copies of the above report can be had by any of the representatives of the various journals here present for publication. These copies are at their disposal, and at the disposal of any persons asking for the same.

After some remarks of a desultory character, Dr. Herman Vogel, of Berlin, was introduced, who said he was paid to be an honorary member of the Association for thirteen years.*

It was agreed that next day be set apart to hear Dr. Vogel's address, which was as follows:—

Dr. Vogel said:—It is the third time in my life that I have the honour to attend the meeting of the National Photographic Association of the United States. I remember with pride and joy the days as I trod American soil the first time, as I left behind me European prejudices, as I was bewildered from all the wonders of industry I met here, and from the hearty welcome I found, not only in your society but also with every photographer I visited in America. Many friends I have found here—not only friends for the short time of my visit, but for the whole life. I am happy to say I am no more a stranger here. I feel homelike on your soil. I felt in Germany a longing for America, and with more than pleasure I followed your kind invitation; for I must confess I have learned in America more in three months than in Europe in three years. I learned to esteem the high position of American photography, and what I learned here I communicated to my countrymen; and I think since that time American photography is acknowledged in Europe as it deserves.

Thirteen years ago but a few American pictures reached us in Europe. To-day we find in the art shop windows of Berlin American pictures, and

* Dr. Vogel, perhaps, does not realise that the Photographers' Association of America is only three years old, the pre-existing "National" Association of which he was an honorary member is now non-existent.—Eds. *B. J.*

they are bought by our photographers as masterpieces. We have introduced in Europe arrangements of American cameras and Seavey's American backgrounds; and if you have learned in the past time from us we learn now from you.

Very often I am asked what is the difference between American and European photography? Is there any in general?

It is true you use the same lenses, the same apparatus, the same chemicals and papers as we do. The main field of photography is in America and Europe the same—the portrait, the likeness; you touch the negative as we do and are anxious to improve the artistic qualities of a picture. But in America you have not so many portrait painters as we in Europe. Life-size pictures are exceptions in Europe for photographers, because our painters make them; in America the life-size picture is an important branch of portrait photography, and I must confess in this branch American photography is ahead.

Still more difference I observe in landscape photography; the stereo. picture is much more esteemed in America than in Europe. I think there is no parlour in America where there is not a stereoscope. But these are only a few instances. The main difference is that photography in America is much more esteemed by the scientific men, by the men of industry, and the people in general, than in Europe. When a scientific expedition is sent to the far west, or to any part of the world from America, certainly a photographer will join it. More than that. American photographers have been the pioneers and have told by true pictures to the world the wonders of the mammoth trees, of the Yosemite Valley, and the Columbia River before scientific men reached there. American photography has more merits for geographical knowledge than big hand books. In Europe, I am sorry to say, the scientific value of photography is only partly acknowledged.

A great many scientific men who intended to travel in Asia and Africa visited me a few days before their departure to learn in the hurry something from photography in twenty-four hours; and because photography is esteemed more in America by everybody its position is a better one, and the photographer is more honoured here than in Europe.

Certainly you want to know from me what is the latest news in photography in Europe—which questions are now discussed there among photographers. I can only mention some points. In general similar questions, as here, are arising among European photographers. Yesterday you had discussions here regarding the low prices of portraits and over blisters in albumen paper. Exactly the same discussions we have in Germany from time to time, and just about the same success; but the chief point of interest for photographers at present is the gelatine emulsion. The gelatine process makes progress every day, and, in consequence, the collodion process more and more. It is true we have obtained much by the gelatine plates—short exposures and more convenience in working—but how is it with the keeping qualities of our negatives now?

There is much more difficulty to fix and to work out a gelatine plate than a collodion plate, especially if the first be intensified by mercury salts; and many careless photographers who look after their gelatine negatives of the past year find them discoloured and useless to make a print from.

A new process has called the attention of the German photographers. That is the Obernetter process. I heard yesterday an unfavourable opinion of it, and it was said that the principles of the process were wrong. I am a chemist, and I must confess, as such, that we do not know yet all the principles of the gelatine process, and under such conditions we can only estimate a process after the results; and here I must certify that Obernetter's results are perfectly satisfactory, so that I have selected for my American trip Obernetter plates. The advantage of the Obernetter plate is that it is very quickly developed, fixed, dried, and washed. The only mistake Obernetter has made was that he gave too short a description of his process—not sufficient explanation for the most part of the subscribers. That is the reason of their lack of success. Some time ago we had in Germany an amateur question. It was asserted that gelatine emulsion favoured amateur photography, and that must injure the practical photographer. We have observed that we have nothing to fear from the amateurs. On the contrary, we are very much indebted to them. Who has invented photography?—An amateur, Daguerre. Who is the inventor of the positive printing process?—An amateur, Talbot. Who has invented the collodion process?—An amateur, Archer. And to whom are we indebted for the gelatine process? Two amateurs at first, Kennett and Bennett. God bless the amateur! We have a very interesting instance in Germany that amateurs elevate the art. Why is Germany the most musical land of the world? Why do you find there music more appreciated than in any other part of the world? Because we have so many musical amateurs. And in spite of the numerous amateurs the position of the musician in Germany is an excellent one. They are esteemed there more than in any other country. Another question discussed now in Germany is the introduction of the electric light. Electricity is not only the power of the future, but the power of the present. It forwards our thoughts all around the world by wires. It moves the engines. It illuminates our streets and rooms. Electricity furnished to the photographers a light of powerful chemical action, which is cheaper than any other artificial light. It makes the photographer independent of sunlight. He can do his work with electricity, even in the night or in the worst weather. That is a great advantage for all the sitters whose time is occupied in daytime. On the other hand, the photographer is no more obliged to do his work on the roof of buildings. He can work with electric light even in a basement. First-rate work is already done in photography by electricity in London, St. Petersburg, Moscow, Paris, and Berlin, and I am glad to see that Mr. Kurtz in New York has introduced it as the first in America. His system is quite original, different from the European one, and I think his example has already called the attention of all enterprising photographers. Electrical light is extensively used already in America. May it be introduced more generally now in photography; then we can say for every time, both day and night—"and there will be light."

Dr. Vogel's address was received with great cordiality.

(To be continued in our next.)

RECENT PATENTS.

AMERICAN PATENTS GRANTED.

No. 282-737.—"A Photographer's Chair." Wm. S. Liscombe, Providence, U.S.A.—*Application filed March* 2, 1883.

No. 282-939.—"Machine for Packing Photographic Dry Plates." P. H. Wheeler.—*Application filed July* 2, 1883.

No. 282-756.—"Photographic Plate Holder." M. W. Newcomb.—*Application filed March* 13, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 11 ..	Newcastle-on-Tyne	College of Science.
,, 13 ..	London and Provincial	Masons' Hall, Basinghall-street.
,, 13	Manchester....................	Mechanics' Institution.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of the above Association, held on Thursday, the 30th ultimo, the chair was occupied by Mr. A. Cowan.

The Chairman showed a cutting board, arranged for dividing a plate into small squares for a pocket camera. The board itself was similar to one which he had shown at a previous meeting; but the hinged flap, instead of being one solid board, consisted of a sort of gridiron of parallel bars. The plate was laid face downwards upon the lower board, and the diamond run along each of the bars. The film kept the plate together whilst it was turned a-quarter way round, and then a second series of cuts was made. It was then divided by the hand into the small separate squares.

Several members said that they found it necessary to cut plates on the front, and that if cut through from the back the film was torn irregularly.

The Chairman explained the manipulation by which that was to be avoided. The plate being held in both hands, sufficient pressure was applied to separate the glass along the cut surface, whilst leaving the film intact. The pieces being then pressed in the contrary direction caused the film to divide without raggedness of edge.

Mr. W. H. Ashman thought that cut plates had more tendency to frill than those coated the size they were to remain.

The Chairman then showed a sliding scale which he had constructed of cardboard for facilitating the calculations of exposure according to the aperture used; marked so that either the number, according to the universal system, or the proportion of aperture to focus being known, the relative time required for any-sized diaphragm could be immediately found.

A question was read from the box—"Why is a wet gelatine plate more sensitive to light than a dry one?"

Mr. A. Haddon said that he knew a maker who, on trying his plates in the sensitometer wet, added three tints to the number so procurable as to indicate those they would give when dry. This experience was, of course, exactly the contrary to the condition assumed in the question. He thought, however, that if any emulsions were more sensitive wet than dry, it would be those which were capable of being made more rapid by the addition of more gelatine.

Mr. J. Briginshaw had had a plate which was so long in coming up under the developer that he thought it had not been exposed, and put it away in a box. Some time afterwards he found the picture developed.

Mr. Ashman said that Colonel Wortley had, in reply to a question as to how he got his large heads on collodion emulsion with such short exposures, said that he treated the plates with pyro. before exposure.

Mr. A. L. Henderson thought that much of the rapidity of the plate depended upon its permeability to the developing solution, and that if all plates were well soaked to soften the gelatine before development there would not be the difference of sensitiveness that was now found to exist. He said also that the same result would accrue by using a very dilute developing solution, and that plates so developed were much more rapid.

Mr. W. E. Debenham referred to some experiments made by the Chairman of the present meeting, the results of which he had shown some time since, when he found that dilution of the developer—even in one case to the extent of requiring many hours for its action—did not affect the exposure of the image, but only the time required to bring it out.

Mr. Henderson replied that that was so, because in each case the plate had been removed from the developing solution as soon as the image appeared to be perfect; but if it had been kept in longer he believed that the negatives developed in the weaker solutions would have appeared to be more exposed.

Mr. F. W. Hart inquired whether anyone present had tried the method of intensifying with silver in the presence of alum and acid recommended by Mr. W. Brooks in The British Journal of Photography of the previous week.

Mr. Henderson had formerly used silver intensification and employed alum and boracic acid. A negative, however, which had been so treated, and which was very good at the time, was now covered with spots and rendered useless.

Mr. Ashman considered it as material that the alum should be used with the silver intensifier instead of as a previous wash merely. The use of a hypo. bath after intensifying would, doubtless, have its influence by clearing the plate of unreduced silver in preventing the after-coming of spots. Mr. B. J. Edwards had some time since published a somewhat similar method, but used iron instead of pyrogallic acid as the reducing agent. It was a noticeable fact that with silver-intensified negatives the deposit was superficial, and could be rubbed off.

Mr. Haddon laid before the Society a project of which he had spoken to several individual members, who had promised their support in carrying it out. He said that some time since, upon the proposal of Mr. Briginshaw, a night had been announced to be devoted to the consideration of a particular subject, but that when the night came the experiment proved a failure, for the reason that that had been left to the whole Association which ought to have been entrusted to some one only. He thought that it would tend to the elevation of the weaker members of the Society to have *lecturettes*, with illustrations, once a month, or oftener if occasion required. Many of the members would, he was confident, make it a point to be present at such *lecturettes*, and to bring with them friends interested in the particular subject to be expounded. The lectures to be followed by discussions, for very often more is learned from the answers to questions arising from the lecture than from the lecture itself. He added that he had already received promises of lectures from eight or nine of the members on some of the most interesting subjects connected with the art of photography, so that if the members thought fit to sanction the proposal he was sure that they would all derive a vast amount of information and pleasure from its being carried out. The object of the existence of a society was not solely that its members might give the world the results of their labours in new soil, but also to educate the weaker of its members, so as to enable them to undertake a certain amount of new work; and even the more experienced would be likely to gain some information from a lecture on a subject to which the lecturer had devoted particular attention. The subject of the preparation of emulsion by all manner of methods had been discussed. Boiling, the addition of ammonia, the use of ammonio-nitrate, and decomposed gelatine with cold emulsification had all had their share of attention; but discussions on this subject did not satisfy all their members, however interesting they might be to the majority, as many had never made up a batch of emulsion in their lives, and could not, therefore, take that interest in the discussion which they would otherwise do. The list of members had gradually increased, but paying its expenses was not all that a society should look forward to. It had a noble task before it—the education of its members not only in what was going on at present but also in what had been done in years gone by. This knowledge was an essential part of the education of every good photographer, professional or otherwise.

Mr Debenham moved that the proposal of Mr. Haddon to have monthly lectures on subjects to be announced should be adopted, and that Mr. Haddon be requested to make the necessary arrangements.

Mr. Henderson seconded the motion, and it was carried unanimously.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held on Thursday, the 30th ultimo, at the Free Library, William Brown-street—Mr. W. Horsman Kirkby in the chair.

The minutes of the July meeting having been read, confirmed, and signed, Mr. Edward Lewis, Jun., was unanimously elected a member of the Association.

Mr. J. H. T. Ellerbeck, acting as secretary for the evening in the absence of the Rev. H. J. Palmer, read extracts from letters from the Hon. Secretary in Switzerland and Italy recounting his adventures with some scoundrels who, finding sensitive plates of no use to them, were kind enough to allow him to retain the same (of course spoilt by exposure).

Mr. Wharmby presented *The Heliotype Process, Illustrated*, to the Association's library.

Mr. Maycock exhibited a Lancaster's camera with movable back, allowing the operator to use his plates either upright or oblong without shifting the camera itself. Prints were exhibited by Messrs. P. Mawdsley, Phillips, Howarth, and the Rev. G. J. Banner. No business of a formal character being before the meeting, the members separated at an early hour.

An excursion will take place tomorrow (Saturday), the 8th instant, to Mold, leaving the Landing-stage at 11.20. Members intending to join the excursion party were requested to send their names to the Rev. H. J. Palmer, Wallasey.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Association was held on Thursday evening, the 30th ultimo, at the Town Hall, Hanley—Mr. Charles Alfieri, Vice-President, occupied the chair.

The Chairman remarked upon the loss which the Association had sustained by the death of Mr. John Lockett, one of the most intelligent and persevering members. He had known Mr. Lockett a great number of years, and had found him a man who, although knowing something of almost every science and conversant with several languages, was himself modest and retiring. Mr. Lockett had been an enthusiastic experimental photographer ever since the discovery of the wet collodion process, and by his decease the Association would lose one of its most useful members.

On the proposition of the Chairman, seconded by Mr. F. J. Emery, the Hon. Secretary was requested to send a letter to the friends of the late Mr. Lockett, expressing sympathy with them and deep regret at their loss.

The Chairman, reporting upon the last excursion of the Society to Ashbourne and Dovedale, announced that, in conformity with a resolution passed at the last monthly meeting, some of the members and other friends who were invited made an excursion as arranged. The party assembled at Stoke Station at 8 a.m., and reached Ashbourne at 9.45. After looking about the town they partook of an excellent luncheon at the Green Man Hotel, and afterwards proceeded to Dovedale, per wagonnette. On arriving there cameras and sketch-books were soon at work and the members busily employed. Some of their number took dry gelatine plates whilst he (the Chairman) used his old own made "camera campestra," or field camera for wet plates, and consisting of camera, dark room, chemicals, and lens-chest combined, at the same time occupying (as was remarked) no more space than some of the members' dry-plate kit. The members, having secured a number of negatives, walked to the "Izaak Walton" Hotel and were served with an excellent tea, to which all present did ample justice, after which they were driven to Ashbourne in time to catch the last train for home. The weather was throughout the day propitious, and the light all that could be desired.

Negatives and prints, the result of the excursion, were then passed round, and the excellence of the Chairman's wet-plate pictures remarked upon. The gelatine plate workers had also been very successful. It was resolved that mounted prints should be brought to the next meeting, and that an excursion (half day) be made to Trentham or Tutbury Castle on Saturday, 8th September; also, that ladies and other friends be asked to join the party, so as, if possible, to make the excursion a still more pleasant one than the last.

Mr. Allison proposed, and Mr. Hall seconded, that the Chairman be requested to read a paper at the next meeting.

The Chairman kindly consented to read a paper upon *Pictorial Composition*.

Messrs. Kirby, Henshall, and Turner having been elected members of the Association, the meeting was adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

A special meeting of this Association was held in Lamb's Hotel, on Thursday, the 30th ult., when the President, J. C. Cox, Esq., read a letter from Mr. Charles Johnson, resigning the office of Secretary.

Mr. G. D. Valentine proposed that Mr. D. Ireland, Jun., be appointed Interim-Secretary, which was unanimously agreed to.

A sub-committee was appointed to draw up new rules, to be submitted to the next meeting.

This was all the business, and the meeting was concluded with the usual votes of thanks.

Correspondence.

A REDUCER.

To the Editors.

Gentlemen,—Being rather troubled with over-dense negatives, and having tried the common ozone bleach reducer with very indifferent success, it struck me a few weeks ago to try tincture of iodine and a solution of cyanide of potassium as a reducer. I had previously seen iodine and cyanide used for another purpose, which I shall not mention just now.

I first took a negative (unvarnished) which I did not require, and soaked it thoroughly in cold water. I then took tincture of iodine three-quarters of an ounce, water one and a-quarter ounce, then put the soaked negative in the developing tray, and applied the solution of iodine. I allowed it to remain on three or four minutes, poured the iodine back into its own glass, and applied the weak solution of cyanide of potassium. In a minute or two the image had almost disappeared.

I then put it in the hypo. bath and washed as usual. The stronger the cyanide the quicker the action. Should the first attempt not reduce the negative enough the iodine may be reapplied; but *every trace* of cyanide must be washed away from negative and tray, otherwise the iodine will be eaten up and so make the reducer rather an expensive one. With me the above has worked well.

As I have not seen the foregoing in print, nor heard of it before, I hope you will find space for this letter and give photographers a chance of trying it. I hope it may prove useful to amateurs like myself. I would be glad to hear how it acts in the hands of others.—I am, yours, &c., Thomas Thorburn.

Thrushville, Stirling, N.B., September 1, 1883.

[The method given above is a very old one, and requires considerable care in its employment in order to avoid over-action. —Eds.]

PHOTOGRAPHY AS A FINE ART.

To the Editors.

Gentlemen,—It has been eloquently written—"Man dies and is forgotten, but the beautiful survives him and is immortal;" and I would urge that without a keen perception of this "beautiful" we are but too apt to confuse its ideal with that which is simply real, and to indiscriminately give the name of "artist" to the gentleman who obligingly paints the signboard for my neighbour, the publican, and to the genius who elevates my mind by the contemplation of the "life" upon his canvas.

I am truly surprised to find such an authority as Mr. J. Traill Taylor asserting that photography is *not* a fine art but a technical art, and I must confess my inability to master this latter designation. There is a certain technicality about all art which if a man possess not he cannot give expression to his ideas, and is, therefore, out of the category of "artists," or "authors," or "creators," and for the simple reason that he is unable to "create." Before we say photography is not a fine art we must first be satisfied what fine art really is. There Mr. Taylor confesses his inability to furnish a satisfactory definition. May I sug-

gest that all art—that all human "creations" or "conceptions" which tend to exalt and elevate the mind of man—fall within the limits of fine art. By contemplation of these "ideals" evolved from the "inner consciousness" of our intellectual giants we soar, as it were, from the real, from the true, and become wrapt in meditation on the beautiful.

But, says Mr. Taylor, photography, *per se*, is not, and cannot be, a fine art; it is a graphic, not (therefore?) a creative, art. Let me show the fallacy of this reasoning. Let me suppose a photographer endowed with "creative" power, that his genius conceives a certain "idea" which he is capable of expressing in an adequate manner, only instead of taking the palette in hand he "adjusts his lenses" and reproduces his idea in a visible form. I hold that if this "idea" be such as will exalt the mind of the spectator it will be as much a fine art as if he had taken brush in hand and reproduced his thoughts in colour.

My contention is that photography, *per se*, is as much a fine art as any of the other arts—that it requires the same artistic *technique* to make its productions presentable to the cultured eye as music demands of her votaries in order that the attuned ear shall not be offended by discord. If it be urged that some there are who photograph without regard to artistic knowledge or feeling, I answer they are no more photographers than the originators of music-hall ditties can be dubbed "musicians." If there be any unworthy members in a profession, do not attempt the degradation of that profession to the level of those who should be accounted as not of it; but, rather, by incessant study and meditation raise the mind to the fruitful contemplation of the ideal—of the beautiful—till it shall comprehend that ψυκγ of the Greeks, which some of our wonderful theologians have corrupted into the word "soul."

Mr. Taylor says that "St. Paul's Cathedral was evolved from the inner consciousness of Sir Christopher Wren, and he is justly entitled to be designated the creator," &c. He is *justly* entitled the author, but *legally* he certainly is not until the House of Lords come to the rescue. According to the recent case a man cannot be accounted "author" of a picture unless he paint it—that is, with his own hands, so arranging his colour that the mental conception becomes visible to others exactly as it has been previously thought or even sketched out; and I contend that, illumined by the light which has been shed on me by the Court of Appeal, as the laying on of the paint alone constitutes authorship of a picture, regardless of previous "studies" or "plans" for this picture, so the authorship of a cathedral will devolve on the man who manually arranges the stones, who rears the "mental conception," the "study," the "plan" in marble, exactly as the picture was reared in colour, and this is precisely what Sir Christopher Wren did *not* do with St. Paul's.

Picture and cathedral are alike mental conceptions made visible by certain technical means, both tending to elevate the mind and to be regarded as fine art, as the beautiful brought to our view to our contemplation. Photography claims equality with painting and with sculpture, the camera and the chemicals are the technicalities which correspond to the paint and the chisel; and by means of his appliances the photographer is enabled to make visible that which his genius has created in his "inner consciousness." Suppose a portrait be taken by means of photography, and that portrait, by pose and by lighting, idealises the sitter—or, in other words, "makes him better looking than he really is"—that portrait will take rank as fine art. It has "elevated" the subject, and, by consequence, the spectator. I grant very few portraits fall under this category; but, when reached, the beautiful, the ideal, has been attained in a similar way to the painter, who idealises his subject by softening some lines and by bringing into prominence the best points of his model.

Mr. Taylor says "it is the *man*—not the process he employs in delineating or giving expression to his ideas." I venture to suggest that the process which gives utterance to the ideas is the art; that this art is fine or beautiful exactly as it elevates or ennobles; that it is fine or beautiful whether the means by which it be conveyed to us be a palette, a camera, or a lyre; that the man who uses these means is the artist who admits us to participate in his views of the ideal, and so, as it were, raises us, if only for a time, towards the level of his own genius towards that "life" which never dies—the ψυκγ of the Greek.—I am, yours, &c., AUDI ALTERAM PARTEM.

September 1, 1883.

THE INTENSIFICATION OF GELATINE PLATES.

To the EDITORS.

GENTLEMEN,—In my article on the above subject, in the issue of this Journal of the 24th ultimo, I made one or two little omissions which I think it well now to mention.

The intensification takes place better directly after fixing and before the negative is dried, as I find at times the image does not intensify so readily after drying, especially if the surface of the film has been touched with the fingers, making it greasy and very repellent to the intensifying solution. After the negative has once been dried the film never seems to regain its former state on wetting—that is, if it has been passed through the alum previous to the drying.

If a negative is to be operated on that has been taken some time I find it better to allow it to soak in water for an hour or two. I have not found any material difficulty with plates of this kind, only that the time of the intensification is protracted.

Since my former article appeared I have seen several photographers who have tried the process and are delighted with it.—I am, yours, &c., WM. BROOKS.

September 3, 1883.

A MOUNTANT THAT WILL KEEP.

To the EDITORS.

GENTLEMEN,—I noticed in one of your back numbers a question on mountants. I cannot help thinking starch is the best, the only objection to it being the speed with which it decomposes.

I find the following method of preparing starch very good. The paste so prepared keeps well in the warmest weather for about ten days, and in winter an indefinite time:—Starch, one drachm; water, one ounce. Mix and heat over boiling water till turned, then add half-a-drachm of glycerine.—I am, yours, &c., J. LUCAS.

August 29, 1883.

DEVELOPMENT OF PLATINOTYPE PRINTS.—SULPHO-PYROGALLOL.

To the EDITORS.

GENTLEMEN,—In a recent communication to your Journal Mr. W. J. Stillman has fallen into an error in supposing that the method he adopts for the development of platinotypes is different to that we recommend. If Mr. Stillman (who is by no means alone in not sufficiently studying the printed instructions we supply—we wish he were so!) will refer to our directions in his possession he will at once see that we recommend development by *floating the print for a short time* (not less than five or six seconds, though) *upon the surface of the solution.*

It is true that in some cases we recommend that the print be immersed, as when the surface is too large for floating on the largest dishes obtainable; in such case the print may be drawn *through* the solution contained in a trough, face upwards, and under a glass rod placed at the bottom of the trough. Textile fabrics should be immersed after laying them down on the surface of the solution. With these exceptions we always float the print, and a very easy operation it is. If some of the solution should wet the back of the print we have not found it to produce any appreciable permanent effect. Immersion softens the paper, and the latter then carries much more potassic oxalate into the acid baths. By either plan, however, good prints may be produced.

With regard to the "rough" paper, which Mr. Stillman says is not suitable for water-colours: we may point out that it is advisable to size the prints after washing with a solution of white gelatine (about five grains to the ounce); to this may be added five per cent. of chrome alum. This special platinotype paper is considered by American artists to be most excellent for crayon work, on account of its hard, firm "tooth;" and we know that with proper preparation it is also excellent for water-colours. The treatment the paper undergoes is a severe test for any kind of paper (it is doubtful whether any drawing-papers would withstand the treatment so well), and it is no wonder if some kind of preparation is necessary to render the prints fit to take water-colours.

Our attention also has been directed to a letter from Mr. J. Bate. He founds his objection to sulphite of soda in the alkaline developer upon a trial made with a preparation obtained from ourselves. Whether the experience was gained prior to the commencement of the present year we are not aware, but we believe that it is an uncommon one, especially with the sulpho-pyrogallol as at present manufactured by us. From our own experience and that of a large number of our licensees who use it we are able to say that our preparation does not—or ought not to—have any restraining action; and we understand that you are able to support us in this opinion.

Under some conditions the "restraining action" might appear most marked, and that is when a developer very weak in ammonia—and, perhaps, strong in pyrogallol—is used. The reason is that every forty minims (= four grains of pyro.) of our preparation *neutralise* one minim of strong ammonia, sp. gr. ·880. Hence it is that a developer made up (say) with pyro. three grains, and ammonia one minim, would really contain only a quarter minim of such ammonia. We always take this property of our preparation into account, and a few calculations will show how greatly one might be misled when not taking the neutralisation, or destruction, of a portion of the ammonia into account.

We are ourselves in the habit of mixing four ounces of developing solution, employing ten-per-cent. solutions of the constituents (an old practice of ours and doubtless of others). Whatever number of grains of pyro. *per ounce* we settle upon in this case represents the amount of ammonia in minims that will be neutralised in the *whole* of the developer; and, of course, were only two ounces of solution required then the ammonia neutralised would be half this figure; if three ounces, three-fourths; and if one ounce, one-fourth this figure. But when four ounces of developer are used very little calculation is required when varying the quantities; it is merely necessary to deduct the number of grains of pyro. *per ounce* from the *total* number of minims of

strong ammonia, and we have the amount of active ammonia present. This quantity divided by four gives the amount of ammonia per ounce.

To some these details may appear puerile; but we have reason to know that many who have only recently taken up photography, with no knowledge of chemistry and of weighing and measuring, often fail to work out for themselves details to be deduced from a bare statement.

Even supposing that sulpho-pyrogallol *did* cause the making of the negative to be delayed ten per cent., it would be utter foolishness to discard so useful a constituent in the developer for the sake of gaining a few precious (?) moments.—We are, yours, &c.,

September 1, 1883. THE PLATINOTYPE COMPANY.

[We have used the sulpho-pyrogallol as now sent out by the Company, and when the instructions as to the extra allowance of ammonia are carried out there is not the slightest "slowing" of development. We found the solution after it had been in our possession nearly six months to be in every respect as good as when we first obtained it.—EDS.]

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

Wanted, THE BRITISH JOURNAL OF PHOTOGRAPHY, *Photographic News*, Almanacs, &c., for the last three or four years. Good exchange offered, or cash.—Address, W. HARRISON, 365, Lodge-road, Birmingham.

Wanted, a posing-chair, curtain and tassel, in exchange for Marion's grass mat and twelve studio border stones. Adjustment in cash; send photograph.—Address, J. H. CHADWICK, 22, Victoria-crescent, Eccles.

I will exchange a landscape lens, by Ross, three and a-quarter inches in diameter, for small dry-plate apparatus or anything useful in photography.—Address, W. B. ALLISON, 43, West-street, Stoke-on-Trent.

I will exchange an excellent whole-plate lens and mahogany camera, little used, in good condition, for a studio chair with changing backs, or open to offers. Wanted accessories. — Address, E. HALL, photographer, Malton.

I will exchange a $7\frac{1}{2} \times 5$ portable bellows camera, with swing back, focussing-screw, splendid view lens, double and single dark slide, for a good portrait lens, by a good maker.—Address, A. HOLT, Northleigh House, Stourmarket.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

Thomas Mills, 53, Garth-road, Bangor.—*Photograph of Group of Bangor Citizens Reading the Charter of Incorporation—Group of Incorporation Committee.*

NOTICE.—*Each Correspondent is required to enclose his name and address, although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference, under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

HUGH BREBNER.—Received. Too late for this week.

H. H. H.—Your queries are answered in a leading article in the present number.

A. FOX.—To be certain you had better communicate with the Secretary of the Society.

J. F. RUNCIMAN.—You will, no doubt, be able to procure the composition you require from Mr. Moule, 391, Hackney-road, E.

FERRO.—There is no very satisfactory method of preparing the solution so that it may be used several times. You will find it better, in practice, to mix fresh immediately before use.

PYRO.—Without knowing how the picture was produced it is impossible to assign a cause for its fading; nor can we suggest any means by which it can be arrested if such a thing were desirable.

T. W. HOGG.—Evidently there is a small hole in the front of the camera which has caused the formation of a secondary image on the plate; hence the cause of the "phenomenon." The remedy in future is obvious.

H. LAWN.—If you employ the gelatine you mention and follow the instructions given you should not be troubled either with frilling or blisters. Many employ chrome alum, but we do not find it necessary in our own practice.

R. UPJOHN.—The reason the film of the collodion transfers does not adhere to the paper is that there is no adhesive substance to hold it. Either you have dissolved off the gelatinous coating or the paper does not possess any.

LYDFORD.—Let your assistant wear clean cotton gloves when handling th paper. This will enable him to avoid the stains. We do not know any plan by which the hands can be prevented from perspiring without risk o injury to the health.

GEORGIUS.—Your best plan of acquiring an insight into photography, as professional, is to apprentice yourself to a good photographer. If you only wish to practice as an amateur get some good apparatus and manual, and follow the instructions there given.

SEPTUM.—If the negative has been intensified with mercury we fear you will not succeed in reducing the density so as to yield satisfactory impressions. As you say you can easily take a fresh negative equal in quality, we should certainly advise its being done.

S. WILKINS.—The best plan of making finely-ground glass is to grind it yourself with flour of emery, using a small piece of thick plate glass as a muller. If you commence with a piece of patent plate you will save much time, as there will be no inequalities to grind out.

UNSUCCESSFUL.—Yes; the negatives are far from satisfactory. In the first place they appear to be much under-exposed. But they are so wretchedly out of focus that it is next to impossible to say positively what are the other faults. Some of the prints are doubled in the printing.

FRED. WARNER.—The only chance you have of getting presentable negatives from the plates you have so much over-exposed is to use a very large proportion of bromide and a minimum of ammonia in the developer. By this means you may succeed in saving some of those which have received the least exposure.

LONDON AMATEUR.—Your first essay with the wet collodion process is, as you say, by no means satisfactory. All the negatives are very much under-exposed, and this appears to be the chief fault. Try again, but give at least five or six times the exposure you have hitherto given. Remember, compared with gelatine, the collodion is a slow process.

H. VINCENT.—So far as we can judge from the prints, the printing plate was considerably under-exposed to begin with. Hence it absorbs water in parts which should have been hardened by the light's action, so that they would take the ink readily. Try again, and print much deeper than you have hitherto done. The formula is quite correct. We presume your roller is in good condition.

N. W.—The prints appear to be over-toned. The paper you are using, it is evident, will not give satisfactory tones beyond the warm brown stage. That you have been using hitherto, which you say gives a "metallic lustre," will no doubt stand more toning, so as to reach the purple stage. The "metallic lustre" is of no consequence, as it will disappear in the toning and fixing, and leave a vigorous print.

THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.—The next meeting of this Association is to be held in Cincinnati, in 1884, under the Presidency of Mr. Kent, of Rochester, N. Y.

GELATINO-BROMIDE PAPER.—We are requested to state that, in consequence of the outdoor meeting of the Liverpool Amateur Photographic Association on Saturday, the 8th instant, the demonstration by M. Hutinet and Professor Stebbing advertised for that day will not take place in Liverpool. It has been arranged, however, to give a demonstration in Manchester on that evening at 7.30 p.m. Full particulars can be obtained from Mr. W. J. Chadwick.

ERRATA.—In our first article on *Photomicrography* the following corrections should be made:—For "Dr. Douné" *read* "Dr. Donné;" for Dr. "Steenberg" *read* "Sternberg;" for "Lakubouer" *read* "Lakerbouer;" for "Dounadieu" *read* "Donnadieu;" for "Lilleferme" *read* "Lisleferme;" for "Count Castracem" *read* "Castracane;" for "Strüenberg" *read* "Strürberg;" for "Melwig" *read* "Helwig;" "Mr. A. C. Malley" *should be* "*Dr.* A. C. Malley."

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For the Week ending September 5, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

August	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
30	29·94	SW	62	58	112	72	58	Cloudy.
31	29·80	W	61	57	83	65	57	Cloudy.
Sept. 1	29·60	W	55	54	112	68	52	Overcast.
3	29·39	W	60	55	108	67	55	Cloudy.
4	29·74	NW	57	52	111	67	50	Bright & Clear.
5	29 81	NE	51	50	106	66	49	Raining.

CONTENTS.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1219. Vol. XXX.—SEPTEMBER 14, 1883.

DR. STOLZE'S BOILING PROCESS.

In our article last week on this subject we gave practical details of the facts observed in passing steam through water, as Dr. Stolze recommends, for the boiling of emulsion. It remains now for us to deal with the application of the process to actual emulsion making.

Dr. Stolze, it will be remembered, in his first description of the plan, spoke of it as only suitable to such processes as the precipitation method of Burton, in which the quantity of water added to the original volume of emulsion by the condensation of steam does not matter. But, as we showed last week, this difficulty does not exist to the extent mentioned by Dr. Stolze, and we propose to give directions which will enable anyone to work this method of boiling with any formula that may be chosen.

From what we have already said it will be gathered that the increase of volume, consequent upon the condensation of steam in the emulsion vessel, bears a definite relation to the original quantity or volume of liquid acted upon. A large bulk of emulsion requires a larger quantity of steam to raise it to a certain temperature than does a smaller volume, though within certain bounds the relative proportions of emulsion and steam remain nearly the same; in other words, the increase in the bulk of the emulsion during boiling remains proportionate to the original bulk.

In operating upon small quantities, however, it is desirable to keep down the increase as much as possible. It is awkward, in manipulating a five-ounce batch, to find it run out to six or seven ounces, which is the tendency if care be not taken in the early stages. If, however, the following line of action be adopted there will be no cause for fear.

Let us take by way of example a well-known formula:—

Gelatine	20 grains,
Ammonium bromide	60 „
Silver nitrate	100 „

to make five ounces of emulsion. Take the gelatine first of all and allow it to swell thoroughly in water; when completely swollen introduce it into a glass boiling flask, or other suitable vessel, together with the ammonium bromide, first draining the gelatine as closely as possible. It will be noted that so far no water is introduced except that which the gelatine itself has absorbed. In another flask dissolve the silver nitrate in one ounce of distilled water and, preferably, raise this to nearly boiling point. The boiling apparatus, with steam tube, having been already arranged and set in action, the exit tube with its jet of steam issuing is inserted in the flask containing the gelatine and bromide. The gelatine will soon melt and the bromide dissolve, and when steam issues freely from the neck of the flask the silver solution is to be added gradually. Nothing better can be used for this purpose than the funnel and pointed tube arrangement which has been so frequently described; but the point of the tube should be carried nearly to the bottom of the flask, and its orifice should not be too large.

In this manner the silver solution as it emerges from the delivering tube is met by the jet of steam issuing from the boiler, and is at one and the same time heated and dispersed throughout the emulsion. In fact, if proper and careful arrangements have been made, emulsification takes place under the most favourable conditions it is possible to imagine. The mixing having been completed the emulsion is left to "boil" for any desired length of time, without any fear that it will become too dilute. As an example of an experiment with the above quantities of material, we found that, after half-an-hour's boiling, the total bulk was three ounces less one drachm; in other experiments with longer periods of boiling the volume was practically the same, varying within but a drachm or so one way or the other. This, therefore, allows more than sufficient margin for the absorption of water during the subsequent operation of washing.

We may pause here to remark that notwithstanding the apparently violent ebullition which goes on in the emulsion this method does not afford, as Dr. Stolze appears to claim, such a perfect means of agitation as we should like, unless a vessel of suitable shape be used. With the ordinary flat-bottomed boiling flasks, and still more with a flat-bottomed bottle, the steam sets only the centre portion of the liquid in agitation; and, after even so short a boiling as half-an-hour, a large—perhaps the greater—portion of the bromide is found to have settled in a "ring" at the bottom of the receptacle. If a *round*-bottomed flask or a soda-water bottle be employed, and the tube from the boiler carried completely down to the bottom, there is no chance of this subsidence occurring, as the current of steam then works in all directions up the sides, and keeps the whole liquid in motion.

As regards sensitiveness we have found the results of this method very satisfactory—half-an-hour's boiling giving, with the above formula, 19 on the standard sensitometer, and 22 with forty-five minutes.

The apparatus required is of the slightest. Two flasks and a bent tube, with a gas stove, comprise nearly all. A retort stand is an additional convenience, and a bag of black velvet or twill of double thickness to protect the emulsion bottle from the light of the stove, complete the arrangements, which a little ingenuity will probably render perfect. Where the process becomes a permanent arrangement it would be a simple plan to enclose the emulsion bottle in a dark box through the roof of which the steam tube passes, making the boiler and the dark box a fixed connection or an emulsifying cabinet, similar to the one described in our last Almanac might be fitted up. These are, however, details which the ingenious mind will arrange without difficulty.

THE NEW ACT ON PATENTS, REGISTRATION OF DESIGNS, AND TRADE MARKS.

Last week we gave a brief outline of some of the more important features of the new Patent Act, which is to come into force on the first of January next. We shall now give a short summary of the principal points in the other portion of the Act—those which apply to the registration of designs and trade marks. The knowledge of them may prove of assistance to those of our readers who may have original designs, photographic or otherwise, of which they are desirous of retaining the exclusive use to themselves. It will also give them an idea how to proceed in effecting the necessary registration, as well as to comprehend what may and what may not be legally registered under the different heads.

Perhaps at the outset it will be as well to give an explanation of what comes under the distinction of the term "design" within the

meaning of the Act; hence we cannot do better than quote, in its entirety, that clause (60) which defines the term, as well as that of copyright as applied to it.

"'Design' means any design applicable to any article of manufacture, or to any substance artificial or natural, or partly artificial and partly natural, whether the design is applicable for the pattern, or for the shape or configuration, or for the ornament thereof, or for any two or more of such purposes, and by whatever means it is applicable, whether by printing, painting, embroidering, weaving, sewing, modelling, casting, embossing, engraving, staining, or any other means whatever—manual, mechanical, or chemical, separate or combined, not being a design for a sculpture or other thing within the protection of the Sculpture Copyright Act of the year 1814 (fifty-fourth George the Third, chapter fifty-six).

"'Copyright' means the exclusive right to apply a design to any article of manufacture, or to any such substance as aforesaid in the class or classes in which the design is registered."

Application for the registration of a design must be made to the Comptroller of the Patent Office, on a proper form, which is supplied for the purpose. The application must contain a clear and definite statement of the nature of the design, and the class of goods to which it is to be applied; but the same design may, however, be registered in different classes, if it be so desired. In the event of any doubt existing as to which class a design should be registered under, the Comptroller may decide the question. As in the case with patents, the Comptroller, if he think fit, may refuse to register any design; but in the event of his doing so, the applicant has the right, if he choose to exercise it, of appealing from his decision to the Board of Trade, who will then decide whether the design shall or shall not be registered.

With all applications for registration, drawings, photographs, or tracings of the design must be furnished, sufficient, in the opinion of the Comptroller, to enable him to identify it. He has also the power, in the event of the drawings, &c., not being, in his opinion, sufficient for this purpose, of refusing to accept them. When the design is registered the proprietor will have the copyright in it for the period of five years, dating from the day of registration.

An important point in connection with the registration of a design (and one that should be borne in mind) is that before any registered article can be put into the market it must bear the prescribed mark or word denoting that it is registered, otherwise the copyright will be forfeited. Any person infringing the copyright in any registered design, under the new Act, will render himself liable to a penalty of fifty pounds; or the owner may, if he think fit, bring an action for damages arising from the infringement.

With regard to trade marks: the formalities to be gone through and the conditions to be fulfilled are very similar to those for the registration of designs. The Comptroller has the power of refusing the application if he think fit—as he has with respect to a patent or the registration of a design. It is necessary with a trade mark that the registration be completed within twelve months after the application is first made, as in the case with a patent. Clause 64 defines what is a trade mark, and, as the definition may be of service to many readers who are in doubt on the subject, we here give the clause in full:—

"(1.) For the purposes of this Act, a trade mark must consist of or contain at least one of the following essential particulars:—

"*(a.)* A name of an individual or firm printed, impressed, or woven in some particular and distinctive manner; or

"*(b.)* A written signature, or copy of a written signature, of the individual or firm applying for registration thereof as a trade mark; or

"*(c.)* A distinctive device, mark, brand, heading, label, ticket, or fancy word or words not in common use.

"(2.) There may be added to any one or more of these particulars any letters, words, or figures, or combination of letters, words, or figures, or of any of them.

"(3.) Provided that any special and distinctive word or words, letter, figure, or combination of letters or figures, or of letters and figures used as a trade mark before the thirteenth day of August, one thousand eight hundred and seventy-five, may be registered as a trade mark under this part of this Act."

The trade mark must be registered for particular goods, or classes of goods; and a register of all trade marks will be kept at the Patent Office. Before the expiration of fourteen years from the date of registration a further fee will have to be paid, otherwise the Comptroller will have the power to remove the mark from the register; and also at the end of each succeeding fourteen years, unless the fee be previously paid. We do not think it necessary to refer to that portion of the Act which affects "Sheffield marks," as that only applies to cutlery and edge-tools, and, therefore, has no interest whatever for photographers.

Under the new Act it will be seen the Comptroller is invested with considerable powers in the refusal to grant patents or registrations. Several grounds upon which he may refuse the application we have already given. Here is another which is provided for by a separate clause. He may at all times refuse to grant a patent for an invention, or to register any design or trade mark, if, in his opinion, its employment would be contrary to law or morality.

One clause in the Act is an important one, inasmuch as it will put a check upon a deception that is at present often practised, namely, that of marking or stamping articles as "patent" or "registered" which are really neither patented or registered. The penalty for doing this will, under the new Act, be five pounds for every offence, so that henceforth it may fairly be assumed that any article which is marked "patent" or "registered" is so in reality.

There is a clause in the Act which, we strongly suspect, will materially affect several photographers who are making use of the Royal Arms in their business. This clause enacts that any person who uses the Royal Arms—or an imitation thereof—in connection with trade or business, without legal authority to do so, renders himself liable to a penalty of twenty pounds. This, we have little doubt, will necessitate the removal of a large number of the Royal Arms now being displayed by those who are using them without legal authority.

THE VARIOUS STYLES AND THE MODE OF PRESERVING PHOTOGRAPHS.

The question is often raised whether the multiplicity of existing sizes and styles which at present dominate professional photography is of advantage or otherwise to its progress. The present generation of photographers has almost entirely lost touch of the old sizes, which, previous to the advent of the *carte de visite*, were almost religiously adhered to by all votaries of the camera—the stereoscopic, and the sundry sizes under the name of "panoramic," being the only break in the system of dimensions that prevailed for so long a period. The basis was the "whole plate"—$8\frac{1}{2} \times 6\frac{1}{2}$ inches—and the "half," "third," "quarter," and "ninth" plates measured, exactly or approximately, one-half, one-third, &c., of the "whole plate," which itself was founded on artistic requirements of proportion for figures less than full length.

Mounts of various kinds—in the main gilt matts and glazed cut-out mounts, or *passe-partouts* as they were termed, enclosed in all kinds of open frames or closed cases—were made in accordance with these sizes, and were stocked for many years, without thought of variation of measurement, though in immense variety of style, from chaste and purely designed patterns to those of the most *rococo* description. As soon, however, as the *carte de visite* was devised and had obtained a fair footing all this was changed, a new size was introduced, and almost every year since that time still another shape or size has been brought before the profession, and recommended as a panacea for declining business.

In the first years of *carte* mania, out of the millions of pictures issued there would scarcely be a single copy that was not full-length. "Vignettes"—so called till long usage has caused the word to become a photographic technical term—were, perhaps, the earliest kind of variety, soon to be followed by the half- or three-quarter length. Then followed the "cabinet," to be neglected till taken up across the Atlantic, then almost re-introduced, and now bidding fair almost to eclipse the humble *carte*.

The proportions of the *carte de visite* are well adapted for the full-length figure, as those of the cabinet are for three-quarter lengths; and it is undeniable that a full-length on a cabinet size, or a three-quarter length on a *carte*, are most decided misapplications. The latter is compressed in an inelegant manner, while the former requires additions suggestive of Wardour-street to prevent its having the most bare and empty appearance. Victorias, Imperials

Malverns, promenades, boudoirs, and many others of greater or less notoriety followed in quick succession in a manner that, we fancy, must have conduced to increase in the exchequer of the manufacturer rather than of the poor photographer. So long, however, as a great house chooses to start a new size of mount, and a few others take up the idea, the lesser ones appear to believe it to be incumbent upon them to follow suit, with expense and worry as the inevitable result.

In the larger portraits much depends upon the kind of *clientèle* the artist possesses as to whether its introduction is likely to lead to increased business or not, and this quite apart from any question of wealth or its absence, as it is quite certain that in a poor district, or in one where the photographer's connection—though it may be a good one—lies more among the artisan classes, there could be no thought of making money out of large, direct, uncoloured pictures—for instance, twelve or fourteen inches long.

Let us give an example: we believe the form called "imperial" (an unfortunate designation, as clashing with a long-established term representing far larger dimensions) may be associated with a well-known name—that of a gentleman who has executed some of the finest photographs ever produced. He issued large numbers of these pictures, and at no exorbitant price considering the size and excellence of the work and the artistic manipulation, and they were even bought by many brother artists as types and examples of excellence. We believe we are correct in saying that this same gentleman's productions have formed a very considerable proportion of the whole of the "imperials" produced in the country. We opine that, apart from his being the introducer and the work being so good, which would carry any size, one chief reason of the photographer's success was the fact of his studio being at a watering-place—the homes of his sitters thus being far away from the photographer's place of business.

The necessary consequence was that he could give his artistic fancy full play without fear of that *bête noir* of the photographer—the "re-sit." He knew he would rarely be called upon to take a picture afresh, on account of reasons which, if allowed to have weight, could only result in an inferior production. With the family photographer, or the one with an old connection, the conditions are entirely different. A man who, after sending out a picture upon which he has spent much labour, thought, and skill, may be called upon to retake it for some absurdly-trivial reason which, if ignored, may cause the ill-will of his sitter, may accustom himself to giving way in the case of *cartes* or even cabinets; but when it comes to much larger pictures the chances are he will rebel, and, rather than submit to such caprices, will more likely throw himself upon the tender mercies of the enlarger. When large pictures are required he will endeavour to obtain a commission for a coloured enlarged one, where the highest class of photography would not be needed, and would, indeed, be thrown away. A good *carte* or cabinet negative would then well suit his purpose, and with experience and a clever staff he could compete very fairly with the producers of direct photographs of large size.

These remarks may be said to refer more especially to private portraits of the monster size that are now becoming popular, and are to be seen exhibited all over the country.

For publication pictures of popular characters—where "re-sits" are out of the question, and where, indeed, in many cases the photographer pays, rather than is paid by, his model—the case stands on an entirely different footing; and we should heartily welcome the advent of a size that would give scope for the display of ability, and, by reason of its dimensions, make the sale of a single copy a matter worthy of notice.

These larger pictures, and some of the smaller large ones, have not had full play. In our next we propose to make some suggestions in this direction which, we trust, may have a practical application.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XX.—Mounts and Cells.

Many years ago a French optician, Derogy, introduced a lens, now disused, but the mechanical features of which deserve more general recognition than appears to have been accorded to it. It was formed in several different sizes (three at any rate), these being the quarter, half, and whole-plate portrait lenses. In the normal condition these were lenses of good quality suited for the different dimensions of plates.

Upon dissection and examination of these objectives certain peculiarities became apparent. First of all, the cells containing the lenses are not adapted to the mount by screws but by means of "bayonet joints," there being two such fastenings fitted to each cell. The workmanship being good there is no chance of anything becoming unfastened. On removing the front cell, which is done by a quarter of a turn of the hand, it is found to contain the means for adapting still another cell, the position of which will be nearly midway between the front and back lenses. The object of this third cell-receptacle is seen when, upon opening a small circular morocco case, which is packed in the hood of the lens, two cells, each containing a supplementary lens—one concave and the other convex, both being achromatic—are disclosed neatly fitted in appropriate receptacles. Either of these can, with a quarter turn of the hand, as before, be transferred to the vacant place in the mount, and thus serve to modify the focus.

The real efficiency of the system will be seen from the following measurements which we have made of the *equivalent* foci of the one such lens in our possession when subjected *seriatim* to its several modifying influences:—Premising that the lens now being described is one of the smallest which were made, namely, the quarter-plate size, and that the diameter of the front and back elements is slightly under one inch and three-quarters, in the combined form as a double portrait-lens the equivalent focus is seven inches. The insertion of the cell containing the concave achromatic, and upon which is engraved "*Lentille pour faire plus grand*," lengthens the equivalent focus to nine inches; while the substitution for it of that containing the convex achromatic, and which bears the inscription "*Lentille pour faire plus petit*," shortens the focus to five and a-quarter inches equivalent, or three and a-half inches back, focus. But the front lens is also adapted for being used alone, for which purpose it is transferred to the place of the back combination, previously removed from its position, giving a focus of eleven inches. This, however, is not all, for by employing the front and the concave together a focus of seventeen inches is obtained—the substitution of the convex for the concave in this relation giving a focus of eight inches.

Here, then, are great capabilities condensed in a small space. In this one objective we have foci to the following extent:—Five and a-quarter inches, seven inches, eight inches, nine inches, eleven inches, and seventeen inches. We have an idea that this combination has long ceased to be manufactured; but it is probable that the causes which led to its having fallen into desuetude are now removed, and we describe it as containing merits to which manufacturers might well pay heed. Incidentally we may state that one of the combinations formed is that which, after many years' experiment, has been found by Professor Woodward to be best adapted for use with his solar camera as an objective. The combination alluded to is that in which the convex supplementary lens—an achromatic meniscus—is utilised for the purpose of shortening the focus of the portrait objective.

In the interests of the tourist photographer who desires to take with him a supply of lenses it is greatly to be regretted that brass is so cheap and of such high specific gravity. The brasswork of lenses is in most cases far heavier than is at all necessary. That of the little quarter-plate combination above described is such as would give an ox his *quietus* if hurled with much muscular force. It is proverbial that Englishmen have a *penchant* for something substantial—something weighty. Let us adduce an example from an incident with which we are acquainted. Two natives of "*perfidious Albion*" about to start on a tour involving several thousand miles of travel called upon a well-known optician, at that time in Wigmore-street, London, to be supplied with powerful field-glasses. One selected aluminium, the other brass, as the mounting material—not because it was cheaper, but it was so much "heavier and therefore more substantial." Before their lengthy tour had been one-half

accomplished the latter of the two travellers, whose muscular development had not attained the high pitch of the other, made overtures for having an exchange of field-glasses effected, and concluded the negotiation by paying as difference between the two the full sum which the aluminium one originally cost, both glasses being identical save in the metal in which they were mounted. This incident has a moral, and it will not require much wisdom for its discovery.

The weight of the brasswork of lenses is in many, if not most, instances far in excess of what is required for rigidity. By adopting *papier maché*, ebonite, or aluminium, an important saving to the wear and tear experienced by the photographer would be effected. It will, doubtless, be objected to aluminium that it is very expensive. This is true to some extent, although not so much so as to render its applicability to a photographic lens of great importance in this respect. But we are glad to say that, owing to a discovery made within the past year, it is quite possible, should an adequate demand arise for this metal, its price may be reduced to that at which copper is now sold. As the specific gravity of aluminium is about 2·56, while that of copper is frequently 8·96, the great gain in lightness will be apparent. Some makers—notably in America—have begun to discard brass for the diaphragms of their larger lenses, adopting ebonite or vulcanite instead, to the great advantage of the users. It only remains that this measure of reform should be applied to the other portions of the mount to secure an improvement far exceeding that which was inaugurated by the introduction of the leather cap in lieu of the heavy brass cap which it superseded.

By the apparent paradox of making use of heavy glass the opticians are now able to give us lenses small in bulk and comparatively light in weight, so far as concerns the mere glasswork of the objective. It now devolves upon them to effect a similar measure of reform in the mounts of the larger of the portable form, such as those exceeding one and a-half inch in diameter.

While on the subject of cells and mounts, we may state that there is a method of forming the cell which frequently induces fog and flare upon the negative. It refers to that portion which, when the objective is screwed in its place, is inside of the camera and immediately contiguous to the lens. It is frequently made of a smooth, concave form, which presents a fine appearance to the convex surface beautifully set in a smoothly-finished, concave mount. Here is where the fatality comes in: this smooth, concave setting or shoulder, while unexceptionable when quite new and the surface of an absolutely dead-black nature, will not have been subjected half-a-dozen times to the gentle action of the soft wash-leather by which the lens is cleaned until it acquires a somewhat shining surface, under which circumstances it frequently reflects the light with all the intensity of a concave mirror. We are aware of a large landscape lens, of otherwise great excellence, having been three times returned to its maker—one of high eminence—under the following anomalous circumstances:—Being sent for examination on account of its flare-producing tendency, it was critically examined on the "horse," pronounced faultless, and returned to the owner with a declaration that nothing had been done with it. But, singularly enough, the owner found it entirely cured of its fault, which elicited from the maker a strong averment that no alteration had been made upon it. After a few weeks the ghostly flare again appeared, followed by a repetition of the scene just described; this being repeated a third time. It was admitted to be a puzzle. Hearing of the case we offered a suggestion, which proved to be a solution of the mystery. The brasswork of the cell, projecting beyond the inner surface, was smooth and had been black-varnished with dead-black. In course of time this became somewhat polished, as already described. Nothing was found amiss by the optician by the method adopted in testing the lens; but, as a mere matter of routine, the foreman had re-blacked the cell before sending it to be packed up for return. The real cause of the ghost being thus discovered, its exorcism was effected by a slight alteration of the form of the offending brasswork.

That portion of the cell immediately adjoining the lens should be as near as possible flat and at a right angle to the axis. It should also be grooved by a chaser or screw tool. If, now, it be well warmed and be given a coating of dead-black spirit varnish, composed of lacquer and vegetable black mixed together *secundum artem*, it will not only not reflect any light, but will remain in good condition for many years.

English-made lenses are now constructed with cells in which no defect can be found; but in some of the lenses of the "rapid" class constructed by the leading continental optician we find that the smooth concavity in the brasswork of the cells is adhered to. In addition to this the smooth surface is stained or dyed black instead of being coloured by a layer of carbonaceous varnish. This staining, which is effected by nitrate of copper and heat, imparts a very beautiful surface; but for the reason given we believe it to be greatly inferior as regards efficiency to the system of blackening by varnish. The worst of all systems of blackening cells is that so frequently found to be adopted in many cheap French lenses, and which consists in immersing the articles to be blackened in a bronzing solution—a common method of preparing which consists in dissolving black oxide of iron (the scales from about a blacksmith's anvil-foot being preferred) in hydrochloric acid. This gives a black bad enough in itself (for the purpose now spoken of) but rendered doubly so when brushed over with a brush charged with plumbago, as is frequently the case. The black colour imparted by applying a weak solution of chloride of platinum is still worse than the other.

Photographers generally do not appear to be aware of the immense influence for evil exercised by a lens injudiciously mounted. In examining a portrait combination for its mounting proceed as follows:—Having screwed it in to its place on the camera, let it be directed to any outside scene through a window. The brighter the sky the better it is for our purpose. Remove the ground glass and any diaphragm which may be in its place. The lens being uncapped, throw a focussing-cloth over the head, and, looking forward from the top of where the ground glass would have been, notice the appearance presented by the lens.

With a view to accuracy of description, we have obtained a new foreign portrait lens by a maker of good repute, and shall report what we notice. First, a bright glare of light comes from the edge of the lens; secondly, a bright reflection is emitted by a broad, flat ring, which, as a counter screw, is employed to retain the lens in its place in the cell. The next light comes from a similar broad ring, which keeps the back lenses in their cell; following this is a white glare from the edge of the flint glass of the back lenses. This, in turn, is followed by a strong reflection coming from the ring by which the two back lenses are separated. Now, any one of these several reflections is calculated by itself to produce some fog upon a plate, and how much more so will this be the case when they all act in combination? The way to proceed in order to rectify such a lens as that now before us is, first of all, to thoroughly blacken the edges of the lenses, as all the English and one or two of the best foreign opticians now do. Then, with regard to the counter screw of the front cell, remove it altogether—it is a nuisance at best—and reduce the depth of the cell, leaving only sufficient projecting beyond the lens to turn over and keep the lens in its place.

Two of these "glaring" evils are thus got rid of. Next, blacken the inside of the separating ring very effectually. If suitable varnish cannot be made or procured for this purpose, paste a strip of black velvet or cloth inside, so as to ensure reflection being eliminated, and do the same with the counter screw. If the photographer possess or have access to a turning lathe, he should discard the inside counter screw of the back cell, and make a small cap with a turn-over edge to screw on the outside of the cell and thus keep the glasses in position; a portion must, of course, be turned off the cell to reduce its depth. If all this be done, and it is the work of only a few minutes, and the lens be once more examined in the manner we have described, all flare and false reflections will have vanished, and an enhanced brilliancy of image will more than repay the trouble incurred.

English opticians have long since realised the evil arising from this class of reflections, and have taken special care to mount their

lenses accordingly. To this in some degree, as well as to other features more purely optical, is, doubtless, owing the high position achieved by the optical productions of English manufacturers.

WE have just had the pleasure of inspecting a few photographs of Swiss scenery, sent to us by our esteemed correspondent "Boode," whose articles on the New Forest appeared in our *Where to Go with the Camera* series last year, and we hope to publish, under the same heading shortly, an account of the trip upon which these pictures were taken. When we state that our correspondent has only taken up amateur photography within the last two years, or so, and has already submitted to us admirable specimens of landscape, animal, and instantaneous studies, it argues an enthusiasm and a capability of achieving success that should prove encouraging to others who are about to commence.

WE promised last week to give details of Mr. Ackland's mode of applying the slide rule to emulsion and other photographic calculations; but, as that gentleman is completing some important improvements which will render the method far more useful, we are asked to hold the matter over for a week or two.

THE question of copyright in photographs appears to be as far from settlement as ever, in spite of legislation, if we may judge from the comments which appear continually in the outside press. It is satisfactory, at least, to find that the subject is now recognised as of sufficient importance to be taken up by newspapers, whose vocation lies not in the direction of either art or photography; but we fear that most of the "inspiration" in such cases—witness a lengthy leader in the *Scotsman* of Monday last—can be traced to the same source, and, while throwing no new light on the subject, presents the old arguments in an ingeniously-twisted form. The letter from Mr. J. H. Jackson—the defendant in the recent suits—which appears in our correspondence columns, will be read with interest by many who have given attention to this subject.

INVESTIGATIONS in spectroscopy are being carried on by a few observers with unflagging energy. At intervals the results are communicated to the learned societies, and almost always, it may be observed, is photography relied upon for the registration of the facts upon which the conclusions enunciated are founded. An interesting paper, read by Professor Hartley, is given *in extenso* in the current number of the *Journal of the Chemical Society*, and is illustrated by a number of maps of spectra mainly founded upon photographs of the spectra of certain elements, and upon which definite arguments are founded tending to show that Mr. Norman Lockyer's theory of the compound nature of the elements is not tenable. Of course, for observation in the infra-violet and infra-red regions, photography is a necessity for obtaining details of the spectral lines of various bodies. With regard to the latter, the writer states that "the probability of many of the fundamental vibrations of the simpler elements being found in the infra-red region will, no doubt, soon be put to the test of experiment, since we have Captain Abney's method of photography applied to these rays, and Professor Rowland's method of spectrum analysis by means of concave-ruled spectra, unequalled for dispersion and exquisite definition, giving us a range of at least four octaves."

WE note two or three interesting reactions, in which aluminium plays a part, that it may be worth while to make a note of, owing to the interest attaching to the alums in dry-plate work. We do not at present perceive any actual process capable of being elaborated; but the facts are well worth putting on record, if only to lead the way to further experiments. The property of alum in its base being precipitated by ammonia, &c., is well known, and also that the presence of sugar, gelatine, and other similar substances interfere with the precipitation. For this reason it has been said that a negative may be safely plunged direct into the alum bath after development without any preliminary washing. The usual form in which alumina is so thrown down is as a gelatinous mass, so that it would be difficult—at first, at anyrate—to detect whether such precipitate were produced or not within the pores of the negative. The fact that glycerine is used in the developer gives interest to the note of a foreign observer—that in presence of glycerine alumina is thrown down not as a jelly but in dense flocks.

THE other note of interest upon these compounds is that by Herr B. Reinitzer, who states that if a solution of sulphate or chloride of chromium is boiled with an excess of acetate of soda no precipitation takes place, and that if an alumina salt be added in certain proportions the latter also fails to be thrown down by the addition of ammonia.

THE late eclipse observers are gradually putting in an appearance and bringing before the public accounts of the actual results obtained. M. Janssen has returned from Caroline Island, and was present at the meeting of the Paris Academy of Sciences on the 3rd instant. The reports drawn up by Palisa, Tacchini, and himself formed a long and interesting reading, which was to be continued at the next sitting. M. Trouvelot himself read the account of his own observations.

THE wet and dry bulb thermometer is an instrument of considerable utility, but one that is used far less than it might be by photographers—not only on account of any weather prognostications that it might afford, but also for its indications as to the state of the atmosphere relative to the drying of plates, tissue, &c. Perhaps this indifference to its value may be owing to the slight trouble involved in the reading of two indicators, and the necessity of referring to tables at each observation before an exact knowledge of the value of the reading can be obtained. A new instrument has been invented and patented which is intended to show at a glance, as readily as taking an observation from an aneroid, the hygrometric condition of the air; and, though it may not be a rigorously-exact instrument, it would appear to be of great practical utility. Many instruments have been founded upon the expansion of hair by moisture; but they have been generally ineffectual on account of the unequal expansion in presence of various proportions of atmospheric moisture. In Klinkerfue's hygrometer these difficulties have been encountered in a most ingenious manner, and this, which is in reality a hair hygrometer, promises to be an instrument of everyday use, though at present its price is rather high, being about equal to that of a first-class aneroid.

BOILING EMULSION BY MEANS OF STEAM.

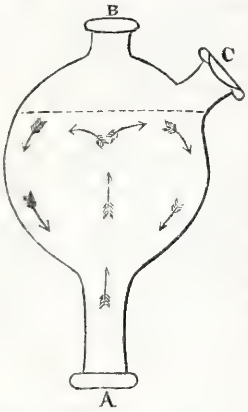
ON reading Dr. Stolze's article, in your issue of the 18th ultimo, it struck me that there was "something in it," and I at once proceeded to try the method of boiling there suggested. In some respects I was satisfied, while in others I was disappointed.

The boiling, I found, could be performed with great regularity and with far less trouble than a casual perusal of Dr. Stolze's article would lead one to imagine. Further than that: I found, as is stated in your leading article of last week, that the condensation of steam and consequent increase of bulk does not occur to anything like the extent mentioned by Dr. Stolze; but that the system is easily applicable to any formula, and not merely, as was stated, to such as Burton's, where the quantity of water is of no consequence.

On the other hand, I found that the ebullition set up in the emulsion receptacle, though apparently very vigorous, is *not* sufficient to keep the particles of silver bromide in constant motion, as was alleged in the article referred to; on the contrary, in an ordinary bottle or flask, such as those usually employed for boiling purposes, quite as much of the bromide was found firmly adherent to the bottom of the vessel after boiling as is the case when the flask or bottle is immersed in boiling water and allowed to remain still during the operation of cooking. This appears to arise from the fact that the current of steam passes up the centre of the vessel only, keeping the liquid in that portion certainly in violent agitation, but leaving the sides comparatively quiescent; so that the particles of bromide are driven up the centre by the force of the

steam, and reaching the surface spread in all directions, falling like the spray from a fountain jet into the still portion of the liquid adjacent to the sides of the vessel. Here the particles gradually settle down and become firmly "caked," as in the ordinary boiling process where constant stirring or agitation is not kept up.

To obviate this difficulty I tried various plans, using different shaped vessels and bending the steam jet so as to set up a spiral current, but none of them were altogether satisfactory. At last I hit upon the following, which not only overcomes the difficulty I have mentioned, but introduces other conveniences. I procured a vessel of the shape shown in the diagram, known as a "three-necked receiver," and obtainable for a few pence from any dealer in chemical glass. This forms the emulsion holder, and being fixed in any suitable holder the steam tube is filled by means of a cork in the neck A. Now it will be obvious that as the steam rushes up the long neck A with considerable force it is practically impossible for the bromide to settle down there; but if the operation be watched in daylight, some water and a few tea-leaves being employed instead of emulsion, it will be found that the current takes the direction shown by the arrows. Rising perpendicularly until it reaches the surface it then spreads in every direction until it reaches the sides of the globe, when it is again deflected downwards until it meets the ascending current of steam at the point where the neck A makes junction with the globe, when it once more starts upon the upward course. In this manner the particles of bromide are kept in constant motion, and little, or very little, subsidence occurs.



A further advantage of this form of vessel is that it permits the process of sensitising to be performed at boiling temperature. Through the neck B the ordinary arrangement of a funnel (drawn to a fine point) is inserted, the point reaching to somewhere about the centre of the vessel. The bromised gelatine having been raised to boiling point by means of the steam jet, the hot silver solution is poured into the funnel, and as it trickles through is met by the ascending current of steam and so intimately mixed into the emulsion. The neck C serves as an outlet for the escaping steam.

A word as to the means for protecting the emulsion from light. The "receiver" may be enclosed in an opaque bag, as mentioned by Dr. Stolze, or, better still, enclosed in a box through the bottom and top of which the steam tube and funnel are passed, the boiling arrangements being outside. In fact, many arrangements similar in principle to the "emulsifying cabinet," described in the leading article in the present year's ALMANAC, will suggest themselves. My own did not take ten minutes to rig up. H. Y. E. COTESWORTH.

PRINTING BY THE ELECTRIC LIGHT.

ON Monday evening last, in response to an invitation given at the previous meeting of the London and Provincial Photographic Association, the members of that Society made a visit to the electric light, power, and storage works of Mr. A. J. Jarman, in Richmond-street, City-road, for the purpose of trying the power of the arc light for printing on ordinary albumenised paper.

It was understood that the special form of arc light—producible by high tension—for the production of which Mr. Jarman was constructing a special dynamo-machine, would not be accessible on the occasion; but it was thought that it would be interesting to try the printing effect of the more usual electric arc, and the result proved that this anticipation was well founded. The machine run was one giving forty Volts and twenty Ampères, and the light was arranged under a white paper reflector. Below and surrounding the light boards were arranged for presses, and it was calculated that if all the available space had been occupied about fifty presses of half-plate could be exposed to the rays of light at the same time. The distance of the light itself from the sensitive paper was a little over two feet. Several gentlemen brought negatives and paper, and, as the negatives were of various colour and density, of course the time of exposure found necessary varied in like degree. As to the actual time requisite, we noted particularly a negative brought by Mr. W. M. Ashman—a gentleman who, as is well known, takes great interest in matters electrical as well as photographic. This negative took half-an-hour to print, and we were informed that by daylight it had required twenty minutes—a difference of time not great, considering the distance from the source of light and the not very highly-actinic character of the arc in use.

The actual power absorbed by the dynamo was, we were informed, a little over two-horse, and it was added that about the same force only would be required for the special high-tension dynamo now in course of construction. This machine would, it was believed, give far greater photographic power, and Mr. Jarman said that he should be pleased to see the members of the Association as soon as it was complete, in order that they might make comparative experiments with it.

THE LUXOTYPE PROCESS.

THE process, so far as we are at present acquainted with it, consists chiefly in the production of a "grained" negative, from which etched plates can be made by any of the recognised methods. The

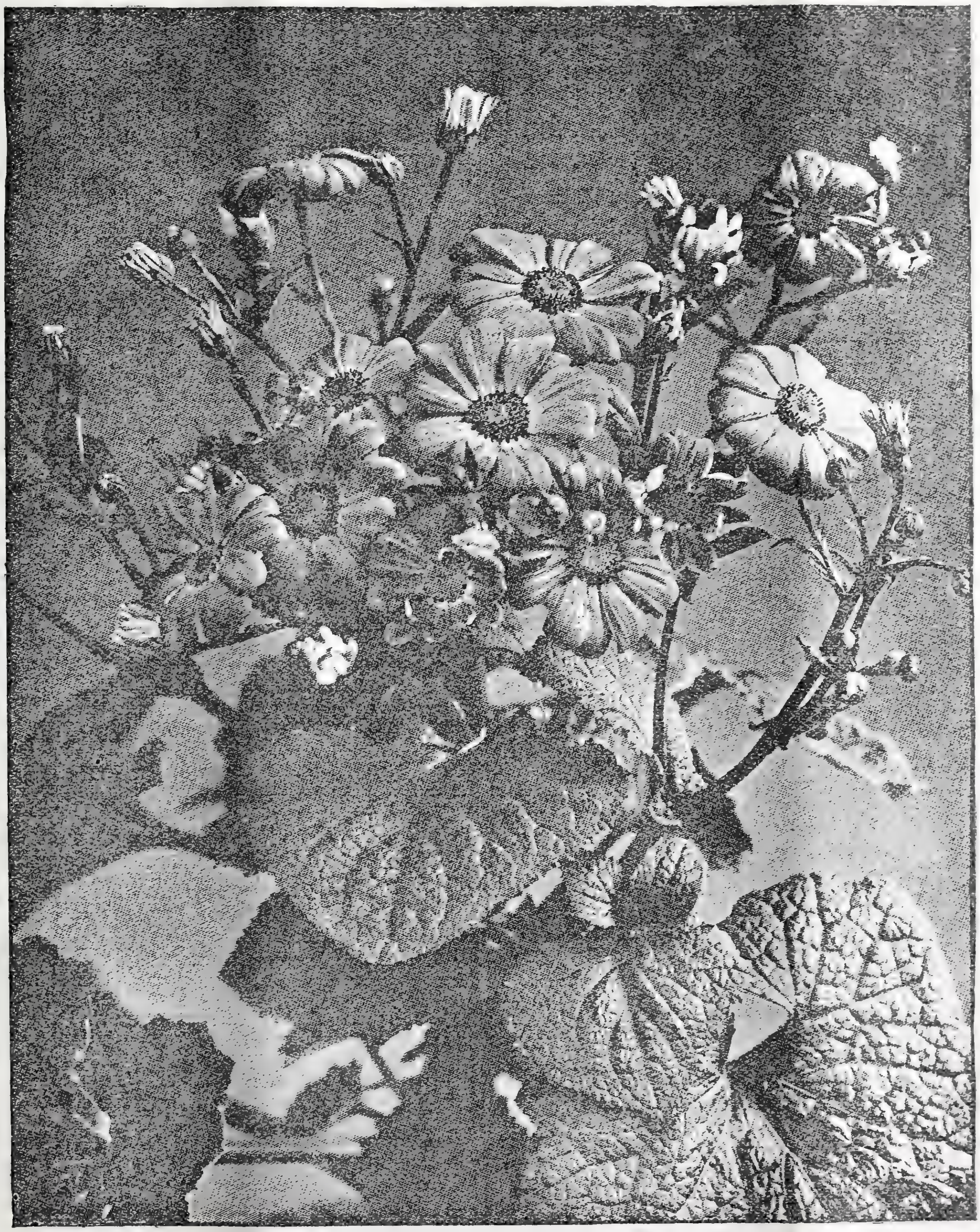
particular details of the mode by which the grain is secured is known at present only to the patentees. We have seen several of the negatives, some of which have been placed in the hands of professional photo. etchers for the purpose of testing their capabilities in connection with ordinary etching processes, and in all cases the result has been satisfactory.

In addition to the illustration we noticed last week as having appeared in the *Bradford Telegraph*, arrangements are at present being made for trials of the process in connection with some of the most widely-circulating papers in this country, and we have little doubt as to the eventual success of the trials. One of our illustrations this week is, we understand, to appear contemporaneously in a popular London illustrated journal.

To say that the production of phototypographic blocks is a new idea would be simply to state what is not correct, for, probably, this application of photography has received more attention—in an

experimental as well as in a practical way—than any other branch of photomechanical printing. Yet "new" processes are continually cropping up, the old lines are being constantly re-traversed, and we are ever on the verge of that millenium in which it will be only necessary to take an ordinary photographic negative one day to find it reproduced in the daily papers next morning.

But the millenium has not been yet reached. The translation of the natural half-tone of a photograph into some form of line or stipple or grain which fits it for the ordinary printing - press when converted into a metallic printing surface has long ago been accomplished; but, as a rule, such blocks require for the production of good work not only great care in printing, but also the assistance of a skilled engraver before they can be put upon the press. Under those conditions, therefore, the problem can scarcely be deemed to have been thoroughly solved.



As we hinted last week, we are in a position to place before our readers in the present issue specimens of the latest attempt in this direction—the "luxotype" process of Messrs Brown, Barnes, and Bell. These gentlemen have attacked the question from an entirely new point. Instead of aiming at the highest degree of artistic and technical excellence in their productions, they have laid themselves out to produce blocks which, while possessing sufficiently good qualities to enable them to pass muster in these days of "high art" in engraving, shall be workable at any ordinary press, along with type, at a high rate of speed, as in the case of a daily or weekly paper. It is obvious that under such circumstances there is little time to devote to careful "nursing" of the phototype block. It must stand its chance with the coarser "type," and if it will not bear the strain the process must give way in the race.

From what has been said it may be inferred that for the production of high-class work a different order of block is required from that which would be necessary in an ordinary newspaper office. In fact, two different processes may be said to be involved, of which, in one sense, the former is the easier. Such work as we are accustomed to find in the American illustrated magazines, such as *Harper's Monthly* and *The Century Magazine*, requires not only the greatest care in "machining," but also a paper of specially fine quality and ink of the highest excellence. However good the block may be for *careful* printing it may prove utterly useless when submitted to the ordeal of the ordinary machine.

In making this new departure the patentees of the "luxotype" process have gone further, inasmuch as they describe their method as one of "engraving without an engraver;" that is to say, the printing surfaces are formed solely by the aid of photography combined with etching or electrotyping in the ordinary way without recourse to any use of the graver or other means to improve the result. But in order to show what can be done in the way of artistic improvement where work of a high class is required, the patentees have tried the following experiment—Four plates have been prepared from the same negative, and while one remains untouched the others have received, respectively, fifteen minutes, forty-five minutes, and one hour's work at the hands of a skilled artist prior to submitting the plate to the etching fluid. The results which we have seen are interesting, and prove that much more than "rough" work can be done by the process. As such we submit the specimens to our readers as some of the earliest that have appeared in the ordinary course of publication of a weekly journal; several are to appear, we learn, in other papers shortly.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

The Fifty-first Annual Exhibition of this Society was opened in the Polytechnic Hall, Falmouth, on Tuesday last, the 11th instant, and, from a glance through the catalogue, the present display appears to be quite up to the previous standard.

In the Department of Photography there are in the Professional Class one hundred and twenty-six exhibits by thirty exhibitors; in

the Amateur Class, thirty-five exhibits and ten exhibitors; and in the Class of Photographic Appliances, sixteen exhibits by five exhibitors.

We append a list of the judges' awards, and shall give a more complete notice next week:—

Professional.

First Silver Medal	N. M'Liesh.
Second Silver Medal	H. P. Robinson.
Second Silver Medal	W. J. Byrne.
Second Silver Medal	Cobb and Son.
First Bronze Medal	Johnson Brothers.
First Bronze Medal	J. M. Browne.

Amateur.

First Bronze Medal	E. Brightman.
First Bronze Medal	J. R. Holmes.
Second Bronze Medal	Rev. A. Malun.

Photographic Appliances.

First Silver Medal	G. Hare.
Second Bronze Medal	W. H. Oakley.

SOME NOTES ON HYDROKINONE DEVELOPERS.

[A communication to the Leeds Photographic Society.]

In a photographic sense—I am sorry it is in that sense only—I am probably the youngest individual present, and, I must say, I feel some diffidence in venturing to address you. However, the experiences of a mere amateur, who, nevertheless, is not unused to experimenting, may, perhaps, be interesting if briefly narrated, and lead to a discussion from which I, at least, hope to gain much valuable information.

My friend Mr. J. W. Bransome called my attention to the reduced price of hydrokinone some three or four months since, and suggested that I should experiment with it, knowing, I suppose, my liking for by-paths and new roads. The experiments and their results shall be given as concisely as possible.

Hydrokinone and Ammonia.

This is the combination laid down by Abney in his *Instructions*, and Eder in his *Dry Plates*, and very naturally I tried it first, taking three grains of hydrokinone to the ounce of water and adding dilute ammonia, drop by drop. Result: fair density when plenty of ammonia was used, but, unhappily, great fog of the dichroic, red-green kind. One grain of hydrokinone was then used, with the same result. Six grains of hydrokinone was now taken: same result. A very little thinking led to the conclusion that the fog was due to the ammonia or, possibly, to the plates employed. The latter option was tested by exposing plates by several makers and developing with the one grain of hydrokinone solution, the result being fog in all, but in somewhat different degrees. I then proceeded to try a solution of carbonate of soda, which, as is well known, answers admirably with pyrogallol. A ten-per-cent. solution was resolved upon as likely to be more readily manageable than a saturated solution or a solution of great strength.

Hydrokinone and Carbonate of Soda.

My experiments with the ammonia combination having led me to the conclusion that a one grain of hydrokinone to the ounce was a sufficiently-strong solution, I proceeded to take an ounce of it, and having added an ounce of the ten-per-cent. solution of soda carbonate developed what I considered a properly-exposed quarter-plate. Development went on slowly and gradually, the details of the picture coming up in the order of their "lightings," and in about ten minutes I had all the detail out.

The negative, after fixing, proved quite satisfactory. Its density was sufficient, and there was an entire absence of fog. The lights were clear, except for a slight yellowish tinge, which did not materially affect its printing rapidity, being hardly more marked than the yellow colour of good pyro.-ammonia negatives, and was distinctly better than the deep or yellow often seen in pyro.-sodic-carbonate negatives.

A standard and stock developer was made up (according to the formula published in the *News*) as follows:—

Hydrokinone	8 grains,
Alcohol	8 drachms,

a drachm of this being added to one ounce of water when required for use with one ounce of the ten-per-cent. solution of soda carbonate (which then becomes a five-per-cent. solution or thereabouts). The alcoholic solution of hydrokinone keeps fairly well, but discolours somewhat after the lapse of a week or two. It is best, I think, to make up not more than sufficient for (say) a week's work at a time. The sodium carbonate solution will, of course, keep for, practically an indefinite time if excluded from the air; but I make about a week's supply at once, so as to obviate chances of trouble from the reduction of the developing power of the sodic carbonate, due to its absorption of carbonic acid and conversion into the bicarbonate.

It has been stated—and the statement has been refuted—that hydrokinone permits the usual exposure of a given gelatine plate to be reduced to one-third; that is, an exposure of one second when the plate is subsequently developed with hydrokinone is equivalent to three seconds if the plate be developed with pyrogallol. I have not been able to satisfy myself on this point, various circumstances having prevented me from having the needful leisure in which to perform accurate experiments; and it is obvious that experiments made to settle that point must be carefully performed, care being taken to eliminate such sources of error as would be due to inequalities of lighting over the surface photographed—in the plate itself, as well as those incidental to the development. My impression is, so far as I can form an opinion from the development of plates taken under nearly the same conditions, that hydrokinone used under the formula given above allows of a slightly-less exposure than pyrogallol, but not much—certainly not of a quarter less exposure; but that, on the other hand, hydrokinone does allow a considerable latitude in the direction of over-exposure.

Having noticed indications of what I may term elasticity of developmental power in hydrokinone I turned my attention in that direction, and tried the addition of various substances to the developer. My experiments in that part of the subject are not yet complete, but I will give the results so far as I have gone.

Mixture of Pyrogallol and Hydrokinone.

I have made a few experiments with this mixture, but my results are purely negative. I am not able to satisfy myself at present that any advantages are gained by the combination when sodic carbonate is selected as the alkali. When ammonia is used without bromide green-red fog results. The addition of bromide to hydrokinone introduces so large an amount of retarding action that its addition to the mixture may be expected, and appears, to result practically in the use of pyrogallol alone. However, I wish to be understood to speak with a good deal of reserve on this point, as I have not been able to resume the experiments commenced in July.

Hydrokinone and Sulphite of Soda.

Having found the retarding effect of bromide to be very great—too great to allow of its employment with ease or safety—after some reflection I decided upon employing sulphite of soda, having in my mind, at the same time, the chances that its employment might enable me to avoid staining the negative.* My first sulphite-hydrokinone developer I made up by taking a weight of *commercial* sulphite of soda equal to the weight of hydrokinone employed. The results were very satisfactory, except that development was very much slowed, and under-exposed plates came up badly. Plates that had presumably received double their proper exposure came up remarkably well after a development extending over twenty minutes. Judging that the amount of sulphite was in excess I reduced the proportions to sulphite one part, hydrokinone three parts, with improved results. Properly-exposed plates came up more quickly whilst over-exposed plates still came up satisfactorily.

Here I was disposed to rest, but a friend who tried the formula with a different sample of sulphite reported that he met with nothing but failure. My confidence in his skill caused me at once to suspect that his sulphite was different from my sulphite, it also being within my knowledge that experimenters with sulphite and pyrogallol had obtained very dense results. I procured a sample of "chemically-pure, recrystallised sulphite of soda," and made up a developer on the basis of one-third grain to each grain of hydrokinone. Result: intolerable slowness and entire failure in the case of normally-exposed plates ("normally exposed" meaning "proper exposure for pyro."). It appearing probable that my first sample of sulphite was largely contaminated (as sulphite often is) with carbonate, I reduced the proportions of the new sulphite to one-half, or about fifteen per cent. of the hydrokinone employed, and re-obtained my first results with greater rapidity of development.

These experiments having promise of good in them, I next prepared my standard solution of sodic carbonate, and added to eight ounces of it half-a-drachm of solution of sulphurous acid of the B. P. strength, or thereabouts. Result: a very good developer for fully- or over-exposed plates. The proportion of sulphite present in this solution I have not calculated out, and, of course, in the absence of information as to the precise strength of the solution as used, can only be ascertained approximately. This solution, of course, con-

* This object was only partially gained.

tains sulphate and bicarbonate of soda, the action of which are under study.

I have brought down with me a few negatives developed with the sulphite-hydrokinone developer just described. The same developer has been used throughout, a fresh quantity taken for each plate, and an ounce of the one-grain solution of hydrokinone added to one ounce of the sulphite-carbonate of soda solution. Negative A, a landscape in broad sunshine, was cut into halves—one half developed with a standard developer (Fry's), and, as you will see, is fogged from over-exposure; the other half with the sulphite developer, and, as you will see, is clear and free from fog. I may, perhaps, presume and hope that for an amateur it is not a very bad negative. I could, in all probability, have saved the pyro. half by tentative development; but my object would not have been gained in that way. I did not want to get the negative up by a slow process of tentative development, whereas I do want, for my own comfort, to find a development which will answer for any exposure ranging from normal to ten times what it ought to be. Proper exposures undoubtedly ought to be given, but equally undoubtedly cannot always be hit upon by an amateur, like myself, whose days out come very like "angels' visits." Negatives B and C are of the same building—a mission church in my neighbourhood. The correct exposure with the lens, stop, and plate employed I had previously ascertained to be two seconds when pyro. was used. B has received ten, and C twelve, seconds. D and E have also received ten and twenty seconds, where two ought to have sufficed. They have all come up fairly well without any more trouble than the use of the ferrous oxalate solution would entail in a case of normal exposure for that developer.

I have also brought a few Kirkstall Abbey views, in all of which the exposure has been five times the proper exposure, except the cloister, where I gave twenty seconds instead of two seconds, and the river, where I gave only double the exposure. The last-named negative I have brought to show the effect produced by leaving the plate in the developer for three-quarters of an hour, an occasional rocking only having been given to it. As a photograph you will agree that it is not good, but it may illustrate the exceeding little liability to stain and fog the sulphite developer has.

I am not going to presume for a single moment that I have devised a developer that will be taken up by professional photographers, or, for the matter of that, claim to have devised a *new* developer at all; but I will venture to express a hope that it may be useful to amateurs who, like myself, often find that they have by accident given far too long an exposure to a series of negatives which they specially wish to develope well. If over-exposure be known, or strongly suspected, I use the sulphite developer at once. If unsuspected, pour off the normal hydrokinone solution as soon as the over-exposure is detected, wash the negative, and use the sulphite developer.

HENRY POCKLINGTON.

PHOTOGRAPHY IN MEDICINE.

THE almost daily-increasing value of the recognition accorded to photography is naturally very gratifying to its professors, both in this country and on the continent. In the latter, indeed, the science would appear to have more scope at present than in our own country. Recently an interesting paper upon the connection between medicine and photography has been given in our contemporary *La Nature;* and, although some of the methods described therein have been anticipated, and in a superior form, by mechanicians in our own country, we do not doubt that the paper, which we give *in extenso*, will be interesting to our readers.

Since the employment of the new gelatino-bromide of silver processes photography has achieved important results. That motion which hitherto has been considered an obstacle is so no longer; on the contrary, it is actually sought for, that more life may be given—more reality to the subjects we desire to reproduce. Even more is done: it is decomposed; it is analysed. The horse does not run swiftly enough nor the bird fly sufficiently rapidly to escape the apparatus of Messrs. Muybridge and Marey, whose interesting works are known to all the world. Owing to such results we cannot be surprised to see photography enter the domain of science and take an important place there.

In the present note it is our intention to give to the readers of *La Nature* an indication of the principal applications of photography in medicine.

Let us state at the outset that at the present moment most of the hospitals possess a photographic service. We place this fact on record with so much the more pleasure seeing that photography—one of the most beautiful applications of physics and chemistry—has been rather treated as a pariah. It takes its place now in all laboratories where exact testimony is required, and, at the same time, enters more into instruction.

One of these laboratories in particular is known to us. It is that of the Salpetrière. It owes its initiation to our teacher, Professor Charcot. We take it as a type, for it receives a certain class of patients which necessitate the employment of special apparatus, of which we shall speak further on.

The day he enters the hospital the patient is photographed. This picture serves as evidence and guidance in observing all the changes that take place in his condition. In a case of hysterical contraction, for instance, it is interesting not only in preserving the form of the original contraction, but, further, to note from it with care the changes and fluctuations. These different photographs are bound together in an album, allowing the whole series of phenomena which have supervened in the state of the patient in a given time to be seen in a few moments.

From an examination of prints from individuals attacked with the same complaint one cannot fail to find interesting comparisons. Professor Charcot, in his clinical lectures for 1883, has further insisted upon this point in particular in the case of scleroderma.

The new processes of photographic printing which allow any negative whatever to be changed into a typographic plate lend great value to these collections. In effect these reproductions in combination with observations with treatises and with medical publications will be at everybody's door, to the great gain of science and instruction.

It must not be forgotten any longer that positive proofs upon glass are known under the name of projections.

This instruction through the eyes, whose value is indisputable, extends more and more, and thanks are due to photography that it has made such rapid progress. If the patient die the anatomist preserves those aspects of the injured organs which might be interesting before preparing them for microscopic examination.

Here comes in one of the most important applications of photography. We allude to photomicrography. It is known—and to the histologist better than anyone—that those sections which excite our admiration are very liable to destruction. Some change, others may be broken or put out of order with the greatest ease. They must, then, be preserved. It is photography which will enable this to be done, and not only in a permanent manner, but also so as to facilitate research and study. These sections will in fact be considerably enlarged when collected and published. There will be no further need to keep them locked up in laboratories to the hindrance of all persons engaged in medicine.

To sum up: a photographic service specially designed for the needs of the physician ought, beyond the ordinary applications of photography, to possess a photomicrographic laboratory. The negatives, the lantern-slides upon glass, will be classified in a perfect manner. Albums containing prints after nature and micrographic enlargements will be preserved, and carry every indication of nature to the enlightenment of the physician who consults them.

This is really the *rôle* and the use of photography. But it is not all. As we said at the commencement—photography decomposes motion; and under this head what finer field of study than medicine! If certain patients are incapable of moving, how afflicted are others with a superabundance of motion! I now would speak of individuals attacked by certain maladies of the nervous system, such as hystero-epilepsy, true epilepsy, &c., &c.

The attacks which we have above all seen, so far from being an odd mixture of disconnected movements, submit on the contrary to certain rules, certain laws.

If we take as a type an hysterico-epileptic attack we shall see, as proved and demonstrated by Professor Charcot, that it is made up of perfectly-distinct periods, each of which bears a succession of regular and characteristic movements.

What we need, then, is an apparatus which will allow—first, the seizing of different special attitudes at various times; second, during each period the decomposing of a movement into a series of studies taken at closely approaching instants of time. To this end we arrange a series of objectives, of the same focus, in a circle upon a photographic camera. A blackened disc of aluminium, pierced with a rectangular aperture and worked by clockwork, is placed behind the objectives. When not in use the aperture rests in the space between two objectives, and, in consequence, the plate is protected from the action of the luminous rays. An electro-magnet governs a commutator, so made that when the current flows the aperture turns so as to uncover one of the objectives. Upon the current being broken the aperture goes between two objectives, the plate is covered again, and so on.

The advantage of this arrangement is evident, for so long as the current passes one of the objectives is working. We can then give any length of exposure whatever—a necessity in the laboratory. So long as the current is broken the apparatus is closed. We can then graduate to any extent the limits between two consecutive pictures.

An index finger placed outside follows the motion of the disc and continuously records the number of pictures taken.

Electricity being the motive power of the apparatus, the medical man can take from a distance whatever lies upon the patient's bed. [An engraving is given in *La Nature* showing the general arrangement of the apparatus at the moment of exposure. The arrangement for making and breaking contact are inferior to the ordinary "push" or pear-shaped pusher such as have been employed in this country for a similar purpose. It is to be observed too that the battery employed appears

to be one of the bottle bichromate batteries, which, though more powerful, are inferior in general utility to the *Leclanché*.—Eds.]

It is with this arrangement that pictures characterising each period are taken. When in a given period we wish to analyse a motion we can use Brétueg's arrangement, or, still better, a cylindrical transmitter, to which any speed desired may be given by a regulator. This cylinder of insulating material carries a series of long metallic triangles, inlaid upon the surfaces, and communicating with one of the poles of the battery. During rotation a metallic conductor receives the current each time one of the triangles passes and transmits it to the apparatus. Towards the extremity of the triangle the exposure will be very short, but as the base is approached it will be long. It is easy to conceive that with this method, a motion of known duration being given, it will be easy to take photographs with variable intervals and times of exposure. The motions being analysed, it will be easy to combine them again in the phenakistiscope.

Messrs. Muybridge and Marey, the pioneers, have commenced this study of movement—the first by means of his train of distinct pieces of apparatus; the second by his photographic gun. For our part, and for the kind of studies we are interested in, we prefer the system of multiple objectives we have explained.

The question of expense in lenses is certainly considerable; but other advantages cause us to place this consideration upon one side. The apparatus, of which we give an engraving in *La Nature*, is only a model. It ought to be made of such size as to give images the size of those shown in the engraving [a series of medallion views of no special interest, about three-quarters of an inch in diameter.—Eds.]. There is no limit except the height. It is besides only a laboratory apparatus. One of its advantages is the power of taking more pictures in the same time. In fact, one can give to the disc any rapidity desired.

In the gun of our esteemed colleague and friend, Professor Marey, the revolution of the barrel which carries the sensitive plate is made in one second, twelve pictures being taken, each in the $\frac{1}{720}$ of a second, with a second's exposure. All the intermediate attitudes between the exposures are lost. It presents different parts of the same plate before a single objective, and only allows the light to penetrate when the plate is motionless. We can easily comprehend the importance of the time lost for experimenting.

With the system of multiple objectives each objective is independent. The time lost is considerably reduced, since the aperture of the disc is always before the objective in a manner convenient for working. Just as the height of the apparatus is not limited, neither, likewise, is the number of objectives; in a similar time, then, one could take any number whatever of studies. It is a question of lenses.

In conclusion: we have held back the description of a most convenient apparatus for obtaining photographs at equal intervals. It is the electric metronome of M. Gaiffe. The current coming from the battery enters this apparatus and leaves it by an armature with two points alternately dipping in a cistern filled with mercury, exactly following the movement of the metronome. From this cistern the current returns to the apparatus. A commutator is introduced in the circuit and breaks it thus:—Everything being arranged, the metronome is regulated to the desired rate. When it has acquired all its speed and the moment for the experiment has arrived the commutator is pressed and the current allowed to pass until the index has returned to its place. The current is then broken and the experiment is performed.

The apparatus we have described, and which we propose to call "photo-electric," is thoroughly indicated for certain medical and physiological studies. In military art it might be usefully employed to register the effect of torpedo explosions. The force of these machines is practically studied by measuring the column of water thrown up by their explosion. The evidences that allow us to furnish this result owe their existence to instantaneous photographs taken at equal intervals of time by different apparatus. In practice this arrangement gives rise to difficulties and errors that could be prevented by employing photo-electric apparatus, worked from a distance, and whose progress was regulated beforehand.

In concluding this unassuming work we may assert that the last word has not been said upon the application of photography to medicine. We now see photography registering the most delicate phenomena in observing apparatus, and, doubtlessly, she will soon do as much in the domain of medicine. ALBERT LONDE.

NOTES FROM THE NORTH.

I REGRET that I have not sooner been able to have a word or two with Mr. C. Brangwin Barnes—a gentleman whom I have not the pleasure of knowing, but who I am willing to believe would not willingly write anything—especially anything that was not true—likely to offend the *amor patriæ* of any of the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY. But "facts are stubborn things," and I find him writing in the number for August 3, page 450:—

"Judge my horror, then, when recently, on being called out to photograph the deceased child of a *shopkeeper*, I found that the corpse was kept in the general living room, in the grate of which a bright fire was burning, and where two or three other children were playing about. I suppose the excuse would be want of room; *for it happened in Scotland*, where every room is parted with that can be let, no matter what little space is left to the family in which to 'pig' together."

The italics in the foregoing extract are mine. Now, if this had been written of England, or at least some parts of it, it might have been accepted as fairly near the truth; as it is not unusual to see advertisements addressed to "shopkeepers" and even to photographers, which wind up with something to this effect:—"Rent low and easily covered by letting." But it is a gross libel on Scotland, and could only have been written by one who knows very little about it. I do not doubt, of course, that Mr. C. Brangwin Barnes came across the exceptional case he mentions; but I equally believe that he might walk from "Maidenkirk to John o' Groats" without finding such another, and most emphatically protest against the making of such a serious charge on such scanty evidence.

A large number of photographers, both professional and amateur, met in the London Hotel, St. Andrew Square, Edinburgh, on the evening of Thursday, the 6th inst., in response to the invitation of M. Hutinet and Professor Stebbing, of Paris, to witness a demonstration of the method of making enlargements on a gelatino-bromide paper manufactured by the former gentleman.

Of the simple apparatus employed and the method of development recommended I need say nothing, as they were fully explained in an article in this Journal of September 7, except, perhaps, that simple as the apparatus is it is more complicated than it really need be; and that any photographer possessing the most rudimentary knowledge of enlarging may, with an old packing-box, a few of the articles in daily use in his studio, and a little brains, construct for himself all that is required for the production of very perfect enlargements.

Professor Stebbing, who is a ready speaker, began the work of the evening by lucidly describing the apparatus and the method of using it, and incidentally alluded to the fact that M. Hutinet's object in these demonstrations was the introduction to the profession of his gelatino-bromide paper—a paper which, from the nature of the mechanical appliances employed in its production and other causes, was capable of giving, by the simplest means, enlargements sufficiently perfect to be ready for framing and delivery.

Judging from the specimens shown he did not claim more than was warranted by the results, as, with the exception of one—a large head—which had been a good deal worked up, they were just as they had left the washing water, except the usual gumming of the shadows; and they were certainly as beautiful, and much more valuable *as portraits*, than most of the highest class of wrought-up work.

Proceeding to the practical work of the evening: the first enlargement got an exposure of five minutes, as that had been the correct time with the same negative in Newcastle-on-Tyne the previous evening. It proved, however, to have been too much; the fact being that gas in England rarely exceeds seventeen candles, while that in Scotland generally, and certainly in Edinburgh, is always within one or two of thirty. The second experiment, from a negative of the Professor himself, which, from previous experiments, was known to require just double the time sufficient for the one first used, got six minutes, and on development proved to be most excellent. The enlargements are characterised by great brilliance, perfect purity in the high lights, and entire absence of the trace of greenish tint so often seen and objected to in prints on gelatino-bromide paper.

In reply to questions Professor Stebbing said that there was very little tendency to blistering in the paper, and none at all when cold water was employed; but that, when a blister did occur, if punctured with a pin it would disappear on drying.

At the request of some of the gentlemen present Professor Stebbing exhibited an ingeniously-designed and beautifully-constructed pocket camera for the production of negatives of about 3 × 2 inches for enlarging purposes. While primarily designed for long rolls of the sensitive films, so successfully manufactured by Professor Stebbing, it is also furnished with a dark slide for the exposure of dry plates. The lens is adjusted once for all, so that focussing is not necessary, and there is a "view meter" on the top by which the subject included in the picture can be at once seen. The rollers may be said to work automatically, and puncture the film between each picture, so that dozens of exposures may be made with no more labour or delay than the simple turning of a knob through a portion of a circle.

As a proof that "they do things better (or rather cheaper) in France," it came out incidentally that the cost of camera, lens, and tripod is just sixty francs (fifty shillings)—a sum which most certainly would not purchase anything like the work required to produce it in this country.

Dr. Thomson, in moving a vote of thanks to Professor Stebbing and M. Hutinet, simply gave utterance to the opinion of all present, when he said that the demonstration had been in every way successful. The process was so simple, and the results so satisfactory, that he was sure it would be at once adopted by all who wanted to make enlargements; and that the beautiful camera designed by Professor Stebbing was so well adapted to secure the end in view that he wished to get one for himself. The vote was passed *nem. con.*, and the gentlemen separated all apparently much pleased with the work of the evening.

JOHN NICOL, Ph.D.

THE THIRD CONVENTION OF THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

[From Our Own Correspondent.]

The afternoon session of the third day was devoted to the discussion of photography from an artistic point of view, and in this connection Mr. J. H. Kent, of Rochester, N.Y., the President-elect, was called upon to make some remarks, the President observing that Mr. Kent uses his light different from anybody else. In his exposition of this subject Mr. Kent, not having prepared himself to speak, did not believe he could say anything that would be properly understood by them.

"I cannot (he said) illustrate here how my method of handling light is done. Really, I do not see how any benefit can be derived from anything I can say. I may say while I am here, however, how my sunlight is arranged, and probably that will interest you; I also might state something in regard to positions and how I use screens for various kinds of effect. In the first place, I have a large light, consisting of a sunlight and a sashlight, as you all have. Then it is covered with ground glass, or a substitute for ground glass which is equivalent to ground glass. Underneath that are used muslin curtains, divided into sections, so that we can remove them if necessary; but the light is used under those two covers, the ground glass and the curtains, which makes a soft light, of course. We have no direct sunlight to contend with in that arrangement. I put my sitter around in different positions under the light, instead of in one, and having that fixed, I have my room quite clear of all my instruments or apparatus—clear of my screens, and my camera, and my chairs, and my rest, and everything. I place the sitter upon a platform so that we can get around the room anywhere, and it makes it convenient. If you find one lighting is not adequate, or not the best for the subject, you move into another position and try the light there. If you find it is not right, then try in another position. That is done instead of trying to arrange the light on the sitter from one point, understand. In a word, instead of moving the light I move the sitter. There is always some place where the sitter will be at his best, if you can only find that place. Get the sitter in the best position for the light, and then you will surely get his best expression and his best picture. That is about the way I manage my light. Of course, I always use my screen. That I keep in my hand to modify the light. I am liable to put the sitter in the middle of the room, under the centre of the light. If I do that, I gain on the effect I get by covering the head at the last, because the light will be too strong on top. If I do not do that I use the hand-screen. In all cases I allow for that—that is, for the effect of the light—otherwise I arrange by the different positions in the room I place him. The top-light I never pay any attention to under the screen. The question might be asked, and you might readily suppose that the exposure would be prolonged under all those covers. You naturally say, if you shut out all the light, how do you get such quick exposure? You know the first point when you develope the negative is the high light; that, of course, is exposed first, afterwards the deeper shadows. As you decrease the high light by the diffusion of light you increase the light in the shadows. In the sunlight the shadows are much darker than in a diffused light. If you take a person in the sunshine and you attempt to give time enough to get out the deep shadows, you would over-time the shadows. When you take them in a diffused light and lighten the shadows, you decrease the time of lightening the shadows, and the high lights will come out any way, and take care of themselves."

In reply to a question as to the height of his light at the lower end—

Mr. Kent said that where the side light intersects with the sunlight it was seven feet. The side light came up in this shape: starting two feet from the floor, it came up for seven feet; then at an angle of 45° with the top light. The whole light was about twenty-two feet long and about twenty feet high, so they could see he had a great deal of light. You go (he continued) into my sunlight-room with the heavens all on and it is very light. In the darkest day I have light enough to make a good negative. It has more light than most of you use. I will say here I have no use for, and I never would use, any opaque screens. I don't think they are ever useful, but always a damage. I suppose a great many of you use opaque screens, but really a transparent screen is very much better. You get a little light through them; and if you want to get a different effect—if you want to get a shadow—you had better move your subject away from your light, and you had better have a screen that tips and throws a shadow where you want to. Instead of having fixed screens, I always use a screen that will tip in that manner; so if there is too much light I throw this screen over, and that softens it down. Then I have upon the other side, next to the light, rather a high screen, with sliding curtains in it, that I can open a little if I wish, and shut off the balance of the light from there, so that these two screens are all that I use—one between the sitter and the light, and the other on the opposite side. The screen I use between the sitter and the light is an ordinary muslin screen, and the one on the other side is of a grey, neutral colour, so we get no reflections from it. It is not necessary to use white there or anything so dark as to cast a shadow more than is apparent when you look over the canvas. By the way, I never make any allowance for the difference between the apparent light and the effect produced upon the negative. I always expect, when I light a subject, that the negative will come out as it appears upon the ground, and if my negative will not do that I know nothing to go by, and I give it up. I cannot work negatives that will not do as they appear on the ground.

Mr. Hesler, of Chicago, followed with some remarks descriptive of his system of proceeding. He said:—

"When a sitter comes in to be posed I make it my object to study the face. I do not aim to make those stunning artistic effects that, if you have the subject in harmony, you can sometimes get. There are times and subjects that we can treat with fine artistic effect, but there are very few such opportunities in Chicago or anywhere around here. My aim is to make portraits and to study the face the moment I see it, read it over, see what view of it will give the best expression and make the most pleasant picture. After observing my light, and studying the person who desires a picture, I know in a very short time what position to place him in. If he has a big, projecting brow we do not want these heavy shadows, and sit him away from the light. If a man has light-blue eyes and not a projecting brow, I sit him pretty well under the light, so that the eyes may be brought out clear. I never use my reflectors, because they make a cross light, and also because, as I have seen in many pictures, they make the sitter appear to have a wall-eye. I do not know how to describe it otherwise. There are persons who have both sides of the face exactly alike. Of course there is a great variety in faces—some very much, and some less, distorted than others; and when they sit for their pictures the object of the photographer should be to study the face, and see what light will produce the most pleasant effect for a portrait. They all want good-looking pictures. There is hardly a person of whom you cannot make a good-looking picture if you study the points. In order to do it you must study faces wherever you see them, under all kinds of lights, bearing constantly in mind that in that way you will be able soon to tell very quickly in what position a person will produce the most pleasant portrait. When your sitter is in the chair do not manipulate him and twist him this way and that way until you make him nervous; some people will stand it, but many will not. Engage him in conversation, converse with him on something that will interest him, get him in the best possible mood, and at the same time watch the light and the pose of the head that will give the finest lines. A person cannot stand here, and have a good line here and another one there. Expose when the expression is right and most pleasant. Catch it in the shortest possible time and you will have a pleasant picture. I would rather give a man a good, pleasant picture than a first-class, exact picture, because it pleases him better.

The President then said:—

"I want to appoint a Committee for the coming year on the Progress of Photography. The first name that I shall mention is that of a gentleman to whom we are considerably indebted. I refer to Mr. J. Traill Taylor, the editor of the *Photographic Times*, of New York. The remaining members of the Committee are Mr. C. Gentile, of Chicago; Mr. G. G. Rockwood, of New York; Mr. Schleier, of Nashville, Tenn.; and Mr. F. W. Guerin, of St. Louis, Mo."

A collection was then made on behalf of Mrs. Fitzgibbon, widow of Mr. J. H. Fitzgibbon, and who is carrying on the journal established by her late husband, the *St. Louis Photographer*, under financial difficulties. The sum of 537 dollars was announced to have been collected, more being expected afterwards.

Mr. Dixon, of Toronto, said he had been asked by many for the composition of the developer he used; but it was already published in all the journals. It consists of—

Pyrogallic acid	1 ounce.
Oxalic acid	35 to 40 grains.
Water	8 ounces.
Liquor ammonia	1 ounce.
Bromide of ammonium	60 grains.
Water	8 ounces.

These two stock solutions are diluted by adding fifteen ounces of water to one ounce of each, and equal portions of the diluted solutions mixed together form the developer.

Some remarks then followed upon the preparation of the silver bath for printing and upon the making of chloride of gold; after which the Convention adjourned till the following day.

The business transacted on the fourth and last day was at first of a somewhat desultory and routine character, the topics informally talked about being the disadvantages of photographers making their own dry plates, and the net cost of plates when thus prepared.

Dr. Herman Vogel then addressed the meeting, as follows:—

"Ladies and Gentlemen,—We have sensitomers enough already in photography, but only a few which are usable, and which are for testing modern dry plates. There is a well-known sensitometer manufactured by Mr. Warnerke, of England. His sensitometer has a screen of different thicknesses of coloured photographic paper. One, two, three, four, five are laid one upon the other, and in this way we have the scale. This scale shows different thicknesses, and for this reason different degrees of transparency. No. 1 is very transparent; No. 2, which has two thicknesses, is less transparent; No. 3, still less; No. 24, the least. In this way you expose the dry plate to this screen of one degree a certain time—say twenty seconds—and you develope the plate, when you can observe which number will be developed, and if the highest number is developed you will be able to observe it, and then you have an idea of the sensitiveness of the dry plate. The only difficulty here is you have no idea as to what is No. 10, or what is No. 12, or what is No. 20 in any case with the sensitometer. This will give the proportion between different quantities of light which penetrate the film the same as by the instrument of Mr. Warnerke. Mr. Warnerke has made his instrument for estimating the quantity of light which is going through the different layers of this coloured photographic screen, and he gives a list or table for the practical photographer. As for myself, I would say I have made experiments with Warnerke's sensitometer; and I have found that this instrument is in general a good one, but it has some imperfections. If you take any coloured screen and the light is faded (shaded) on the screen, the light itself is changed in its qualities. The blue light is absorbed by the film, and the yellow light is not absorbed, but when the yellow light is used it will be found to contain no more of the rays with which we are accustomed to work. You get quite a different result if you prove the sensitiveness of the dry plate by the sensitometer,

by taking pictures in less time. I give you an instance of two different plates which I proved with the sensitometer, and after the Warnerke formula, and I found that one of these plates was sixteen times more sensitive than the other. Now I made two pictures with the two plates, and I found the first plate was sixteen times more sensitive than the other. That is the strongest one, and the only reason is that the quality of daylight is quite different from those qualities of light which have penetrated the film of Mr. Warnerke's. For this reason I have thought that it was better to construct a sensitometer without any screen which could absorb and change the quality of light. Here you see such an instance [showing his model]. I show you first the fore side or front of my instrument, with a double plate like a stereo. box. You see on the right a plate, and on the left a plate—two plates. Each plate is divided into twenty-four portions or holes, drilled from one to twenty-four. This plate of brass with its different arrangement of holes is screwed on the wood block, and in this wood block a number of canals are drilled, each canal corresponding to a hole in the sheet of brass on the opposite side. Now if you look at this instrument upon the back side you will see these canals, or tubes, or holes, which are drilled here in the wood box, and observe how you have different quantities of light. In No. 1 you have the light admitted through one canal, giving you a certain quantity of light. If you have two holes you get double the light, and if you have the three it is treble, and so on, and in this way you have here the two sides of these different tubes illuminated in quite a different manner, but so that you can easily calculate how intense the light is from these different tubes from the quantity of holes drilled here in this brass plate. Now I have here on the other side a brass plate like the other, corresponding exactly in its different numbers, its holes corresponding with the tubes on this side, so that if I put here on this side a sensitive gelatine plate I can observe the effect of light upon the plate. I now close the instrument and bring it into the dark room and put it opposite to a white screen. I can make a white screen very easily by means of a sheet or a lot of photographic paper. I prefer the screen of photographic paper. Then I burn before the tablet on the instrument itself an inch of magnesium wire. In this way the screen is lighted. The light of the screen works through the holes of the plate, and if you develope the plate by-and-by you can easily observe which hole is developed, and you can determine it accurately by its correspondence with the holes drilled in the brass plate. So if I take two different plates, I get one plate, for instance, of No. 5, and with the other plate of No. 2; then I can say that No. 5 is more sensitive than the other in proportion to the numbers which are developed—that is, in the proportion of two to five. So I have an instrument which I think is of more advantage than the Warnerke instrument. I do not want any screen which is coloured, for that would change the quality of the light. Now I make an instrument like this [indicating]. I can thus prove two plates at the same time, which is a very desirable thing to do. I can also use it if I have no dark room. I have no dark room, so I put the screen opposite to the instrument and the screen is in the daylight. It is easily employed; the plate can be exposed one second or more, and each plate is exposed for exactly the same time and developed with the same developer. I will not go through the proportion of the sensitiveness of the two plates. You will excuse me, ladies and gentlemen, for my imperfect English, and I shall be very happy if you have learned anything from what I say. I have fully described my sensitometer, and given a drawing of it in my new book, *The Progress of Photography*, recently translated, and published in this country by my friend, Mr. Edward L. Wilson, of Philadelphia.

After a few general remarks the Convention was then adjourned *sine die*.

The 1884 Convention will be held at Cincinnati, under the presidency of Mr. J. H. Kent—Mr. Weingartner, of Cincinnati, being Secretary.

WHERE TO GO WITH THE CAMERA.

[It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

IVER, HERTFORDSHIRE.

I HAVE seen a few articles lately, on the above subject, in your valuable journal, but the places referred to are at a considerable distance. Now, Iver is a place easily reached by the Great Western railway, booking to West Drayton, at small expense. Several views and picturesque "bits" can be secured on the road from West Drayton to Iver, among others are one or two of a ford, through which vehicles and horses have to be taken; and for foot passengers there is a bridge erected on wooden piles. I was informed that there was good fishing to be had.

Iver is very prettily situated. The church is at the top of the hill, and below the river Colne flows (which divides Bucks and Middlesex), with an arched brick bridge over. Iver is very quiet and has quite an old-world aspect. The distance from West Drayton is about two miles. Near Iver is Stoke Pogis, and no doubt a tricyclist with camera, &c., could do a good day's work and obtain some excellent negatives.

I conclude with a couple of hints. For raising the plate out of the developing solution use a quill toothpick; the pointed part is easily inserted under the plate. Secondly, to dry a gelatine negative quickly, open the window, place the negative in a perpendicular position, and bring the window frame down so that the negative is fixed, and the air soon dries it. It is, perhaps, better to wipe the back of the negative dry before placing it in the window. G. T. GRAMMER.

Our Editorial Table.

PHOTOMICROGRAPHS, AND HOW TO MAKE THEM. By DR. GEORGE M. STERNBERG.

Boston, U.S.A.: J. R. OSGOOD AND CO.

Photomicrographs, and How to Make Them, is the title of a very handsome 8vo. volume from the pen of Dr. George M. Sternberg, Surgeon-Major in the U.S. army, and just issued from the press of James R. Osgood and Co., Boston, illustrated from the original negatives by the Heliotype Printing Company, of the same city.

Dr. Sternberg, who is well known as the translator of Dr. Magnin's work on *Bacteria*, and by his own researches upon the infectivity of certain of these minute organisms and the value of the so-called "germicides," has mostly addressed himself to beginners, and, although he insists chiefly upon the use of light from a clear, blue sky, or direct sunlight, which unfortunately is not always a gift in this climate, there is ample evidence of the value of his method of working.

Dr. Sternberg gives due praise to the work of Dr. J. J. Woodward, of the Surgeon-General's office, Washington, whose beautiful prints have been greatly admired in this country. We are glad to see the accepted definition of "photomicrography" is employed throughout the book. Success is stated to be largely dependent upon the proper selection of objects, and the use of suitable objectives. Beginners are counselled to commence with the light from a blue, clear sky and low powers, the instrument or apparatus being fixed at an angle of 8° or 10° from the horizontal, and a prolonged exposure given. In this way Dr. Sternberg, with a $\frac{1}{5}$th Zeiss dry objective, and $\frac{1}{18}$th Zeiss oil immersion, with instantaneous plates, has obtained photographs of "*Bacteria rubescens*" with half-an-hour's exposure. With high powers a sub-stage condenser is recommended; "an achromatic object-glass may be used for this purpose." In this country, except upon the most favoured occasions, we should, doubtless, have to largely increase the time of exposure. The removal of the eyepiece is recommended. For large amplifications the light from the blue sky is replaced by light from the sun, directed by the mirror of a heliostat properly fixed, the light traversing, as recommended by Dr. Woodward, a lens with a long focus, then a cell about half-an-inch in thickness, with parallel sides, containing a deep, blue solution of the ammonia-sulphate of copper before reaching the achromatic sub-stage condenser.

Full directions are given for placing the heliostat; and the focussing-screen, instead of being—as usually placed when using a special room as a camera—supported from the floor, is suspended from above, and a method is given for focussing at a distance from the microscope. There are also directions for placing the camera, mode of working, use of diaphragms, and exposure of the plate, followed by the method of development. All the negatives were taken by direct central light. There is a figure of a diatom as seen photographed when illuminated by transmitted light, and also by a "spot lens." The difference is so great few would take the figures to represent similar objects. An example is given of the use of reflected light, by a figure of the stellate hairs on the leaf of *Deutzia Scabra* under a low power. Dr. Sternberg speaks highly of the objectives of some of the London and German firms, as well as of those of American make. The frontispiece furnishes a figure of part of the apparatus. The price of M. Kubel's heliostat, with extra-sized mirror, is given at fifty-four dollars. In this country we believe the price need not exceed five pounds.

The second part of the work deals mainly with the description of the objects photographed, and in such a manner as to embrace "elementary lessons in biology." There are some excellent reproductions of the negatives by the Heliotype Printing Company; and we must speak in all praise of the beautiful rendering of plate xii., representing the fourth square of Möller's type plate of the *diatomaceæ* magnified fifty diameters by the half-inch objective of Powell and Lealand, the heliostat being used. One or two of the plates seem to us rather heavy in appearance compared to the work usually seen in this country, and lack the brilliancy of a silver print; but the figures fully illustrate the value of printing in photomicrography.

In another edition it is to be hoped the author may be enabled to give us his fuller experience with the use of artificial light, which, in our climate, we feel sure must compete with sunlight; though from a comparison of plate xvi. of *Navicula lyra*, taken with a Zeiss $\frac{1}{8}$th dry objective, a Tolles' amplifier and heliostat, with a silver print of the same diatom, by a distinguished photomicrographer, taken by artificial light and a $\frac{1}{16}$th immersion objective, the beauty of the detail is in favour of the former method. In the upper figure of *Triceratium*,

late xiii., the phenomena of interference is unfortunately too evident, and is often very troublesome to eliminate in sunlighted photographs of diatoms.

There is little to condemn and much to praise in the book, and the author is to be complimented in his efforts to advance this interesting branch of photography and microscopy.

PHOTOGRAPHIC COLOURING. BY MISS TWYMAN, 4, QUEEN'S SQUARE-PLACE, QUEEN'S SQUARE, BLOOMSBURY.

WE have had submitted to us a number of specimens of coloured photographs by Miss Twyman, whose work includes almost every class, from the delicate miniature to the life-size painting upon canvas. Nearly every basis upon which it is possible to work is represented, from the silver print tastefully painted in water colour to the carbon enlargement finished in oil; while even the lowly collodion transfer appears in a garb under which few of its closest friends would recognise it. No matter what the basis upon which the work is done, the result is a painting and not a photograph; the colouring subdued and harmonious—equally removed from vulgar brilliancy on the one hand or sombreness on the other. One picture which strikes us, by the clever manner in which it has been improved in the painting, is a portrait of a lady, from which a pair of too obtrusive arms—intensified in their obtrusiveness by the camera—have been carefully removed. Another, an enlargement of a child finished in oil upon carbon basis, from a picture we have previously seen, is remarkably good, as are also the life-size enlargements on canvas.

RECENT PATENTS.

APPLICATION FOR PATENT.

No. 4,348.—"A Combined Roller and Wrapper for the Transmission of Drawings, Unmounted Photographs, Music, and other Articles." E. E. MERRICK.—*Dated September 11*, 1883.

PATENTS GRANTED IN ITALY.

"Paper for Photographic Positives and its Manufacture." C. CROS and A. VERGERAUD, of Paris.—*Dated June* 6, 1883.

"Photo-Engraving for Reproducing Designs." P. MAGGI, of Turin.—*Dated May* 19, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 20 ..	London and Provincial	Masons' Hall, Basinghall-street.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Association, held on Thursday, the 6th instant, the chair was occupied by Mr. W. E. Debenham.

Mr. A. COWAN said, with reference to Mr. Henderson's statement at the previous meeting that greater rapidity was shown with plates developed in a weak solution, he had experimented in the opposite direction without causing any slowing influence. He had made up a developer to four times the usual strength, and it had brought up the same result in twenty seconds which accrued upon another equally-exposed plate, after being kept for the usual two minutes in a developer of the ordinary strength.

Mr. A. L. HENDERSON referred to a solution which Mr. Haddon had introduced at a former meeting, and which that gentleman considered to be green fog in a liquid state. He had mixed some of this solution with gelatine and coated a plate (produced), which certainly looked very like green fog. There was a clear spot in the plate, which had resulted from its having been subjected to the influence of a certain re-agent, which he would name upon another occasion, as his experiments were not yet complete. If Mr. Haddon's solution was identical with green fog, then he thought that he had a complete remedy for it; but in that case green fog was not, as it had been stated, a silver compound, as he would be able to prove by the action of the re-agent which he had employed. One portion of the plate that had been immersed in a solution of fresh hypo. had somewhat changed in colour, and become rather more purple in tone.

Mr. A. J. BROWN thought that Mr. Haddon's solution was really green fog.

Mr. COWAN and other members were of the same opinion.

Mr. HENDERSON said that there was no silver in the solution. Another point was that green fog, as they found it in gelatine plates, did not exist until produced by the action of a developer. Without stating precisely what was the re-agent used he would say that it was a gas.

Mr. A. Haddon inquired where the silver which he had employed in making the solution had gone to, if it were not still contained therein. There was very little deposit in the flask in which it had been made. As to green fog resulting only after development, it must be remembered that the sugar heated with potash, as it had been, acted similarly as a reducing agent.

The CHAIRMAN said that, unless they were told what was the re-agent which Mr. Henderson had employed, they were not in a position to judge for themselves as to whether it did, as that gentleman stated, prove the absence of silver from the stain which resembled, and which he (the Chairman) believed was identical with, green fog. He certainly thought it probable that the experiments which Mr. Haddon had instituted would result in the discovery of the cause, constitution, and, probably, of the remedy for green fog. To this desirable end the knowledge and effects of any re-agents upon the substance—when Mr. Henderson felt at liberty to disclose it—would all tend.

Mr. W. H. PRESTWICH said that Mr. Jarman had a scheme for utilising the electric light for printing purposes which he would explain to the meeting.

Mr. A. J. JARMAN said that with the usual arc light, if the negatives were brought very near in order to get its full effect, there was danger from heating and unequal illumination, while the space available for presses was very limited. He proposed to fit up a light with reflectors above and below; the negatives would then be placed nearly upright around the space between the two reflectors. The light he proposed to use would be generated by a current of high tension, giving a blue, actinic light—not such as would be used for visual purposes. To get this light he would employ a machine giving 150 volts and eight or ten ampéres.

Mr. BROWN inquired whether the colour of the arc did not greatly depend upon the terminals used.

Mr. JARMAN replied that it did to some extent. By plating the carbons with zinc instead of copper the light was increased twenty per cent., and was whiter in character. The electric light of course would always cost something, and daylight could generally be had for nothing; but where it was important that work should be carried on regularly, without having to depend upon the uncertainty of climate, there was sometimes immense advantage in the use of the electric light. The Direct Photo.-Engraving Company were now employing it, and could do three times the quantity of work that they did when depending upon daylight. In three hours from a sketch being brought to them the block was ready. He thought that a light fitted up as he proposed would be active enough to keep two printers at work.

Mr. F. W. HART knew of a gentleman who formerly used magnesium wire, and now employed the light from incandescent oxide of magnesium for trade photographic purposes.

The CHAIRMAN said that a current such as that described by Mr. Jarman would be the best form of electric light for portraiture.

Mr. JARMAN doubted this, as the character of the light was such as to produce the greatest effect upon the iodide and chloride of silver, and not upon the bromide, which was sensitive to other radiations.

The CHAIRMAN believed that any difference that might exist in this respect had been enormously exaggerated, and that it would be found that the light, which was most powerful for printing, would be also most powerful for portraiture. He inquired what amount of horse-power would be required to produce the currents referred to by Mr. Jarman when speaking of keeping two printers employed.

Mr. Jarman thought probably two and a-half horse power. If the members chose to appoint some evening to come to his works he would be pleased to show them a more usual form of arc light, as the high tension apparatus was not at present complete, and they might bring negatives and paper with them with which to make experiments.

The thanks of the Association were tendered to Mr. Jarman for his offer, and Monday evening last, the 10th instant, from 7 to 9 o'clock, was fixed upon for the visit.

THE POSTAL PHOTOGRAPHICAL SOCIETY.

A COMMITTEE meeting of this Society was held on Tuesday, the 4t instant,—Dr. Horace Day in the chair. After the minutes of the previous committee and general meetings had been read and confirmed, the following members, who had since the last meeting been provisionally admitted by the Hon. Secretary, were declared duly qualified and elected:—Messrs. A. Bryans, Lieut. E. C. T. Hawker, R.E., Geo. Brydges, G. S. Wilson, A. R. Dresser, S. S. Partridge, Thos. Blake, G. H. Hadfield, H. G. Clarke, A. Youngman, R. Leventhorpe, H. W. Fell, H. Noel Malan, J. R. Canning, J. R. Young, P. Mathewson, and Miss A. Tylor.

It was resolved that the Hon. Secretary be empowered to demand a specimen of the work of each future candidate for election, authenticated by his signature.

The Rules for the Society's Competitions were settled as follows:—1. All work sent for competition must be member's own work (that is, taking the negative, developing, printing, and toning), and must be "noted" and signed. Double printing, spotting, and retouching are allowed only if done by exhibitor himself, but must be stated and signed by the exhibitor on the note form; and the Committee reserve the right to themselves (should they deem it necessary) of examining the negatives of winning pictures previous to giving the prize.—2. The prizes are to be decided by the votes of the members; their value to be determined by the Committee according to the available funds and quality of the work sent in.—3. Each member may send three exhibits in each class. The same pictures may not compete twice. Pictures must be mounted, but not larger than "half royal." Each collection of competition pictures will circulate among the members according to a list prepared by the Hon. Secretary.—4. An entrance fee of 1s. 6d. in each class to be paid by exhibitors in competitions.

The Competition (No. 6) was fixed for April 1, 1884, in the following subjects:—Class I. The best set of four quarter-plate pictures (any subject) mounted on *one* card. Three such cards of four pictures admissible from each competitor.—Class II. Portrait or group.—Class III. "Winter Subject" (view or figure).

The pictures sent for Competition (No. 4) were then inspected, and the prizes were adjudged to be of value:—Class I. Old house or cottage. 1st, 15s. and entrances; 2nd, 10s.—Class II. Marine, lake, or river view. 1st, 15s. and entrances; 2nd, 10s.—Class III. Pictures sent for Pall Mall Exhibition. 1st, 20s., with 1s. 6d. out of each entrance added; 2nd, 10s. The other shilling of this entrance fee to go towards the expenses attending the exhibition of these pictures.

Pictures by Messrs. Adcock, Tindall, Bankart, Withall, Cunningham, Roome, Leigh, Allison, Watkins, Mathewson, and Dr. Day were selected to be exhibited in the Society's name, and duplicates of these were required to complete the collection previous to its circulating among the members.

A grant of 10s. was made under resolution 10 of the meeting of 11th May.

LEEDS PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held on Thursday, the 6th inst.,—Mr. Washington Teasdale, President, in the chair.

A paper on *Some Notes on Hydrokinone Developers* [see page 542] was read by Mr. H. Pocklington. After the reading of the paper,

The Chairman said that since the introduction of gelatino-bromide dry plates two distinct modes of development had been used—the alkaline pyro. and the ferrous oxalate—each with special merit and protean phases of variety. Now a third, suggested by Captain Abney, claimed a share of their attention, and he trusted those who had the opportunity would subject it to the rigid experiments pyro. developer had gone through. Two or three points appeared to him to require deciding before any opinion could be passed upon it.

Mr. J. W. Ramsden had made a few experiments with it, and, although it was a more energetic developer in his hands than alkaline pyro. with bromide as a restrainer, yet it possessed no advantage when tested against pyro. and carbonate of ammonia without bromide.

Mr. Rodwell had also tried some of the formulæ mentioned and got good results, but not such as to suggest the desirability of using it in place of pyro.

Mr. T. W. Thornton admitted that good results could be obtained by the use of hydrokinone, but did not in his own experiments find any advantage, and had not heard anything that would cause it to supersede pyro. It appeared to him that on all points the balance was on the side of alkaline pyro. It was cheaper, and the development could be completed in less time. Negatives were constantly being produced by pyro. with clear glass for shadows and free from stains, while, on the other hand, the negatives he had seen developed by hydrokinone were not superior in any sense to those developed by pyro.

A number of very fine instantaneous seascapes were exhibited by Mr. Durham, taken on Wratten and Wainwright's plates, by the phœnix shutter. A number of very good landscapes were also shown by Mr. Rodwell, taken on plates of his own preparation. Mr. Thornton gave the results he had obtained by the insertion of double-concave and double-convex spectacle lenses in a rapid rectilinear, as suggested some years ago in The British Journal of Photography, and he strongly advised the members to avail themselves of the suggestion.

The meeting was shortly afterwards adjourned.

Correspondence.

THE RECENT COPYRIGHT CASES.

To the Editors.

Gentlemen,—Referring to the recent articles in your Journal on the copyright question, will you please allow me to state that I have not intentionally sold photographs knowing them to be copied from registered portraits, or from originals in which a copyright was claimed. I am not myself a photographer and do not own a single negative, nor have I ever had such in my possession; so your readers may form their own judgments as to the correctness of the statement of one witness (himself a photographer) who declared that when on my premises he saw a large number of *negatives.*

All the photographs in dispute (with one exception) I bought from London publishers without any knowledge as to their being considered infringements, and judgment was given in my favour on this ground. The exceptional photograph was one of the Australian cricketers, which I admitted having had copied; but, even in this instance, I consider little blame could be attached to me, as neither on the photograph itself nor on the card on which it was mounted was there even the name of the photographer or publisher, much less any intimation that it was a copyright picture. It appeared to be one of the many reproductions (of foreign or non-copyright photographs) which are published and sold as originals.

Further: I gave up the sale of all the portraits said to be infringements immediately on being informed of this. I also made efforts to have the dispute settled amicably; but, as the only way to have the action withdrawn was by the payment of a large sum of money, I had no alternative but to place the case in the hands of my solicitors, Messrs. Eddison and Eddison, Leeds, with the result which is now so well known.

The learned judge, Mr. Justice Field, was evidently fully satisfied that I had not intentionally wronged the plaintiffs, and that I had offered to give every reasonable assurance that the interests of the trade required; for, in reply to the counsel's remarks respecting the co which were allowed me, his lordship said:—

"I see no reason to alter the rule. My invariable rule is for the costs follow the event. In this case there is the more reason for this becaus do not think the defendant was a fraudulent infringer. I did not think at the time. I thought it was not necessary to have pressed the acti forward as much as it was pressed. I tell you that honestly. I thou you might have been satisfied with the suggestion I made on the first d of the hearing, but I suppose your clients thought otherwise."

From a moral aspect there is, therefore, something to be said both sides; and it is more than probable that in many previous case where heavy damages have been obtained, they have been out of proportion to the merits of the case, while many of those who ha paid sums of money rather than incur the costs of a lawsuit have bee innocent of any intentional wrong. It may be justifiable for what a considered trade interests to be defended; but surely there cannot any justice where publishing firms "*look* to piracies as an establish source of income." That this is so, however, is distinctly stated i your contemporary on the 10th November last.

On the other hand, among the firms who complain loudly of the so called piracies there are those who do not scruple to copy any portra which they can sell with impunity. *Since the recent trials* I have myse been offered a large assortment of copied photographs by a publishe who was amongst the first to promise a subscription towards the pro posed "Photographic Copyright Association," and who was one of th members of the provisional committee. To make the matter worse these were from originals by a firm for which he professed to be actin as sole agent. The representative who offered the copies did not disput they were such, but simply remarked—"If *they* had not copied the some one else would."

As to the legal point on which the judgment was given some very absurd opinions are prevalent. One of your correspondents argues tha the person who conceives the idea (!) of having the portraits taken i the author, and for this *brilliant* conception he is to be rewarded by th law with the protection given to genius and authors, in preference t the man who actually designs the work and, it may be, also execute it. He cites Sir Christopher Wren as an illustration, forgetting tha probably Sir C. Wren did not first "conceive the idea" of building th cathedral, but when the cathedral had already been decided upon h would be asked to design *how* it should be built. The artist, therefore who *designs* how the photograph shall be taken, and directs the variou operations, &c., is in the same position as the architect of a building, and not those who "conceive the idea" that it would pay them to publish the portraits.

In the recent action, however, those who were entered as the authors did not even know that such a photograph was to be taken, as it was shown by the evidence that the actual person who "conceived the idea" of taking it was neither the employer nor the actual artist, but the *manager* of the firm.

With respect to the copyright itself: the opinion of the best authorities I have been able to meet with is that the present Act was not intended to include photographic portraits from life (the trade in which is comparatively of recent growth), but merely such as photographs from paintings, landscapes, or similar pictures, in which there can be no doubt as to the right of such monopoly. With portraits, however, it is very different; for the saleable value is not so much in the skill of the artist as in the popularity of the person whose features are represented, and certainly he or she has the right to say what shall be done with his or her own portrait. In the vast majority of cases this is so at present; for if the sitter pays anything for the portrait he or she is the proprietor of the copyright, if such exist. Where, however, in answer to a request that the photographer may be favoured with a sitting a person does grant this privilege, it is claimed that he or she has then no control whatever over the sale of such portraits. The sitter is at the mercy of the photographer, and cannot prevent the portrait being sold, however obnoxious that sale may be; while if, perchance, he or she should, under any circumstances, order another photographer to make copies of his or her own portrait the photographer is liable to be prosecuted for piracy. The absurdity of such pretensions needs no comment.

If anyone is willing to give an artist the sole right of selling his or her portrait, the artist has a perfect right to do so; but, clearly enough, this power should be vested in him. If this be recognised by the law, it may be that the monopolies which a few large firms have hitherto enjoyed would be to some extent interfered with; but the real interests of the great bulk of the trade would be more benefited than otherwise. The public, too, who have certainly some share to a consideration, would be likely to receive a benefit in the shape of a reduction in prices.

The cabinet views published by such firms as Frith, Wilson, Poulton, and others, which are as large, and often larger, than cabinet portraits, and certainly equal or superior in quality, are sold at one shilling each, whereas the ordinary price for cabinet portraits of celebrities is two shillings each. Such a fancy price as this could not be maintained if they were fairly open to competition; but with cheaper prices an immensely larger number would be sold, and so the interests of photo-

phers would be made more valuable by the increased demands for eir productions.

Apologising for trespassing on your space, and thanking you in anti- ation,—I am, yours, &c., JOHN H. JACKSON.

New Wortley, Leeds, September 10, 1883.

MARKINGS IN GELATINE PLATES.

To the EDITORS.

GENTLEMEN,—I have only just now seen Mr. William Brooks's letter the above subject in your issue of August 31st.

Mr. Brooks seems to have been misled in his conclusions about markings I described in consequence of a typographical error my letter which I had forgotten to correct. In print it ap- ared as "*hair-like*," but in my manuscript it was "*brain-like*" rkings; so that Mr. Brooks's first paragraph does not apply to the ect I described, but from the second paragraph it is clear that he experienced it. It seems questionable, however, whether his ex- nation of the cause be the correct one, and for this reason, namely, t I used to be more particularly afflicted with it in the old days pyro. and acid silver development, if not even as far back as in iodide plates.

may, at the same time, refer to Mr. W. H. Stillman's allusion to tain markings; but if they be similar to mine I can hardly accept explanation, as I have observed no "black precipitate" in the eloper when this defect is produced. The particular pattern of rkings may be readily recognised in the print I sent you with my t letter.—I am, yours, &c., G. S. PENNY.

Cheltenham, September 10, 1883.

SULPHO-PYROGALLOL.

To the EDITORS.

ENTLEMEN,—In reference to the remarks of the Platinotype Com- y, in their letter of last week, it was perhaps somewhat gratuitous my part to allude to their preparation at all; but certainly I did so illustrating a genuine difficulty I had met with, and not in any it of complaint. I may say the preparation I had from them was ained last year.

n further reference to their remarks, I have no objection to slow elopment *per se*. My own experience and knowledge, gained from ling (and a great part of my knowledge has been so gained), lead me prefer slow development, as giving greater safety and more excellent ults. But slow development with pyro. too often means green fog, it is owing to this that my sulpho-pyrogallol has lain so long on my ds, preferring the simplicity and safety of iron development.

his brings me to the subject of my previous letter—the complexity he present formulæ for pyro. development as sent out by different kers. All their plates may be developed with ease by the ordinary developer; who, then—in the absence of any imperative reason— ing to use plates of different makers, would contend with complex . formulæ when iron pure and simple is the key to them all?—I am, rs, &c., JOHN BATE.

eptember 11, 1883.

A TEST FOR IODIDES AND BROMIDES.

To the EDITORS.

ENTLEMEN,—I have not seen the following test mentioned before, I am not aware whether it is new or not. I should like you to try nd if you think it of sufficient interest to your readers perhaps will be good enough to report.

distinguish a soluble iodide from a bromide, either metallic or line, make in a test tube a weak, boiled solution of starch and let ol, and in another test tube place a weak solution of permanganate otash. Add a drop or two of the starch solution and the same itity of the permanganate of potash solution to the liquid suspected ontain an iodide, when, if an iodide be present, the pink colour of olution will turn blue.

is is an exceedingly-delicate test.—I am, yours, &c.,

South Silver Street, Aberdeen, September 7, 1883. JOHN LAMB.

PHOTOGRAPHER AND ARTIST.—A CAUTION.

To the EDITORS.

NTLEMEN,—There may be no novelty in the following statement of , but as a useful lesson may be derived I think it right to send this munication for publication.

few weeks since I received a commission for a large portrait in oil rs, the price of which was sixty guineas. I employed an artist had done similar work for me for the last ten years (six years of ime at a salary in my own place). The portrait was finished, oved, and paid for. During the progress of the painting it was sary for the artist to go to the house of my client to take sittings, knowing the advantage this gives in obtaining further commis- . I remarked to the artist to that effect, and also said—"of course all further orders will have to be done through me," and the artist replied, in the presence of a witness—"of course all portrait work will be yours." All this ought to have been put into writing, but I thought the word of the artist sufficient.

Very much to my surprise I discovered, a few days since, that the artist had received direct from my client an order for the companion picture. The artist was so far honest that he has offered me *a commission* on the work he is doing, and this, I consider shows clearly that he had no *moral* right to take the order direct. This, I maintain, is not sufficient. I contend that if the artist had offered as much commission as my profit had been on the first transaction, that the business ought to have been done through me alone, and that the artist ought, at once, to have told my client that he could not take the order direct.

It will be seen, then, that if cases of this kind are to be tolerated a photographer—who must necessarily keep up an expensive establishment, without which the client could not obtain what he wanted—may employ his time in getting first orders, and the artist, who has none of the expenses referred to, may reap the advantage of the photographer's clients' orders. I should like to ask where the fairness of this is to be found. The case is similar to that of the *producer*, the *agent*, and the *buyer;* and, as far as I know, any dealing between buyer and producer without the intervention of the agent who obtained the first order is not tolerated in commercial circles, and I do not see why it should be in artistic circles.

Of course I ought to have protected myself by having a written agreement; but I should like to ask whether such agreements are usual between photographers and artists to protect the interests of the former.—I am, yours, &c., PHOTOGRAPHER.

September 10, 1883.

[We should hope that such cases as our correspondent refers to are uncommon, otherwise it would become impossible for photographers to carry on business in which they are at present compelled to employ artists. Too much cannot be said in condemnation of the course taken by the artist referred to.—EDS.]

ON THE FUNCTION OF THE STOP.

To the EDITORS.

GENTLEMEN,—Although I am loth, even were you willing, to start anew the much-vexed question of depth of focus, and all the more that I think Mr. Debenham's views upon that subject may be accepted as sound by the most fastidious and hypercritical, yet must I protest, in the interests of all who value reason more than fallacious argument, against such *dicta* as those of Mr. W. K. Burton (on page 517 of your issue dated August 31, 1883) obtaining currency.

The function and properties of the stop, and the phenomena consequent upon its introduction, have not been sufficiently closely studied nor frequently enough explained to prevent such views as Mr. Burton has—if he has correctly expressed them—from being extremely liable to mislead many who may be desirous of gleaning stray facts from the harvest field of knowledge.

I am very unwilling to misapprehend or put any misconstruction upon Mr. Burton's words, and therefore, at present at all events, I will confine myself to pointing out those of his statements which I consider have the greatest angle of deviation from the normal of truth, in the hope that, upon deeper study of the question, he will of his own accord considerably modify either his opinions upon this subject or their expression.

Mr. Burton, replying to Mr. W. J. Stillman, says:—

"* * * I make the following statements:—First, no photographic lens, unless it be occasionally used for axial rays, or portrait lens is without spherical aberration. Second, in every lens which exhibits spherical aberration the result of inserting a stop is to alter the focal length. * * * Fourth, in a lens which exhibits spherical aberration the result of inserting a stop is always to make the plane of maximum sharpness a different one from the one which was of maximum sharpness before the stop was inserted. Taking the first statement as an axiom—and I think no one will deny it—the second and fourth are as capable of mathematical proof as a proposition of Euclid."

Let me, in conclusion, suggest that the following list of queries might, if carefully thought out and tested, do more to further an intelligent comprehension of the various powers of lenses among photographic amateurs of optics and sciography than reams of mathematical formulæ and geometric diagram.

Are *any* lenses free from spherical aberration? Is it a fact that the *only* possible exception to a photographic lens being spherically aberrated is its being occasionally used for axial rays? If another exceptional case be possible, what is it? If no spherical aberration were to exist would a stop give greater definition? What, here, would be the result of shifting the focussing-glass? Is the focus of all the axes, without exception, changed with the insertion of the stop? If a point on the principal axis were focussed would the insertion of a stop alter its focus absolutely? When photographers focus do they invariably select a point upon the principal axis? Does the careful focussing of a point on a secondary axis and then inserting a stop alter what is, properly speaking, the temporary focal length of a lens, *in situ*, acting

on a fixed anterior conjugate focus? If a point on the principal axis were on the plane of maximum sharpness to begin with, would the insertion of a stop render that plane actually less sharp than another? What is the precise action of a stop? To what extent does it modify the law that a ray traversing a uniform medium does so in a straight line?—I am, yours, &c., HUGH BREBNER.

Edinburgh, September 4, 1883.

THE ALUM CLEARING AND INTENSIFYING SOLUTION.

To the EDITORS.

GENTLEMEN,—I have, since your last issue, tried the clearer and intensifier described by Mr. B. J. Edwards. I made it, as per formula, of alum, protosulphate, and citric acid, and while I find it a splendid clearer, I get no intensifying action on the addition of the silver solution.

Perhaps if you publish this communication the replies drawn forth would be of service to others as well as myself.—I am, yours, &c.,

Walton New Road, Stockton Heath, H. N. HOUGHTON.
Near Warrington, September 12, 1883.

EXCHANGE COLUMN.

50-inch Timberlake bicycle in exchange for anything useful in photography.—Address, A. J. B., 17, Hindon-street, Pimlico.

Fry's Kingston special plates, sizes 12 × 10, 10 × 8, and 8½ × 6½. Wanted, Seavey's backgrounds.—Address, M. Field and Son, Maidstone. See advertisement.

What offers in exchange for about twenty-four dozen good negative glass, half- and whole-plate.—Address, J. PIKE, 43, Northcote-street, Westgate-road, Newcastle-on-Tyne.

Letts's popular Atlas, now published at 42s., splendid condition, complete in case. Will exchange for half-plate camera or lens by good maker.—Full description to F. A., 4, Lyndhurst-road, Chichester, Sussex.

I will exchange a *carte-de-visite* rolling-press, 12 × 10 rocking bath, gem camera with two lenses, and cameo press, all in good condition, for a good quarter-plate, bellows-body camera and lens, or anything useful.—Address, J. MEADOWCROFT, 7, Back North Parade, Underbank, Bacup.

Square bellows camera for studio, with two London-made best single backs, in exchange for good, short-focus *carte-de-visite* lens. Surplus copies of Bigelow's *Album*, Robinson's *Pictorial Effect*, Burrows' *Retouching*, Wall's *Colouring*, and *Autotype Manual*. Offers invited.—Address, WYLES, Southport.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

John Bennett Russell, King-street, Kirkwall, Orkney.—*Four Portraits of the Rev. Walter Taylor.*

H. B. HARE.—We will keep the matter in mind, and probably have an article on the subject shortly.

Q. R. Y.—You had better write direct to Dr. Liesegang, Dusseldorf. He will give you the desired information.

LONDON, N.—There is much to be said on both sides of the question. We shall probably have an article on the subject shortly.

DRY PLATE.—1. No.—2. If you follow the instructions, as you say you have done, you should obtain the results given in the manual.

MESSRS. NEGRETTI AND ZAMBRA.—We have received from this firm Herr Steinheil and Son's *Catalogue of Photographic Lenses and Prisms.*

A. J. W.—Almost any lithographic printer will let you have a little ink and varnish to experiment with. You will not succeed in making it for yourself.

OPTIC.—Any working optician will supply you with spectacle eyes of almost any foci from three or four inches up to about three feet. He will also supply you with concave lenses of different curvature.

EBERT GOODWYN.—Yes; by inserting a concave lens in the centre. You will have to determine by experiment the one most suitable. Get three or four of different curvature, and try which produces the length you desire.

J. O'MAILLEY.—The best information that has been published on the subject in England is that contained in the series of articles, by Mr. Thos. Bolas, F.C.S., which appeared in our volumes for 1878-79.

J. BERRYMAN.—So much has appeared in our pages on the subject, during the last year or so, that nothing more remains to be said. Manufacturers will, of course, continue to use their own discretion in the matter.

D. B. J.—The transparent spots are caused by air-bubbles adhering to the plate during the developement, and so protecting the film from the action of the developer. They may be removed by passing a camel's-hair brush lightly over the film as soon as the developer is applied.

JOHN COUGHLIN.—Your best plan will be to prepare the plates yourself specially for the purpose. Very slow plates will answer best. With some plates the ferrous oxalate developer will give the clearest shadows. This is a great desideratum in negatives to be used in photolithography.

O. P. Q.—Highly-albumenised paper prints are very prone to crack as they dry, particularly if they are allowed to curl up and are made very dry. The best way of avoiding the trouble is to dry them between blotting-paper, so that they may be kept quite flat until they are mounted.

J. LUCAS.—A skilful operator experiences no difficulty whatever in judgin the effect of his lighting, either in the case of portraiture or landscap and we doubt very much, if he were to adopt your suggestion, wheth he could judge the effect nearly so well by looking through a colour glass at his subject.

A. JOHNSTON.—The spots arise from the film not being thoroughly fr from hyposulphite of soda when the negative was varnished; hence th silver paper has produced a stain in some places. If you examine th varnish carefully you will find the surface reticulated or cracked, cause by the expansion of the gelatine beneath.

COLLODION.—You can procure plain Saxe or Rive paper at any photographi warehouse. The sample of paper you enclose is quite a different thin that being an ordinary printing paper, and not suited for photographi purposes. If the paper be sensitive enough—such as was used in th experiments referred to by you—a condenser is unnecessary.

H. WATSON.—The crystals of nitrate of silver being of a slightly-dar colour is no detriment to it. You certainly had no real cause to retur it to the dealer, especially without trying it. At one time nitrate o silver discoloured by light—as your sample appeared to be—was muc sought after by some persons for making their negative baths, it bein claimed for it that it gave better results.

W. D. CLARK.—The spots, or yellow patches, in the prints are due t sulphuretting. Probably, in fixing them, air-bubbles have been allowed t remain in contact with the paper, or perhaps the prints were allowe to adhere together while in the fixing bath or in the first one or tw washing waters. In future keep the prints in motion all the time the are in the hyposulphite solution and in the first washing water, and se that no air-bubbles are adherent.

IN TYPE.—Among other articles we have been compelled to leave over til next week are our leader on *Photomicrography*, and Mr. H. S. Starnes article *On the Representation of Colour by Tone.* Part II.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the meeting of this Club, on Wednesday next, the 19th instant, the subject for discussion will be—*What is the Correct Proportion of Gelatine to Silver in a Gelatine Emulsion, and what is the Effect of Increasing the Proportion?*——On Saturday afternoon next an outdoor meeting will be held at Kew, the members afterwards meeting at the King's Arms at six o'clock.

THE PHOTOGRAPHER'S MAN.—At Worship-st. Police Court on Monday last, H. Bunting, photographer's assistant, was charged with being drunk and disorderly and annoying foot passengers.—Police-constable 416 H stated that on Saturday evening he saw the prisoner follow a respectably-dressed person, seize hold of him, and pull him into the doorway of the establishment of his employer, who was a photographer. He was pulling the person in question into the house in order to make him sit for a photograph, and the gentleman was exclaiming "I don't want my likeness taken." The witness stated that he had received many complaints from respectable persons of this conduct on the part of the prisoner. When people passed the shop who were likely subjects for a photograph the prisoner followed and solicited them to go in. When charged at the police station the prisoner said he did this by order of his master, who had instructed him that whenever a sailor, or a navvy, or such like passed by, he was to "make on to them." The prisoner said there was some work going on near the shop in connection with a new railway, and he was trying to get as many customers as possible on the Saturday afternoon. He denied using any violence to the person in question, who did not appear to give evidence against him. The prisoner's employer said the policeman had some private enmity against witness and his man.—Mr. Bushby said if any persons appeared and complained to him of the prisoner's annoyances about photographing, he should order him to find sureties to keep the peace.—The prisoner was now discharged.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For the Week ending September 12, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Sept.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
6	30·03	W	52	50	—	59	45	Hazy.
7	29·91	W	56	51	95	63	49	Cloudy.
8	29·86	W	56	55	99	64	52	Raining.
10	30·07	S	60	55	—	67	54	Overcast.
11	30·00	NE	57	57	—	61	55	Raining.
12	30·19	N	59	57	99	70	55	Overcast.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1220. Vol. XXX.—SEPTEMBER 21, 1883.

PHOTOMICROGRAPHY.

Having all things ready to hand and a suitable object selected—such as a good thin vertical section of a small woody stem, in which the vascular tissues are well seen—set it centrally on the stage, close up the camera and bellows, draw over all the focussing-cloth up to and over the stage, keep the eye fixed upon the image, and focus it carefully with (say) a two-inch objective. Now draw out the camera with the eye still fixed on the image; watch the alteration of focus and the increase of the size of the object. Very likely the object does not now appear quite centrally placed, so re-arrange it on the stage. Bring back the camera to the point at which the magnification seemed desirable, clamp the camera, insert in front of the screen the appropriate card diaphragm, turn the wheel of diaphragm apertures on the sub-stage, watch the increase and decrease of the brightness of the field, and the increase or diminution of the sharpness of the image; focus as sharply as possible the most delicate parts of the object about midway between the centre and edge of the image, using the focussing or Ramsden's eyepiece.

Now place the condensing lens or bull's-eye, with its flat surface, near to the lamp and centrally with the aperture in the hood, which should allow the lens to be placed, according to its focus, within two inches from the flame edge; its parallel or converging rays should be central with the aperture of the diaphragm, which is seen by noting that the illumination spreads equally round the aperture. Note the increase in brightness of the image, shift the bull's-eye a little both forward and backward, and see if the definition be improved; possibly the next smaller aperture of the diaphragm may be required, and a better focus may, perhaps, be obtained. Some objects appear to be best rendered by being within the cone of rays of the condensing lens; others by allowing the rays to cross before reaching the object; others, again, by the rays that reach the object being parallel; and most by shutting off the superfluous light that passes round the object, which can be done by fastening a piece of black paper with an aperture a little larger than the diameter of the object on the under surface of the slide, or by a pierced blackened card placed on the stage.

Take now a bit of card about three by four inches, cover each side with black velvet, and bend or cut the lower edge so that it will remain on the stem of the microscope when placed against the sub-stage, and effectually stop off the passage of all light from the lamp to the object. Leave it there, remove the focussing-screen carefully and insert the slide with its sensitised plate, cover carefully with the focussing-cloth, lift the door of the slide, pause for three or four seconds, then carefully and quickly remove the card and time the exposure—say ten seconds; replace the card, close up the slide gently and remove it for development of the plate; note the number of inches opposite the plane of the focussing-screen when replaced, again snatch away the card, and rapidly examine the image to see that there has been no misplacement of the same.

The development may be conducted under any approved formula. Let us suppose it is finished and perfectly washed, and that the image is imperfect in general sharpness or definition, but that in the ordinary use of the microscope there is a good image, it may be supposed that the visual and actinic foci have not corresponded. If the objective have been left over-corrected for colour, which is sometimes the case, the actinic focus will have been projected beyond the visual, and the objective will require to be withdrawn from the object by a turn, or parts of a turn, of the fine adjustment. Note the position of the index, turn backwards a certain number of divisions on the head of the focussing-screw and make another trial, and proceed thus until the actinic focus has been determined for that objective. To meet this difficulty Mr. Wenham and Mr. Hislop employed a low-power convex spectacle lens, turned down and centered in a cell that screwed into the back of the combination, which approximated the visual and actinic foci without any very appreciable loss in definition.

At present very many of the low-power objectives have these two foci so closely corresponding that no lens nor alteration of the fine adjustment is required. The negative will also show whether there has been any flare in the image, or unequal illumination, or false light reflected from any part of the interior of the apparatus. Whilst the apparatus is thus in place disconnect the microscope, insert carefully the lowest-power eyepiece, again connect the parts light-tight, bring the image to the same size as the previous one, note if it be displaced in any way (it should remain centered), clamp the camera, focus carefully, and, arranging as before, proceed to take another negative. The approximation of the screen to the source of light may compensate for the loss of light by transmission through the lenses of the ocular. Judge of this by the brightness of the field, and give the time for exposure accordingly; develope the image, and note, supposing the exposure to have been correct, if the resulting negative equal the other. Some advocate the use of the eyepiece; but all opticians consider that any lenses placed between the objective and the focussing-glass, or in the path of the rays issuing from it, deteriorate the image. This may not be very apparent when the two images are held up to the light side by side, though it may be so if a considerable enlargement have to be made.

Having gained some experience in the use of the two-inch objective let the student repeat other experiments with the one-inch, selecting another object. A well-prepared tongue of the blow-fly is a very favourite one for illustrating the defining power and the flatness of the field of this objective. He should not attempt any higher power until success is obtained with this one. Then pass to the half-inch objective; here the correcting collar or adjustment usually comes into use and requires attention. Choose another object, such as a well-made transverse section of bone or of the tooth of the eagle ray, Myliobates, or any object with which the student is most familiar under this power. The purpose of the screw collar is to compensate for the error introduced into the corrections by the thin glass covering the object; according to its thickness, so the front and the two back systems require to be brought nearer to each other.

Mr. F. Wenham writes in the The British Journal Photographic Almanac for 1873, page 85:—"The act of approximating the front lens to the others produces actinic or under correction, and for use in microphotography the lenses must be closed for the mark covered. Experiments only can determine the degree at which the lenses are to be set, bearing in mind that they must

be closed *within* the distance of the best visual effect." The half-inch objective under the former mode of illumination may so cut down the amount of light transmitted to the focussing-screen that a smaller condensing lens will be required. This is then replaced centrally between the bull's-eye and the object, so as to afford the best illumination it can offer, the flat surface still turned towards the lamp. The object being to concentrate the light upon the object, the best position must be carefully sought, for a very little displacement from the centre will cause unequal illumination of the field. Assuming that everything appears correct, proceed to take a negative, adhering strictly to the avoidance of any vibration.

If the half-inch objective have a high numerical aperture (angular aperture) the chances are, supposing all other things correct, that the best negative will appear sharp only over part of the image—say the central two-thirds—showing that the definition is perfect at that part but not beyond, and that the part that lies below the plane focussed is not clearly defined. The higher the numerical aperture of the objective the more this becomes apparent. To bring such an objective to equal one of the same denomination of a less numerical aperture and induce greater penetration, it has been proposed, and is advocated by Mr. G. E. Davis, to place behind the objective an iris diaphragm, which he calls an "aperture shutter." In use this is screwed into the nose-piece behind the objective, and is used to cut off the most oblique rays, and thus obtain greater penetration or visibility of the planes below those actually in the best focus. The reader is referred to the *Microscopic News*, vol. iii., 1883, page 172-6, for his observations.

When the student has attained facility in the use of the half-inch, let him take a one-sixth or one-eighth objective and select another object, such as a good Coxinodiscus valve; then obtain under the same arrangements—using the narrow part of the flame—the best image he can, at the fullest extent of the camera or until it fills the largest circle. He is now likely to experience some difficulty in obtaining a sharp definition, from want of a more suitable illumination.

Insert, therefore, some form of sub-stage condenser, such as a Webster's, or a Kellner eyepiece with a pierced cap, or, preferably, a good achromatic condenser of rather lower numerical aperture than the objective. Remove the small bull's-eye, and try to secure a good illumination by the proper adjustment of the large one and the achromatic or sub-stage condenser, focus the latter so that its focus for converging rays is just a little on the lamp side of the object, and note the increased light and definition; then, again, if the objective be of high numerical aperture only a part will be in true focus—say the the centre; obtain a negative with it, making the necessary allowance for the lengthened exposure of, probably, five or six minutes. Now try, if possible, another one-eighth of lower numerical aperture. If this give more penetration and a flat field the whole diatom may furnish a good image on the screen, but most likely no part of it will be as absolutely sharp as the sharpest part of the former. Hence it will be seen that for objects with curvature, or requiring a certain amount of penetration, the latter objective will furnish the more pleasing picture of the two. But if it be required to photograph a broken edge of the valve, or a distinct appearance singly of the upper and lower surface at some broken part where they are seen separated with their determinate markings—or where the object is to depict the ordinary striæ as dots, or to obtain the finest reticulations in a structure or the minutest objects, as *Bacteria*—then the higher numerical aperture objective may be selected as likely to yield, *cæteris paribus*, the most perfect image over that part truly in focus; and the further this extends into the field beyond the centre the flatter will be the field.

If memoranda have been made of the disposition of the whole apparatus it is easy at any time to re-arrange the parts; but when the condensers are not attached to the apparatus, so as to slide into position, it is as well to mark the place of the foot of the stand in pencil. In the present case, should the base-board not be wide enough to support them securely, it is easy to fasten at the part where they are usually placed a small piece of board each side of the base-board; and if a divided stage micrometer be substituted for the object, provided the lines come well into focus, a photograph of the lines at the centre of the field will provide for the amplification, and also for measurements. It must be remembered that a little alteration of the focus when using high powers considerably alters the magnification of minute objects, and hence would falsify the data.

CLOUD NEGATIVES AND THEIR PRODUCTION.

[First Article.]

Few landscape photographers of the present day consider their pictures complete without the introduction of at least the suggestion of clouds. The chalky skies of a bygone age have entirely gone out of fashion, and, even if no clouds be represented, the expanse of blank white paper is at least replaced by a tint that gives greater harmony to the picture. This change is due not simply to improved artistic perception on the part of photographers, but arises partly from the increased facility afforded by modern dry plates for the rendering of cloud effects; and the ease with which these are produced, when the circumstances are favourable, has led to the now general practice of introducing artificial clouds when the conditions do not permit of their being secured naturally with the landscape.

The production of cloud negatives for this purpose is of itself an easy matter. The proper blending of the cloud with the landscape negative requires more care and skill, as well as some little study of the requirements of art, in order to produce a natural effect. Cloud negatives have been for years a regular article of commerce, so that the landscape photographer has to a great extent been spared the extra trouble of their production; but the results so obtained can scarcely be said to have been invariably successful. Setting on one side the palpable incongruities we frequently see in the shape of landscapes combined with clouds of a totally unsuitable character, it is no uncommon thing to see in a frame of landscapes at any of our exhibitions the same cloud negative employed for several different landscapes without any regard to the nature of the subject or the direction of the lighting.

Strictly speaking, perhaps, the lighting of a cloud negative is of quite as much importance as that of a landscape, especially when the two are combined; but, practically, if moderate care be exercised in the selection of negatives it will require an experienced eye to decide when the clouds are not "natural"—that is, in the sense that they were not taken at the same time as the landscape. Clearly, under the latter conditions little fault can be found with the composition provided a proper exposure has been given to render the subject in due gradations; but it is comparatively seldom that the subject and atmospheric conditions are sufficiently in harmony to render this possible. More frequently the sky in nature is totally devoid of any signs of well-marked clouds; indeed, the best clouds are usually to be seen at the least favourable times for landscape photography—as in windy, showery, and changeable weather. Hence the necessity for having recourse to artificial means in order to supply the deficiency.

We start, then, by recognising the value of separate cloud negatives; but in their production we must insist upon the necessity of a systematic observance of the conditions under which both cloud and landscape negatives are taken. In this matter the photographer who prepares his own cloud negatives has an unmistakable advantage over the one who purchases them; for the former may easily keep a record of the position of the principal light when each negative—cloud or landscape—is taken, and so, easily, match them harmoniously, while the latter possesses no such power.

A very simple method by which this can be done is one which a well-known amateur has had in practice for many years past. In addition to the usual note-book particulars of each plate exposed—such as subject, light, exposure, time of day, lens, stop, &c.—he notes also the position of the sun or principal light—not its actual position in the sky, but its position in relation to the camera. This at first sight sight may appear a troublesome and complicated operation, but it is reduced to practice in a very simple manner. A compass-card is inlaid upon the camera, the north pole pointing in the direction of the axis of the lens; in fact, the camera is always *assumed* to be pointing due north. In this way it is quite easy to record in an intelligible manner, by reckoning the number of degrees east or west of

north, the exact or, at anyrate, the approximate angle at which the sun strikes the landscape.

Thus, supposing the sun to be shining behind the camera and over the right shoulder of the operator as he faces the view: a glance along the compass card, *from the front*, will enable him to fix with tolerable accuracy the point of the compass which coincides with the sun's position. This may be recorded as S.E. or S.S.E., or, when greater accuracy is desirable in degrees, south of east, as E. 48 S. If this course be adopted both with landscape and cloud negatives, and the record either marked upon the negatives or kept in a numbered register, it will always be easy to select clouds which, so far as lighting is concerned, will suit any given landscape, especially if the season and time of day be also taken into account. It will, however, rarely be necessary to enter into such refinements as those last mentioned.

With regard to the character of the cloud negative: much of the success of the combination will depend upon the latter being suited to its purpose, as well as upon the printing-in being performed with judgment. The great fault amongst beginners in cloud printing is that they make the clouds too obtrusive. This may arise either from an unsuitable negative or from too deep printing. In developing a cloud negative it is a mistake to aim at too great vigour and contrast, or the result in the print will be dark, heavy clouds, such as nature never or very rarely exhibits. If the deepest shadows be represented by clear glass, or nearly so, then the whole negative must be extremely thin; but we much prefer a comparatively-dense negative with but little contrast—one, in fact, that will print slowly, much as the sky of a negative in which the clouds are secured naturally. What is required, in fact, is softness and harmony. One does not look for vigour and harshness, "chalk and charcoal," even in thunder clouds, the heaviness of which is rarely made up of contrast.

A suitable negative having been secured, the printing is carried sufficiently far to just tint the paper in the high lights. Even with fleecy *cirrus* or piled-up *cumulus* it is not desirable to represent them as perfectly white, unless, indeed, it be in order to secure any special effect. The clouds should, in fact, be subservient to the landscape, and should not by their ultra-brightness degrade its lights. What is reqnired is rather a *suggestion* than a vigorous delineation of clouds in all their detail.

We shall next week proceed to give a few hints on the preparation and use of cloud negatives.

THE NEW PATENT ACT *VERSUS* "SECRET PROCESSES."

As our readers are aware, we have—or, to speak more correctly, shall have, at the commencement of next year—a new and, at the same time, an inexpensive Patent Act, whereby inventors will be enabled to secure to themselves a monopoly in their inventions. This they may do for a few years at a very moderate cost indeed. A provisional protection for twelve months—during which period the inventor may elaborate his invention or negotiate its sale—costs but twenty shillings; and a patent for four years, including the provisional specification, may be had for the insignificant sum of as many pounds. And, moreover, by the new Act every facility is given to the inventor to secure his patent without the assistance of what has hitherto been considered necessary—the aid of a patent agent. This is, of course, a desideratum; for when his services are enlisted they have necessarily to be paid for, which, as everyone knows who has obtained a patent under the existing Act, adds very materially to the cost, more particularly at the preliminary stages.

But will all the facilities given under the new Act prove such a great boon to photographers as many anticipate? Let us consider the matter *pro et con.* There have been, at different periods, many useful improvements made in connection with photography which did not promise to become of sufficient commercial value to warrant the inventor going to the expense of a patent, while the Government fees, together with the agent's charges, would probably cost something like a sum of thirty pounds, or three years' protection. Hence, to secure some remuneration for his labours, the inventor has had recourse to selling his invention as a secret process; and by adopting this course, in order to recoup himself for the time spent in experimenting, he has frequently brought upon himself a certain amount of opprobrium.

The vending of a secret process is looked upon in this country in a very different light to what it is in America. There it is recognised as a legitimate business; whereas here the "process-monger"—however good his process may be—is very frequently considered by some as next-of-kin to a swindler. There is no question that many persons, particularly in the provinces, have at times been duped in purchasing as new a process that may have previously been published, and perhaps is well known; but, in most instances, they have only themselves to blame in the matter, for had they read the Journal regularly they would have possessed all the information they surmised it was necessary to purchase as a secret.

When anyone purchases a secret process, and afterwards discovers that it has already been published, he has no legitimate ground of complaint; for, doubtless, before parting with his money he has had an opportunity of seeing results which he is incapable, with his limited knowledge, of producing. For this reason he clearly has something to gain by the purchase, as he acquires information which, at least to him, is new, and therefore possesses a commercial value; for had he known a method of producing results identical with those shown he would have no occasion to pay for the knowledge necessary to obtain them.

The vendor of a secret process is at all times at the mercy of the purchaser, who can, and occasionally does, after he has purchased the secret, publish it, whether it be original or otherwise, and thereby effectually destroys all chance of further remuneration. To guard against this (to say the least of it) questionable proceeding, some who have had secret processes for sale have bound the purchaser over in a heavy penalty not to divulge the secret; still, eventually, it is almost sure to leak out. In purchasing a secret process it is always more or less like "buying a pig in a poke," as the purchaser has no means of arriving at a correct conclusion as to whether he possesses the appliances or the requisite skill to work it, or whether in his hands it will probably prove remunerative. Furthermore: he is frequently unable to judge how much of the excellence of the examples exhibited may he due to the process itself and how much to the superior ability of the producer.

But now that patents can be obtained for such a trifling sum—and so readily—doubtless not a few who may make improvements in photographic processes, instead of selling the details as a secret, will secure to themselves a patent. From a business point of view this will certainly be more satisfactory to all concerned, inasmuch as the details of the improvement will be published, and would-be purchasers will then have the opportunity of judging for themselves if the process is likely to be of service to them, or answer their requirements, before they incur the expenditure. The inventor will also be protected, as anyone working the invention will be compelled to pay him a royalty; whereas when a secret process once becomes known the inventor is not likely to reap any further benefit therefrom.

A question very naturally arises in connection with this subject, namely, will a photographic patent always secure to the inventor the remuneration to which he is justly entitled? In many instances we fear not, because photography is unlike many other processes, inasmuch as only the final results are seen, and from them it is oftentimes impossible to arrive at a correct conclusion as to how they were produced. For example: a patent may be taken out for an improved method of making negatives, and any unscrupulous photographer can, when the specification is published, work the process surreptitiously, and the patentee has no means of ascertaining from the prints issued whether his patent is or is not being infringed.

Hence it will be seen that a patentee may, under certain circumstances, be placed at a decided disadvantage compared with a vendor of a secret process, as the latter always secures his fee before he parts with the secret. For this reason it is quite possible that in future there will be secret processes for sale as heretofore. Also, that many processes which are now being worked as strictly trade

secrets will continue to be employed as such. Notably is this the case at present in most of the photomechanical processes, the working details of which are rarely published in their entirety.

THE VARIOUS STYLES AND THE MODE OF PRESERVING PHOTOGRAPHS.

In continuing our remarks upon the subject of the proportions and measurements adopted for the various kinds of photographs that have been brought before the public since the introduction of the *carte de visite*, we would not wish to be considered as decrying the occasional advent of a new size if an actual want were shown to exist, or real chance of success with a novelty were considered to be probable. When, however, we see sizes introduced with no element of success beyond that of novelty, we cannot avoid thinking that the best interests of the body of photographers would be consulted rather by adhering to a few shapes than by too frequently "ringing the changes" upon a matter of inches.

It needs no prophet to point out that there is nothing to gain by adding a few scores of pounds to a year's receipts if the whole of the profits thereon (and the professional photographer knows full well that photographs are a long way from being "all profit," as so many of the public believe) are absorbed by the cost of fresh cameras, lenses, and other necessary accompaniments of novelties. We wonder, for example, how many photographers reaped any actual profit, after all special expenses were paid, from the long-extinct "diamond cameo," not to speak of some of the more modern styles. Not only are lens and camera needed, but printing-frames, storage accommodation for negatives, stock of mounts, and a variety of little expenses that soon foot up to a considerable amount.

Then, again, one very important point must ever be borne in mind: the greater the variety in the styles of pictures undertaken in a single studio the greater is the cost in proportion; and when the larger sizes are taken up the greater the time really wasted in re-arranging apparatus, &c.

Nevertheless, when, as we say, there seems anything like a reasonable prospect of business being done we would decidedly recommend a novelty to be widely tried, and thoroughly-well tried, to give it a fair chance. If any such novelty held promise of entirely superseding the *carte* or cabinet the profits all round would be enormous if it succeeded; but such supersession being highly improbable the question then would be is there an actual want, or even fair room, for introducing a new size?—that is, of course, for the general body of photographers. Any individual artist who sees his way clear to a little temporary notoriety by introducing a new shape of mount, and calling it by his own name or that of the town where his studio is situate, is not likely to be influenced by any considerations as to whether it will probably succeed with other brethren of the camera. To the rest we would tender the advice to first count the cost and the expectation of profit before investing in costly apparatus.

As a case in point we may instance the "promenade," which, as our readers know, is a long, narrow card—longer than the cabinet, but much narrower. There was a distinct place for such a picture: *cartes* were practically extinct for full-lengths, and cabinets are of most unsuitable proportions. Yet ladies would have full-length portraits, if only to show their adoption of the latest fashion. At a time when there was more artistic feeling displayed in the design of ladies' dresses than had, perhaps, ever before been seen during the century, this form—eminently adapted for making effective portraits that would include the whole figure—was started, and has, we should imagine, been a most successful hit.

We arrive at this conclusion less from comparing the opinions of professional photographers than from the fact that there may now be purchased albums containing apertures both for this size, cabinets, and *cartes*. When we see the album-makers selling these special patterns we may be sure that it indicates a demand for them; not that the makers try to create a demand for promenades by supplying albums to hold them.

In the early days of cabinet pictures the one reply that the photographer perpetually was met with when he attempted to show their advantages over *cartes* was—"Oh! but nobody's album will hold them!" And this is the key-note of the difficulty surrounding the attempt to introduce any new form of picture, whatever its merits or however much it may be really needed.

Some years ago we suggested to photographers a certain mode of dealing with the smaller pictures which would be equally well—in fact, better—adapted for use with the promenade and still larger pictures. The method was merely to leave all, or a certain small portion only, of a set of pictures unmounted, or mounted on thin paper, with a slight margin round the photograph, which would thus permit anyone to mount the picture in a plain album by slightly gumming these margins, and so, while keeping the pictures flat, avoiding all cockling or buckling. Promenades, and the larger sizes which are now being taken at some establishments, would be very suitable for this mode, which has so many advantages to recommend it that it is somewhat surprising the profession have not largely availed themselves of its aid. There need, as we explained, be no loss of name-advertising about them, as everything necessary or wished for could be printed on to the light margin, where it would show when pasted into a plain album such as so many people nowadays possess.

So far, however, this has not been done. Albums are bought containing *carte* and cabinet apertures, and occasionally promenades; but those pictures of the promenade size, or the still larger and at present most fashionable ones, whose owners have nowhere to put their treasures, may generally, if not locked in a drawer, be seen ornamenting a mantel-piece or lying about upon the drawing-room or boudoir table, soon to be ingrained with dust and dirt and then to be cast aside.

Frames and *passe-partouts* may, of course, be had, but the former cannot well be put anywhere but in a permanent place upon the wall—accommodation which it is not in every one's power to provide whenever he receives a gift of a friend's "promenade" or "boudoir," &c. Cases for the table, as also ornamental boxes, may be had, but they do not display the pictures.

There is here indicated a great want, and he who first meets it in a satisfactory manner, by producing an extremely-cheap and serviceable mount that will preserve the photograph and yet permit it to be exhibited without deterioration, will make a fortune and benefit photographers and photography in the highest degree.

Who is there that has not, at one time or another, received some beautiful photograph, some portrait of a dear friend, that has not been inclined (and often given way to the inclination) to place the treasure in a spot where he can readily see it—on a mantel-shelf, a bracket, a niche in a cabinet, or on one or other of a hundred places that would not keep it hidden from view—as when buried in an album or shut up in a fancy box, and who, having placed it there, has not left it till its "bloom" has been destroyed by insidious dust or the remorseless "duster" of the housemaid?

It is to supply such a want, to discover some method of preserving photographs which would enable the possessor to dispose them about his room singly or in numbers, yet still be able to thoroughly protect them, that we call upon inventors to come forward. There is a fortune for the man who can invent such a photograph preserver as will be at once very cheap, neat, fairly durable, and capable of ready application.

We have on a previous occasion noticed the report of the mission to observe the eclipse of May 6th that has been presented to the Academy of Sciences, Paris, and we are now able to give a few details from the official record. As it is now more than four months since the event it might be thought that an unnecessarily long time had been allowed to elapse before publishing the results; but the apparent delay will disappear when it is remembered that the place chosen for making the observations is about as distant a spot as well could be found on the face of the globe. Our readers have long ere now read in our pages the interesting account by Mr. H. A. Lawrance, the head of the English party, that was sent by the quickest route possible specially for our pages, which thus contained a direct communication from the scene of the observations before, we believe, any English journal. The French report, however, is a full account of the work performed by their branch of the exploring

party, and was read by its chief, M. Janssen, whose labours had been shared by M. Trouvelot, of the observatory of Meudon, M. Pasteur, photographer, and an assistant, and who were accompanied by Professor Tacchini, director of the observatory of the Collegio Romano, and Herr Palissa, of the observatory of Vienna. One of the main objects of the expedition was the endeavour to discover whether any intra-mercurial planet—so much talked of—did really exist; and M. Trouvelot and Herr Palissa had special charge of these observations. Herr Palissa could find no such planet; he discovered nine known stars, but states that no star of the fifth magnitude or upwards was seen that was not marked on his star map. M. Trouvelot obtained less satisfactory results, as his apparatus did not work smoothly after the first minute or two. A large number of photographs were taken, as our readers are aware; but, sufficient time not having elapsed to permit of the very careful and systematic examination required, an exact report cannot yet be made upon them. So far, however, as they have yet been examined they have given no sign of the long-sought-for planet.

Another most interesting point to be determined was the presence or absence of any considerable proportion of solar light in the corona. M. Janssen succeeded far beyond his expectations; he saw the complete system of Fraunhofer lines, thus proving that, especially in certain parts of it, there exists in the corona a vast amount of reflected light which, as the atmosphere of the corona is known to be very attenuated and incapable of producing reflections, can only be explained by the presence of solid particles of matter. The photographs of the corona showed it to extend to a much greater distance than could be seen by telescopic eye observations; but the complete examination of these photographs is also deferred. The observations made by M. Janssen as to the luminous intensity of the corona allowed, for the first time, an exact calculation to be made. They showed that it gave off (in the Caroline Islands) light surpassing in intensity that of the full moon. These results also were obtained by means of photography.

The sensitiveness to light of iodide of nitrogen, to which we alluded a week or two ago, has, we read, been utilised to form a photometer. The iodide is placed in ammonia solution, and as the light acts upon it gives off nitrogen in proportion to the intensity, so that a measurement of the amount of the nitrogen gives a direct measure of the intensity of the luminous radiation. For our own part we would wish to be defended from any such dangerous chemical and instrumental combination.

A short time ago we called attention to a new burner for producing high value from ordinary coal gas which had been invented by Mr. F. Wenham—a gentleman well known to all our readers from his long connection with the optics of photography. More details are now to hand, which enable us to give further particulars. This burner is of the regenerative type—that is, the heat evolved by the burning gas is utilised in raising the temperature of the gas and air previous to combustion. The burner, unlike others of the type, is to be sold at a reasonable price, and made in sizes to burn as little as five feet an hour, and also, of course, of much larger dimensions. According to competent authority the light is of great brilliancy and whiteness, and, says the *Review of Gas and Water Engineering*, "we are assured that after a most protracted trial and severe tests the burners" are found to exceed the most sanguine anticipations of the inventor and manufacturer. If this be so in fact, there will be every reason to hope that the new burner may be found valuable in sundry photographic operations; indeed, we see no reason why such a light should not find its way into many studios for portrait-taking where an electric-light installation could not be carried out.

Again, too, photography is to the fore. Our readers may be aware of the extra accommodation which has been tardily given up at the British Museum to the Prints and Drawings Department, and photography at present enjoys a good share thereof. A very large number of autotype reproductions of drawings by the old masters has been added to this department by its keeper, Mr. Reid, and one hundred and fifty-two of them—reproductions of drawings by Raphael—are now on public view. Our contemporary, the *Athenæum*, characterises them as "a magnificent series of autotype reproductions."

The collection possesses a special interest, inasmuch as it includes reproductions of a celebrated collection of drawings known under the name of the "Venetian Sketch-book," which of late has been the subject of much controversy. The sketch-book has been attributed to Raphael, but there appears to be little doubt now that no touch of his magic pencil finds a place in it. By means of these autotypes everyone has an opportunity of forming a judgment for himself, as they are placed side by side with others about which not a shadow of doubt exists.

Among announcements of illustrated works we note one whose chief interest will be the illustrations themselves—*The Crowned Heads of Europe*, by J. F. Schipper and Co. The portraits are all to be photographs, and a short biographical text is to be added. Is this another mode of selling portraits of celebrities?

In the early days of the electric-light *renaissance*, amid all the magnificent promises of the various processes and their promoters, there were never wanting many who laughed the whole thing to scorn, and conclusively showed by figures that the system could not pay, and never would succeed commercially. Yet we see the sphere of electric lighting daily increasing, whatever may be its cost or economy. We are reminded of these Cassandra-like prophets by the accounts that come to hand of the working of electric systems of storing and utilising power. "They cannot pay" say these prophets; yet we see electric railways here, tramcars there, and steamboats in another place, and still they increase. At a meeting of the Academy of Sciences, at Paris, on the 10th instant, a report by the Mayor of Grenoble was read, stating that their experiments in the electric transmission of power to a distance was a complete success. The pessimists had pronounced it a failure. A fortnight ago last Wednesday an electric tramcar trial was made in Paris, and the present report is that the success was complete. Shortly we suppose the papers will narrate its failure. Last week an electric launch was successfully tried on the Clyde. With all these facts before us, photographers have good ground for hoping that the time may not be far distant when they will have electricity at their doors, ready for use for a variety of purposes where "power" would be most useful but the purchase of a steam engine to produce it out of the question.

The mechanicians would seem to have in store a simple machine which, if it really be as successful as is stated, would be most handy for ventilating drying-boxes, small rooms, storing emulsion, buffing glass plates, and scores of similar purposes. For we read that a small machine, wound up by a winch handle, has been invented for working a sewing-machine; but, when we read that "a few turns" of this handle will "store up energy for an hour's work or more," a spirit of scepticism that will not be exorcised rises within us.

We lately referred to the celebrated French *savant*, M. Chevreul, as one of the two remaining members who sat in the Academy when Daguerre's invention was first brought before them. The famous chemist bids fair to present another nut for Mr. Thoms to crack, as he attained his ninety-eighth birthday on the last day of August.

If there be "nothing in the papers" just now for the general public, there has yet been sufficient interesting matter for photographers in the recent letter of the well-known aëronaut, Mr. Simmons, regarding his trip of yesterday week, which has gone the rounds the last day or two. His journey is specially interesting to photographers on account of the description he gives of the photographic operations attempted by his companion—Mr. Small, of Baker-street, W. Several exposures were made, but, at the time of writing, we have no account of the success attending them. As the

balloon passed over Hastings a "shot" was tried, and later on some cloud effects were attempted; but the shutter "missed fire" two or three times, we are told, and "this suggested some little improvements for the future." It seems to have been a very strange photographic outfit altogether, for Mr. Simmons writes:—"A remarkable appearance was caused by the reflection of the balloon in the focussing-screen of the camera. When we surrounded with a black cloth the frame round the glass we could see sky, sun, moon, and stars inverted, and the balloon clearing its headlong 'downward' course through illimitable space, the effect being most extraordinary." It must have been a remarkably wide-angled lens that was employed to allow *balloon, sun, moon, and stars!* to find a place all at once on the focussing-screen. And how the downward or upward motion was to be perceived in the camera altogether passes our comprehension. We are inclined to speculate on the probability of a portion of the ballast having been a well-known combustible fluid. Finally: we are told that after "hairbreadth 'scapes," the scene of the descent, on Cap de la Hague, was photographed by Mr. Small next morning. We think that if clever professional aëronauts cannot write more sensible photographic matter than this they had far better leave photography alone.

VERY RAPID PLATES.

A short time ago there appeared in the pages of The British Journal of Photography a very interesting letter from the Rev. H. B. Hare, in which he gave some particulars of the sensitometer numbers given by various commercial plates, and asked if formulæ were not known whereby a rapidity equal to the best of these could be got by amateurs. I expected to see the pages of the Journal flooded with replies to this from many better able to give information than myself; but, as the expected replies do not appear to come from such, possibly a few words describing my own experiences may not be out of place, particularly as during the past twelve months the greater part of my spare time has been spent in endeavours to investigate the various precautions necessary to take in arriving at the highest degree of sensitiveness in plates. I may say at once that I have no startling, new formula or method to communicate, but that possibly certain observations with regard to details may be of use.

The ultimate goal of those who aim at great sensitiveness appears to be to get a plate of good quality which will give the figure 25 on the sensitometer. I have known no commercial plate which will give so high a number, or anything over 22 or 23, and I know of no formula or method which will give so great sensitiveness *with certainty*. I have several times got the number 25 on a plate showing good quality; but have found that, on repeating the manipulations and to get it as precisely as possible, the result has been the figure 22 or 23. I, therefore, conclude that that figure represents a sensitiveness equal to that of the most rapid commercial plate is the highest which can be reached with any degree of certainty by methods which have been as yet published.

It has been truly said that it is easy to make a gelatine emulsion—difficult to make a gelatine plate; and if this be true of plates of moderate rapidity, it is ten times more true of those of very great sensitiveness. It is certain that a good formula and method of making an emulsion are necessary to gain a plate of great sensitiveness, but it is equally true that this is not all. At almost every manipulation after the emulsion is complete it is possible to so degrade the sensitiveness that a plate of only ordinary rapidity, or even a slow plate, will result.

I may begin by giving two processes, either of which will give an emulsion of the required sensitiveness, and afterwards may give a few hints on the precautions necessary to observe in coating and drying the plates so as to avoid degradation of that sensitiveness. The process which I place first, and consider the best, is the well-known boiling process, which may be followed afterwards by either washing or precipitation, as the operator may desire. I give a formula—not because it contains anything new, but simply for the sake of completeness. The amount of gelatine used in boiling is, it will be noticed, somewhat large. This, in my experience, conduces to density of image:—

A

Silver nitrate	400 grains.
Water	4 ounces.

B

Bromide of potassium	320 grains.
Iodide of potassium	10 "
Nelson's No. 2 gelatine	100 "
Water	4 ounces
Hydrochloric acid	Enough to make the solution perceptibly acid.

C

Heinrich's gelatine	600 grains.
Water	Enough to thoroughly soak this, the excess being poured off.

A and B are emulsified as usual at a high temperature. Boiling is performed until the bromide, red by transmitted light, is converted to blue, and for a further time equal to that required to bring about the conversion. For example: in my experience the time required to change the haloids from red to blue is about an hour—say it is fifty minutes. In such case I should boil for one hundred minutes; that is, one hour and forty minutes.

If it be desired to proceed by precipitation, the emulsion is poured into a large vessel amongst twenty ounces of water, when the process proceeds as described by me before the Photographic Society of Great Britain some time ago. If it be wished to wash as usual, the emulsion is poured into the gelatine, C—not the gelatine into the emulsion, as in such case the sediment, which is always formed to a greater or less degree during boiling, will be incorporated with the emulsion and will deteriorate it. The whole is put on one side to set, and is washed as usual.

The second method, which has with certainty given me a high degree of sensitiveness, is a modification of Eder's ammonia process. This gives the same sensitometer number as the other—22 or 23 with certainty, 25 occasionally—and a very dense image. Although the sensitometer indications are the same in both, the camera sensitiveness is somewhat greater in the plates produced by the latter process—possibly almost double. The quality, on the other hand, is much inferior; green fog seems to be unavoidable. The negatives are dirty-looking, and seldom quite clear in the shadows. It must be admitted, however, that they give remarkably fine prints, which, after all, is the main point.

A disadvantage of the latter process is that a given amount of silver serves to coat far fewer plates than in the former. The formula is as follows:—

A

Silver nitrate	400 grains.
Water	4 ounces.

B

Bromide of potassium	330 grains.
Iodide of potassium	20 "
Nelson's No. 2 gelatine	100 "
Water	4 ounces.

C

Heinrich's gelatine	200 grains.
Water	Enough to soften the gelatine.

D

Heinrich's gelatine	200 grains.
Water	Enough to soften the gelatine.

E

·880 ammonia (which is best diluted with two or three times its quantity of water to prevent its losing strength)	5 drachms.

The two quantities of Heinrich's gelatine must be first washed and must afterwards have as much as possible of the water pressed out of them.

A and B are emulsified as usual at a high temperature, and afterwards raised to the boiling point. C is added. This will probably reduce the temperature to about 150° Fahr. A thermometer must be used, and if the emulsion differ in temperature from this, must be either raised or lowered to it as required. At the temperature of 150° E is added. After this the vessel containing the emulsion is placed where it may slowly cool, and for half-an-hour is stirred at frequent intervals, or, still better, continuously. At the end of this time the temperature will probably be about 120° Fahr. If it be more the vessel is dipped in water till it reaches this temperature. D is then added, and after stirring the whole till the gelatine is melted the emulsion is put on one side to set.

We have left both emulsions at the same stage—that is, where washing is about to take place. If the weather be cold no difficulty will occur; but if it be hot here is the first point where degradation of sensitiveness may occur. If the emulsion do not set very firm it will take up so much water during washing that it will get "sloppy," and such an emulsion will never give rapid plates. It

may be caused to set on the plates; but during such setting the bromide of silver will settle somewhat, the plate will have a hard, brilliant surface of gelatine only, and will repel the developer. Not merely this, which might only produce *slowness of development*, but the bromide which has been, so to speak, precipitated on the plate being not sufficiently protected with gelatine is reduced without the action of light by a developer which would not otherwise effect it; the consequence, practically, is a slow plate giving a weak, thin negative.

If the emulsion will not otherwise set firm ice must be used. The emulsion prepared with ammonia will not set at so high a temperature as the other. A piece of ice several times larger than a hen's egg may be pressed right into the emulsion, and after half-an-hour this latter will be found to be quite stiff. If the temperature be very high the water into which the emulsion is first pressed may be iced. If the emulsion be once pressed into the water in the form of well-defined, stiff threads it will not afterwards become sloppy unless the water be very warm.

The next point requiring attention is the setting of the plates after coating. It is commonly supposed that if the plates set at all that is sufficient. It is not. If they do not set within a very short time of coating they will suffer in sensitiveness. A plate which has set five minutes after coating will be several times more rapid than one coated with the same emulsion which takes half-an-hour to set. It would appear that settling of the silver bromide is the cause of deterioration here again. The following observation is instructive:—If plates be coated in such hot weather that (say) half-an-hour is required before the emulsion sets on them, and if after about twenty minutes after it is coated a plate be slightly tipped, a clear liquid will flow off the surface. This appears to be little other than a weak solution of gelatine. It will set into a soft jelly through time.

So far as we have considered the matter the dangers are peculiar to summer weather, and the means of avoiding them, if emulsions are to be worked in summer, is to use ice profusely. The next, which refers to the drying of the plates, is most likely to occur in winter. It is generally known that a very high temperature of drying slows a plate; but there is something quite unexplained in the matter, inasmuch as it would appear that a high temperature produced artificially during cold weather produces greater deterioration than the same temperature due to hot weather. I have known cases where in winter the use of a temperature of 80° Fahr. reduced the rapidity of plates two or three times. All that can be said in the matter is that the lowest temperature which will dry the plates should be used, chloride of calcium being, if necessary, employed to absorb the moisture of the air.

The use of alcohol or methylated spirit without discretion in emulsions is a frequent cause of deterioration of sensitiveness. At times precipitation with spirit will effect the sensitiveness. Too great a quantity of alcohol mixed with emulsions to cause them to flow freely on the plates will have the same effect. A finished emulsion should never contain more than eight per cent. of alcohol. It is as well not to have more than five per cent.

The thorough washing of emulsions I have not considered it needful to mention, as it is generally recognised as a necessity if a high degree of sensitiveness be required. Increase of sensitiveness does not appear to take place in an emulsion by keeping if the highest sensitiveness have been obtained at first.

I have written pretty freely of the use of the sensitometer as a test for the sensitiveness of plates. I have assumed that the emulsions are worked in such a light that there is no likelihood of a disturbing element arising from "pre-exposure" and giving false indications, as described some time ago by Mr. Debenham and myself.

I am aware that the above hints contain little that has not been said or written before by others. They may, nevertheless, be useful to some. In conclusion, I would impress this on all emulsion experimenters: a good formula is necessary to gain the highest degree of sensitiveness, but quite as necessary is the most minute attention to details apparently trifling at every turn of the process.

W. K. Burton.

PHOTOGRAPHY AND PHYSIOLOGY IN PARIS.

Our readers have been made familiar with the most recent achievements in instantaneous photography as applied to the study of the various phases of motion of human and other subjects, the names of Muybridge and Marey being inseparably connected with such inception. The wonderful achievements of the former gentleman must ever cause him to be looked on as the pioneer of whatever of the kind have followed and will follow; but, great as was the expense undergone in carrying out his experiments—upwards of thirty thousand dollars he has stated they cost—he cannot be expected to compete with other experimenters equipped and aided by the State.

In France M. Marey has had the good fortune to be so placed, and as time progresses we may expect still more interesting studies from his laboratory, which has only been in working order since March last, and, indeed, was not commenced before the preceding autumn. He gives, in *La Nature* of the 8th instant, a full account of the place which, with the earnest goodwill of M. Jules Ferry, has been built and arranged for the prosecution of certain physiological studies. M. Marey writes that he has passed long years in discovering methods and apparatus capable of faithfully translating the outward signs of the functions of life. The pulsations of the heart and arteries, respiratory movements, and contractions of the muscles record themselves with these apparatus, and hand over for analysis the curves describing the minutest details of these movements. Other instruments have for their object the recording of the path traversed by a man or animal, and of work done in a given time, &c. More recently instantaneous photography has come upon the field to complete the knowledge of physiological movements, so that now we can easily resolve the greater part of the problems of animal mechanics. To do this satisfactorily requires such a special laboratory and other arrangements as have now been built, and which he goes on to describe.

A nursery garden near Paris has been utilised, and a large, perfectly-horizontal, circular space set apart. It is surrounded by two concentric tracks—the inner one, over four yards wide, being for horses, and the outer for men. A telegraph line runs round the track, and is carried by posts about fifty-four yards apart, which serve the purpose of giving an exact account of the rate of the walker; a signal being automatically sent to a certain part of the main building, whence also proceeds an electric line actuating an electric drum to give the time or rate to the pedestrian, and which also is governed by mechanical means.

A small railway line from the centre of the course carries a little carriage which forms a photographic studio, and from which instantaneous photographs are taken of the men or horses whose gait it is desired to analyse. They are taken as the pedestrian passes a black screen.

M. Marey has substituted for the multiple camera arrangement of Mr. Muybridge a special apparatus, which gives on one plate a register of the successive positions of a man or animal as he passes in front of the screen; and he promises, further, to give details explaining the means he adopts to secure increased sharpness and the time measures more exact, and which multiplies to an indefinite extent the number of images, thus giving a complete analysis of every kind of movement.

The arrangement adopted consists of two distinct parts—first, the camera and the movable studio that contains it; and, second, the black background upon which stands out in white the man or animal whose photograph is being taken, and also the instruments for measuring the distance traversed between two successive images, and the time occupied in the act.

The photographic studio, which carries the operator, is mounted upon wheels and placed upon a small railroad, so as to be able to approach or recede from the black screen according to the objective employed and the size of image required. Usually it is better to place it some distance from the screen—about forty-four yards. From this distance the angle at which the object is seen changes but slightly during its passage before the black screen. From the outside of this studio may be seen the red glass windows, through which the operator can follow the motions which he is studying; a speaking trumpet is attached, and by means of it he can give orders as to the different acts required to be executed.

The exposure is made by means of a revolving disc containing a small aperture, through which the light passes intermittently to the objective. This disc is of large size—1·3 metres (about 51½ inches) in diameter, and the aperture with which it is pierced measures only the one-hundredth part of its circumference; hence, if the disc makes ten revolutions in a second the duration of the exposure is only *the thousandth part* of a second. The movement is communicated to the disc by a train of wheels, which is wound up by a winch, and worked by a weight of one hundred and fifty kilogrammes (about three hundredweight) placed in front of the moving studio. A catch allows the movement of the disc to be arrested, and a bell, worked from the inside of the movable room, serves to give orders to an assistant either to set it going or to stop the disc.

Inside the studio the camera is placed upon a table and pointed towards the screen. It holds a long and narrow sensitive plate, exactly embracing the entire screen. M. Marey states that the plates that have given him the best pictures with the briefest exposures have been those of Monckhoven, and of Melazzo, of Naples. [We apprehend that he has not made any lengthy trials of plates of English manufacture, or he would, perhaps, have arrived at a different conclusion.] Working in front of the disc, which produces the consecutive exposures, is a drop shutter that is vertically raised at the commencement and falls at the close of the experiment, so as to permit no light to enter into the room except when absolutely necessary. Then, again, there is a large slit in front of the lens which restricts the scope of the instrument to the exact field in which the movements that are being studied are performed.

M. Marey concludes by saying that the complete absence of light which reigns in the movable room allows the plates to be manipulated with comfort and changed at each fresh experiment.

ON MEN AND THINGS.

Few matters in connection with dry-plate work have caused so much inconvenience as the great diversity of developing formulæ in existence for different makers' plates. I will not say for different *kinds* of plates, as that would imply some radical variation in the composition of the films, which certainly cannot be said to be the case. Variations there may be in the mode of manufacture, in the quantity of silver salt spread on the glass, and perhaps, to a slight extent, in the precise salt or salts employed, or in their proportions; but surely these are insufficient to account for the vastly-different proportions of ammonia and bromide recommended by some of the makers!

* * *

Somebody ventured to assert in the pages of the Journal a few months since that any good plate could be developed with almost the same solutions, and was promptly "sat upon" for his temerity. In spite of the risk I run of incurring a similar unpleasant experience, I will dare to suggest that the first writer was perfectly correct. Further than that, I am not ashamed to say that I have invariably for years past worked upon that principle in treating dry plates, and have not even yet seen any reason to depart from it.

* * *

It should be borne in mind that it was only with the advent of commercial gelatine plates that the system of mixing the ammonia and bromide in unvarying proportions came into fashion, and it was only with the increase in the number of manufacturers that the puzzling multiplicity of formulæ sprang into existence—for no other apparent reason than to avoid any suspicion of copying a rival's developing instructions. In the "good old days" of collodion dry plates the alkaline development was performed invariably with separate solutions of ammonia, bromide, and pyro., each being employed as the judgment of the operator and the requirements of the plate seemed to dictate; hence, perhaps, arose the well-known latitude of exposure which used to be claimed for the dry over the wet plate.

* * *

Few wet-plate operators ever thought of changing the proportions of the iron developer, and that remaining constant the exposures had to be made with extreme accuracy to suit it. When gelatine plates first came into use people began to talk of the want of "latitude," and such nonsensical statements were made by some as that the exposure must be exactly correct to the fraction of a second, or it was hopeless to expect a good result. With the mechanical system of development in vogue then—a system, moreover, of the principle of which the vast majority of operators were entirely ignorant—there was probably some foundation for the complaint, but the older dry-plate workers knew otherwise; and, as experience was gained by the wet-plate men in the new mode of development, it soon came to be recognised that a gross libel had been perpetrated upon the dry process. Still, however, they remained hampered by the system of "mixed solutions," and it is only within comparatively recent times that the full power of the alkaline pyro. developer has begun to be understood by the few.

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The subject of separate solutions has been dealt with over and over again by different writers without its having apparently gained much in popularity, and its revival once again by Mr. C. Beckett Lloyd will possibly not alter matters to any great extent. If, however, operators could be made to understand (as Mr. Lloyd endeavoured to point out) that the adoption of separate solutions does not in the least militate against the employment of any pet, fixed formula, but only enables *any* formula to be made up from only three solutions, they might be induced to give the plan a trial. They would then, perhaps, also find that they possessed a far greater control over the development than had ever been the case before.

* * *

It is, of course, well understood that different plates do vary more or less in the treatment that suits them best, but not in anything like the proportion the analyses of different formulæ would indicate. Some plates will bear the use of a larger quantity of ammonia than others; others, again, absolutely require a large proportion of bromide to prevent fog, or strong pyro. solution to give density. These peculiarities being known, it is as easy to satisfy them when working from three separate solutions as when using the set formula of the maker. One thing only requires to be attended to, namely, not on any account to exceed the maximum quantity of ammonia that can be used with safety—a temptation difficult to withstand when an under-exposed plate requires forcing.

* * *

The practice of invariably using the minim measure or properly-graduated dropping-tubes, as recommended by the Editors, cannot be too strongly enjoined upon all. It is true that, when using dropping-tubes which deliver indefinite quantities, or where a system of guesswork prevails, habit will bring about a certain amount of uniformity; but, if an accident should occur to a tube or vessel to which the operator has become accustomed, and a new one has to be used, he will find himself all "at sea," and equally so if he has to treat a new kind of plate. Measuring is quite as easy as "guessing," or easier if it be done systematically, and it leaves no room for uncertainty.

* * *

I have a number of dropping-tubes marked to deliver half-a-drachm of solution, and I find that by squeezing the "teat" so as to expel the air as completely as possible just that quantity of solution is taken up, and in that manner I am saved even the slight trouble of looking for the mark in the dark room. In addition to this the tubes deliver as nearly as possible accurate *minims*, so that if quantities smaller than half-a-drachm be required the minims can be counted off. By merely referring to the instructions sent out with a strange make of plate I can mix the developer as easily as if I had the special solutions by me; that is, for the commencement of the operation. According to the behaviour of the plate I afterwards exercise my own judgment; for no instructions or no manufacturer, however skilled, can help me any further unless he stand at my elbow.

* * *

The method of boiling emulsions suggested by Dr. Stolze appears likely, from what has been written about it, to prove satisfactory where it was not expected by the learned gentleman without bearing out the claims he made in its favour. It certainly does not seem to me to offer any greater chance of uniform cooking than does immersion of the emulsion vessel in boiling water, if even it is equal to the latter. The quantity of steam required to raise the emulsion to boiling point must obviously vary with the quantity of emulsion as well as its temperature at starting, so that we have here two conditions that militate against uniformity. Then, again, on the same two conditions—or, what is the same thing, on the quantity of steam condensed in the emulsion during the operation—will depend its degree of dilution, a point upon which will depend the fineness of the particles of bromide and the length of time they take to reach the "blue" or sensitive stage—another powerful element of uncertainty.

* * *

On the other hand, the convenience of being able to boil in a bottle enclosed in an opaque bag without the necessity of stirring or shaking, and not necessarily in the dark room, is undoubtedly great; and, if a tolerable degree of regularity can be secured, no doubt many amateur emulsion makers will be glad to adopt the plan.

Argus.

British Association.

SOUTHPORT MEETING, 1883.

The fifty-third annual meeting of the British Association for the Advancement of Science was opened at Southport on Wednesday last. The inaugural ceremony took place at the Winter Gardens, at

3 p.m., when Sir C. W. Siemens, D.C.L., LL.D., F.R.S., &c., resigned the chair, and the President-elect, Professor Cayley, M.A., LL.D., F.R.S., assumed the presidency.

Of Southport itself there is very little to say. A town which has sprung into existence almost within the memory of the present generation—certainly within the last two—can have little but a local history. It will suffice to say that Southport is a Lancashire watering-place situate about eighteen miles north of Liverpool, and about equidistant from Preston. During the season it is the favourite resort of the inhabitants of these two places, as well as of Manchester and other towns of Lancashire and Yorkshire. Facing the Irish sea, it is protected by a sandy foreshore extending seawards for upwards of half-a-mile, which, in conjunction with its other natural surroundings, is supposed to conduce greatly to the mildness of climate even in the coldest of winters, which has rendered the place a favourite resort for invalids.

A century or less ago the site of the present borough of Southport was, like so much of the surrounding Lancashire coast line, a mere waste of sandhills. On account, however, of the natural advantages this portion of the coast offered to timid bathers, it was much visited at certain times of the year by holiday keepers; but, as no accommodation existed for housing these nomads in search of healthful breezes, they were perforce simply day visitors. To remedy this defect, one William Sutton, an innkeeper in the neighbourhood, built as a speculation, in 1792, an inn for the accommodation of bathers, and such was the popular opinion of the wisdom of this step that the inn for some time went by the name of "Sutton's," and subsequently "The Duke's Folly." The latter designation was gained in the following manner:—Soon after the establishment of "The Original Hotel," as Sutton called it, the Duke of York, on a tour of inspection of that portion of the coast, arrived exhausted at Sutton's hostelry, and, being too tired to travel further, insisted upon putting up for the night. The landlord did the best he could for his royal visitor, and after his departure was so fond of making allusion to what "the Duke" had said and done during his brief stay that he acquired the cognomen of "the Duke," and his house became "The Duke's Folly."

From this modest commencement the town of Southport gradually increased; but it is only within the last thirty or forty years that it has had any claim to importance, the chief improvements having been made within the last twenty years. It is, indeed, essentially a modern town, with broad, well-laid-out streets and handsome buildings, gardens and trees being met with everywhere. It possesses one of the longest piers in the kingdom, along which is laid a tramway, the cars being worked by a stationary engine. The chief feature of the town is, however, the Winter Gardens, which, with the Aquarium and other attractions, vie successfully with any similar establishment in the country. The Winter Gardens, which have been secured for the temporary use of the Association, were established about twelve years ago, and have added greatly to the popularity of Southport. The Aquarium, attached, has at times contained unique specimens, which have been the envy of rival establishments. As another example of the enterprise of the local authorities we may mention that Southport possesses a "Glaciarium," or real ice skating-rink, which was established upon Professor Gamgee's principle some years since. The Botanic Gardens, the Zoological Gardens, and the miniature Crystal Palace, are some of the remaining places of amusement, while amongst the chief public buildings are the Town Hall, Cambridge Hall, and the Atkinson Free Library—all of which have been pressed into the service of the Association.

In the more or less immediate neighbourhood of Southport are numerous objects and places of interest, to which attention will be called in connection with the excursions of the Association; indeed, at the time we write, there appears to be no reason to doubt the success of the present meeting, either from the scientific, business, or pleasure point of view.

The Reception Room is in the Cambridge Hall—a spacious and handsome building, which has been fitted up with every convenience for visitors in the shape of writing tables, post and telegraph offices, lavatories, &c., &c. A new feature is the telephonic connection between the Reception Room and the different sections, which will undoubtedly prove a great convenience.

The *soirées* and evening lectures will be held at the Winter Gardens, which have been fitted up to accommodate upwards of two thousand guests. As usual, two *soirées* are to be held on the Thursday and Tuesday evenings; but, owing to our going to press too early, we are unable to give any report of the first of these, which will have passed when these lines reach the public. The following evening lectures are announced:—On Friday, September 21st, a discourse on *Recent Researches on the Distance of the Sun*, by Professor R. S. Ball, LL.D., F.R.S., Astronomer-Royal for Ireland. On Monday, September 24th, a discourse on *Galvanic and Animal Electricity*, by Professor J. G. McKendrick, M.D., LL.D., F.R.S.E., Professor of Physiology in the University of Glasgow and in the Royal Institution of Great Britain. On Wednesday, September 26th, the concluding general meeting will be held, at 2.30 p.m.

The Winter Gardens will be specially lighted during the week by electricity, and in the Pavilion will be an exhibition of Lewis's system of incandescent gas lighting.

Excursions have been arranged to Knowsley (the seat of the Earl of Derby); Lathom (the seat of the Earl of Lathom); Ince Blundell Hall (the seat of T. Weld Blundell, Esq.); Abram Colliery, Wigan; Chester, and Eaton Hall (the seat of the Duke of Westminster); Lancaster; Rufford Park and Old Hall (the seat of Sir Thos. Hesketh); Liverpool Docks; Windermere and Lake District; Wigan Coal and Iron Company's Works; Clitheroe and District (geological); Oldham; Widnes Chemical and Soap Works; and Stoneyhurst College and Whalley Abbey. These, however, do not complete the list of recreations, as on Friday, September 21st, the Mayor of Southport (Dr. Wood) invites the members and associates to a garden party and flower show in Hesketh Park. It is also announced that the Countesses of Derby and Lathom will be "at home" on the occasions of the Association's visits to Knowsley and Lathom, and T. Weld Blundell, Esq., will give a garden party at Ince Blundell Hall. There will, therefore, be no lack of amusements to relieve the tedium of a week's application to science.

The following are the sectional arrangements:—Section A. (Mathematical and Physical Science) meet at the Atkinson Free Library—President: Professor Henrici, Ph.D., F.R.S., who will open the section with an address on *The Teaching of Pure Geometry*. Section B. (Chemical Science)—President: Professor J. H. Gladstone, Ph.D., F.R.S., meet at the same place. Section C. (Geology), over which Professor W. C. Williamson, LL.D., F.R.S., presides, meet at the Temperance Hall, London-street. Section D. (Biology)—Professor E. Ray Lankester, M.A., F.R.S., and Mr. W. Pengelly, F.R.S., F.G.S., preside in the respective divisions of Biology and Anthropology, the meetings being held in the West End School-room, Duke-street, and the Congregational School-room, Chapel-street. Section E. (Geography)—President: Lieut.-Colonel H. H. Godwin-Austen, F.R.S., F.G.S., F.R.G.S., meet in the School-room of St. George's Presbyterian Chapel, Lord-street. Section F. (Economic Science and Statistics)—President: R. H. Inglis Palgrave, F.R.S., F.S.S., meet at St. Andrew's Hall, Part-street. Section G. (Mechanical Science)—President: James Brunlees, F.R.S.E., F.G.S., Pres. I.C.E., meet at the Town Hall.

Professor Arthur Cayley is the son of a London merchant. Born in 1821, he was educated at King's College and at Cambridge, where, at the age of twenty-one, he came out senior wrangler and first Smith's prizeman. In 1849 he was called to the Bar, and practised as a conveyancer for some years, until, in 1863, he accepted the Sadlerian professorship of mathematics at Cambridge. Of Professor Cayley's numerous works, mostly mathematical, we have nothing to say here. He is said to be the author of upwards of six hundred mathematical treatises; but can we say much that will be photographic of his address to the members of the British Association. The learned Professor himself acknowledges his subject to be a "dry" one, and in comparison with the addresses delivered by the two last presidents—Sir C. W. Siemens and Sir John Lubbock—it was probably to the majority of his hearers, and is to the bulk of his readers, a complete puzzle. Quoting from *The Times*, we can quite believe that "even senior wranglers speak of him with bated breath and silent wonder," and when the writer proceeds to say that only Professor Sylvester (if even *he*) is capable of sounding the depths of Professor Cayley's mathematical knowledge, we are quite prepared to coincide. We shall not inflict the President's address upon our readers, nor any part of it. We have read it ourselves.

A very excellent and varied exhibition has been organised in the Skating Rink attached to the Winter Gardens, and which presents a magnificent *coup d'œil* to the eye of the visitor on entering this now magnificent hall. Among the works of art, science, and *vertu* displayed in the vast area and on the walls we naturally give precedence in our notice to a large and excellent display of photographs arranged under the auspices of the Liverpool Amateur Photographic Association, and to which the attention of the indefatigable Hon. Secretary, the Rev. H. J. Palmer, M.A., has been given for some days, aided by Mr. B. Boothroyd, President of the Association, and Mr. J. A. Forrest. At the time of our visit the display was not completed, but among the pictures arranged was a choice selection of charming works, the results of the Hon. Secretary's recent visit to

Switzerland. To this department we shall refer at greater length in our next issue.

Among other exhibits in the Hall will be found choice photographs and paintings; some rare engravings and etchings and old prints from the collection of Dr. John Newton, Liverpool; a fine series of photographs and etchings from the collection of Dr. Edgar Broome, Liverpool; and innumerable works of art, ancient and modern, contributed from South Kensington Museum (and arranged by Mr. W. T. Key, of that department) and by numerous other owners of most valuable collections.

Science is well represented by Siemens' electrical display, which is to be on a scale of magnificence never approached before in a single building, if we except the Crystal Palace and Parisian displays. The dynamos and driving engines are in the exhibition as well as the lights, and form a very attractive feature of it. They supply the electric current for thirteen arc lamps in the conservatory, and a number of other arc lights in the promenade, staircase, and sundry glow lamps (Swan's) in other parts of the building. One of these dynamos has a separate six-power vertical engine attached to it, and transmitting the power to it by rolling contact of a compressed paper pulling upon an iron pulley. This machine supplies the current to four arc lamps in the carriage entrance. It will also occasionally provide current for a single arc lamp of the enormous power of 30,000 candles, such as is used for naval and military purposes. Another supplies five arc lamps in the exhibition, and a further keeps going two arc lights of 1,000 candles each, one of 3,000 candles, and fifty Swan lamps of twenty each, so that there will be no lack of light. There will be several electrical machines shown for supplying different kinds of electricity, notably an inductorium producing a prodigous spark. This inductorium has been made by Mr. B. Boothroyd.

When to all the above are added interesting collections illustrative of botany, zoology, conchology, and natural history generally, it will be acknowledged that a large, valuable, and instructive exhibition has been prepared for the edification of the "travelling philosophers" and the local adherents of the British Association. Much of the credit of the success of this exhibition is due to the energetic Secretary of the exhibition department, Mr. Alfred Morgan, of Liverpool and Southport. We must defer further notices of the Southport meeting of the Association till our next publication.

COLOURED PHOTOGRAPHS ON GLASS.

The daily and weekly newspapers have recently contained biographical notices of the late Cromwell Fleetwood Varley, the electrician, and given details about many of his discoveries in science, together with incidental references to the discoveries of other members of his family, for in his family inventive genius appears to be hereditary in the three last generations.

A few weeks ago his daughter, Mrs. Nelson Decker, began to teach herself "crystoleum" painting for amusement, and after a few weeks' work at it began to improve the process. She discarded the back glass, greatly improved the pictorial effect, and produced a more permanent picture in that it was all upon one glass instead of two, and was entirely coated with paraffine.

She tells me that she begins by cleaning the glass, as well as the face of the paper photograph, with benzine. Then she smears the "adhesive mixture" sold for the purpose upon the concave side of the glass, lays the photograph upon it face downwards, lays a piece of parchment paper upon that, and then by a scraping motion with a piece of wood presses out all she can of the adhesive mixture. She then leaves it to dry thoroughly before grinding away the hinder part of the paper of the photograph with sand paper, with which she thus reduces the thickness of the photograph to one-third.

Next she puts it in melted paraffine wax until it is transparent. The paraffine is warmed until it is just liquid and not very thin; it is kept at an even temperature by placing the vessel containing it in boiling water. When the photograph is taken out it is tipped up quickly to drain. Then she paints in, with *transparent colours only*, the more prominent parts of the portrait, such as the eyes, lips, hair, pieces of jewellery, and sometimes the cheeks when it is desired that the latter shall not be very pale. If these colours do not dry well she mixes them with a little japanners' gold size. The colours are then allowed to dry thoroughly, two days being usually allowed for the purpose. She then re-melts the wax in the bath, and afterwards, by an immersion rapid enough not to give time to re-melt the first coat of paraffine, gives the picture a second coat, and quickly tilts it on end to set so that the wax shall not thicken more at one place than another. This is the part of the operations which requires most "knack"—such, indeed, as can be attained only by practice.

She next paints in the complexion and other parts in solid body colour, waits until the colours are dry, then gives the picture another quick dip in the paraffine, after which she paints in the background. By this method, as I have seen by comparing the results, a better pictorial effect is produced than by the use of two glasses. The reason of the last dipping is to send the background far behind the rest of the picture.

Mrs. Decker says that, although some persons assert to the contrary, it is absolutely necessary to have some knowledge of painting to do this kind of work well. For instance: commercial teachers say that burnt sienna and yellow ochre make golden hair; but the fact is that, with some kinds of photographic paper and depth of printing in the photograph, the recommended mixture will produce "unmitigated carrots." With some photographs, again, it is almost impossible to produce the pink hue of the skin with the ordinary flesh mixture, namely, rose madder, Naples yellow, and white. In these cases, she says, it is necessary to use very little yellow. When the photograph is printed on somewhat pinkish paper it is necessary to use much yellow to make a good flesh colour.

William H. Harrison.

"HOW IT'S DONE."

In Three Parts.—Part I.

To borrow a phrase for a title from one of our popular entertainers is not perhaps a very dignified introduction to an article on an art-science. I hope, however, to make amends for it by leaving the reader somewhat less bewildered at the conclusion than the entertainer quoted. There are few occupations more engrossing connected with the pursuit of art *by those not regularly trained to it* than landscape photography. The fatigue an enthusiast will undergo to secure a few pretty photographs almost passes belief, and to those not interested in the work it is positively amazing to see anyone go through so much to obtain so little. The excitement, however, fully makes amends for the exertion bestowed. With what interest the development is watched! what jubilation if the results are satisfactory, and, must I say, consequent but quickly-passing depression if the negatives turn out failures! What healthful exercise both for mind and body is the search after the picturesque with a camera! Fatigue is forgotten and, if the hunt has been successful, positively gloried in. Few sciences or arts so happily combine full and pleasurable occupation simultaneously both for mind and body, and introduce their devotees to so many unexpected natural beauties, ignorance of which may be considered a misfortune.

Photography lends itself to both scientist and artist, and either one or the other can follow it to the full bent of his inclination, always finding something to repay him for his trouble. Moreover, it cannot be said to be time thrown away or wasted, even if the results are disappointing; for, unless the pursuer is very obtuse, he must add considerably to his general information. With such recommendations no wonder photography has become one of the most popular amusements and occupations with the intelligent of all classes, and one in which the pleasure conferred in securing a single brilliant and successful negative far overbalances the disappointment of a great number of failures.

It must be borne in mind that I am not addressing myself to those who take out a couple of dozen plates and bring home a couple of dozen perfect negatives, but to those less successful ones who feel satisfied if fifty per cent. of their work be first-class, and who pursue photography chiefly for amusement and love of art. The actual love of the occupation upon which we are engaged is, perhaps, in photography an absolute necessity. If our work is to be better than mediocre a certain amount of mechanical skill is undoubtedly necessary; but beyond this there is required a spirit of appreciation of the beautiful that has more to do with success than anything else. As soon as the photographer asks himself the question—"Will it pay to do this or the other?" and allows this consideration to enter into all he does and be a dominant power, refraining to follow any impulse to secure a beautiful effect because the pecuniary return for his trouble will possibly be *nil*, he may be excluded from the list of artists as never likely to produce anything but ordinary mechanical work unless by a "fluke." I believe it is safe to say that if the consideration of profit be allowed to influence all a man's work, *in an artistic sense*, that work will be inferior. Of course the professional photographer must look to the profits, or business would come to a standstill. There *must be a love of the work itself* independent of money considerations, if it is to deserve recognition as something more than a mechanical process.

Unfortunately artistic feeling and money-getting are somewhat incompatible—at least frequently so; and artists, as a rule, do not bear a character for brilliant business capacity. Sometimes a satisfactory combination takes place, and with eminently satisfactory results both for purse and reputation; and happy is the man who has the power to disassociate his ideas when he works, and keep his idealising and money-getting qualifications in distinctly-separate channels.

This, then, is the primary condition—the foundations as it were, of successful working. The next is the knowledge of what is to be done—not in an ambiguous, but thorough, manner. If possible the views intended to be photographed should be seen beforehand more than once and at different times of the day, and the best effects of lighting noticed, as we all know that under different conditions of light the same view may be either exceedingly pretty or not worth notice. So much depends

ı the direction of the light it is quite worth while to devote con- derable care and attention to this particular.

I may here remark that an exceedingly pretty effect on the *focussing-creen* is when the light is directly behind the camera, for the simple eason that the colours are brilliant and sparkling and the lighting ven; but a negative taken with such lighting will be very disappointing, ıaving a confused, spotty appearance—anything but artistic. The ›righter the light the worse the result. This fault is not uncommon. n the case of the last negative or so of a day's work, taken with a vaning light, the temptation is great to get the most light possible on he subject, and this is often the condition that is chosen. It is only ›ccasionally that such lighting is permissible, and then only on special ubjects. Views with much overhead foliage perhaps suffer as little as ıny, but for open landscape or architectural subjects it is always to be ıvoided.

The lighting that casts the longest shadows is most suited for effects, ›onsequently early in the day or late in the afternoon is better than nidday. It is not only advisable to select a light that casts good shadows, but to see that the *shadows are represented on the photograph*, ıs under certain conditions of sunshine there are no cast shadows that will photograph. In fact, the strongest light comes from the sky opposite the sun; the conflicting lights neutralise each other. This effect is ›ccasionally very marked. Rejlander once took a portrait out-of-doors where the sunny side was actually the shadowed side.

Many beautiful effects are to be secured with nearly front lighting, proper precautions being taken to shield the lens from the direct rays of the sun; a tree or a building at some little distance will often answer the purpose. I remember seeing a photographic gem produced from an apparently unpromising subject, namely, a flock of sheep being driven down a dusty lane that was barricaded with a gate. By the front lighting every object was relieved by a luminous outline, the bulk of the substance being in shadow, but not black, the dust raised by the sheep partly obscuring the distance and nearer trees, while the effect of atmosphere was very pleasing. This was by the old wet-plate process, and was considered then a very lucky exposure; now, however, with gelatine plates always at hand, many such "bits" are within reach of the photographer without any special difficulty. A slight veil produced by smoke, dust, &c., is frequently a most valuable aid to effect. The phrase that "distance lends enchantment to the view" is, undoubtedly, correct. Mist in slight, but varying, proportions gives an artificial distance that for pictorial purposes is exceedingly valuable. Anyone who has watched a mist come on amongst the mountains of Wales or elsewhere will at once see the pictorial value of mist in the proper place; hills and rocks near at hand, scarcely showing their irregularities, will in a few minutes be apparently removed a considerable distance, and their forms altered and metamorphosed in a most bewildering manner, but invariably with improved pictorial effect. This, then, is mist where it should be, to aid the photographer in picture-making.

A mist, however, that pervades everything—foreground and distance as well—is a condition of things utterly unsuitable for photography, as many know to their chagrin after making a long journey with a limited time for work. Day after day the same impracticable and impenetrable mist and haziness prevails; and with gelatine plates a very little fog goes a long way—so much so that it is simply waste of time to attempt exposures. We all know the peculiar flattening effect of haze in the shadows of the foreground; how, try as we may, the negative will be deficient in force and brilliancy. With wet plates a sort of compromise could be at times effected by a little extra intensification which would overbalance the slight deposit on the shadows; but with gelatine plates the case is different, and the same measures will not be followed by the same satisfactory results. It is quite hopeless to expect a fogged gelatine negative can be made to print even fairly well if the fog be apparent by transmitted light, and be more than a slight trace. A little surface fog—or, rather, opalescence—is not of much consequence, and I believe is preferred by some gelatine workers as tending to improve the richness of the print. But of all kinds of negatives to be shunned and avoided are under-exposed gelatine ones. They are totally devoid of luminosity—one of the greatest charms of a photographic print—and no other qualities will make amends for this shortcoming.

EDWARD DUNMORE.

ON THE REPRESENTATION OF COLOUR BY TONE.

PART II.

THE first thing the eye notes in a picture is the general effect of light and shade, and it is not until after that it examines the details. A picture full of the most microscopic details fails to attract or give pleasure to the eye if there be no broad, telling masses of light and no deep shadows; it will only be flat, spiritless, and unsatisfactory. The great difficulty in landscape photography is to avoid breaking up by small details the unity of the mass; but it will be found that, unless this can be done, the resulting picture will be little more than a waste material.

It will be impossible in an article of this kind, and without the aid of illustrations, to more than point out general rules, which can be applied to any class of subject. I would advise every photographer to follow the example of Sir Joshua Reynolds. In one of his lectures on the works of the Venetian painters he said—

"When I observed an extraordinary effect of light and shade in any picture I took a leaf of my pocket-book and darkened every part of it in the same gradations of light and shade as the picture, leaving the white paper untouched to represent the lights, and this without any attention to the subject or to the drawing of the figures. A few trials of this kind will be sufficient to give the method of their conduct in the management of their lights. After a few experiments I found the papers blotted nearly alike. Their general practice appeared to be to allow not above a quarter of the picture for the light (including in this portion both the principal and secondary lights), another quarter to be as dark as possible, and the remaining half kept in mezzotint or half-shadow."

These studies can be easily worked up with crayons and white chalk on tinted paper.

The careful study of good engravings will be found the best means of distinguishing what constitutes a good picture, namely, the harmonious arrangement of lines and the best effects of light and shade. It is by tracing such points to their source that we are taught the laws that govern works of art, and the mind soon becomes full of ingenious thoughts and artifices which it will apply to the everyday work of the studio, as well as to the selection of the best subjects suitable for a photograph among the multitude of objects found on the mountains of Wales and Scotland or the lake districts of England.

What is required in every picture is that there should be a leading mass of light which will attract the eye. This must not be a spot of white, but a gradual gradation of light from the half-tints; and there must not be any other equally-powerful mass of light to divide the interest. This rule will also apply to the leading mass of deep dark; and upon their relative position and power will depend more than anything the pleasing effect of the picture.

The nearer the high light and deep dark approach each other the more they give the effect of power; and the more they are separated and graduated by half-tones the more they will give the effect of repose. This influence of the relative position of light and shade can be used very effectively in the portraits of old age and youth.

These masses of light or shade should never be placed exactly in the centre of the picture, neither must they be situated in the corners of the picture, because if they are the eye will be attracted from the general interest of the view.

The principle of simple gradation from high light to deep dark would give a very heavy effect without secondary lights among the dark shades and dark shades among the high lights; but these secondary lights must not be so large as the principal one. This rule applies equally to the deep darks. Provided the great principle of gradation is maintained, lights and darks may be produced throughout the picture if neither appear *as a spot*, which, by attracting the eye to itself, injures the general effect.

Sir Joshua Reynolds's rule as to the relative quantities of light and shade must be understood to apply to general effects. In an extensive view in bright sunlight the half-tones must be light, and dark ones be only sparingly introduced; whereas in a view of close mountainous scenery under the effect of gloom the dark tones must predominate and the high lights be bright and sparkling.

Among the most telling of all artistic effects, and the one most easy of attainment by photography, is that where the deep dark is thrown immediately against the high light; but the same principle of gradation must be observed, namely, from the high lights there must be a gradation of half-tones sweeping round the picture until they culminate in the dark tones thrown against the high light.

In my next article I hope to show how we can apply these rules to the everyday work of the photographer.

HERBERT S. STARNES.

WHERE TO GO WITH THE CAMERA.

It is hoped that this series of articles will be continued at regular and frequent intervals during the vacation months, and we shall be glad to receive contributions to the series from any friends able to treat of new and interesting ground.]

CROMER AND NEIGHBOURHOOD.

"WHERE shall we go with our camera?" was the question proposed to me one evening lately when sitting in the family circle talking over matters photographic, and especially of the interesting articles which from time to time appear in the Journal under this heading. Soon a general interest was awakened, maps were consulted, and all points of the compass were suggested. We did not want to go away for any length of time nor for any great distance. Some places were too hot and relaxing; others were flat and uninteresting; others were stale and offered no fresh attractions. At last the question, "Why not try Cromer?" set us all thinking. It was new to us, and, if not too cold and bracing, it would be to us unbroken ground. While still wavering in our minds, an article in the *Daily Telegraph* hit the nail on the head and drove it home in our convictions that it would not be a bad place to try. The features portrayed in that article seemed to promise everything in favour of photographic pleasures, and it was not long before all things

necessary were packed for our journey in search of "fresh fields and pastures new."

A run of under five hours brought us to "the haven where we would be," and our first view of Cromer from the railway station on the brow of a hill soon told us we had done wisely and well in selecting "the village on the cliffs." There before us lay the wide expanse of ocean with nothing between us and the North Pole, while the quaint, little town, with its red-tiled roofs and its tall, old church tower, nestled in the bosom of the hills beneath us. An omnibus ride of about three-quarters of a mile landed us in the centre of the town, and soon an obliging landlady was doing her utmost to make us comfortable after our journey.

The streets are most irregularly built, and at every step offer quaint architectural features, which seem to invite a visit from the camera; but if the streets offer no attractions there is the wide, sandy beach, with its busy throng and its primitive jetty (you must not smoke tobacco on it under a penalty of twenty shillings, as a painted notice informs you). Then there are sand cliffs varying from 80 to 180 feet in height, with their broken lines, the effects of many a violent storm, and giving every gradation of light and shade. If these please not the fastidious photographer, good views of the town are obtained from the tops of these cliffs both from the east and the west, but especially from the west hill "when the evening sun is low."

The town and its immediate surroundings would afford work for a week's photographic enjoyments; but how dare I limit the duration of that enjoyment when we go further afield and explore those delicious old Norfolk lanes! They absolutely teem with picturesque "little bits." Every step presents some combination of woodland scenery, while ever and anon a peep of the blue sea furnishes its quota, as if anxious to share your appreciation of the inland beauties. What man with a love of nature and the photographic art but would revel in scenes like these! He is embarrassed by the riches lavished on every side, and especially is this the case when he pays a visit to the many parks and grounds to which he is generously invited.

Fellrigg Park, Sherringham Woods, and the Roman encampment—all within a radius of three miles from Cromer—offer many attractive views. But, perhaps, of all the places that would satisfy the lover of woodland scenery none could surpass a wood about two miles from Cromer, the entrance to which is called the "Lion's Mouth," why I could never ascertain, even from that reliable authority—"the oldest inhabitant;" for there is more of the lamb than the lion in its peaceful aspect. As you enter this Lion's Mouth from the Holt-road you descend a narrow pony road completely arched over by beech trees, whose gnarled trunks and weird limbs, interlacing overhead, may have suggested the name. But soon the avenue, with its curved and irregular path crossed at intervals by the rays of the sun as it pierces the wood, lies before you, and you walk over a carpet of fallen fir needles feeling that nature has laid her best Turkey carpet to receive you in state; for not a footfall breaks the silence, nor any sound save the rustling of the squirrels as they mount to the first branch and curiously inspect the three-legged intruder as you set up your camera. In this glade alone a dozen "shots" could be advantageously taken. A wide-angled rectilinear would be required in many cases, while a ten-inch lens would find plenty of work for it in the vistas which now and again are opened up to the gaze.

Perhaps our photographer may be archæologically inclined. Then his antiquarian tastes may be gratified by visits to Overstrand (two miles), Blickling (eleven miles), Beckham (five miles), and Fellrigg Hall (three miles), where abundant materials for many an interesting view may be obtained.

It is not the purpose of an article such as this to do more than indicate the localities where a camera might be profitably employed, and in closing it I can only recommend to those who have not visited this part of the Norfolk coast to pay a passing visit to this quaint little town on the Cliffs.

And now, anent the discussion which has lately agitated the members of the Photographic Club relative to the position of photography in the art world, I may wind up with an illustration derived from our experience in this little town, which may serve at least to show the estimation in which our favourite pursuit is regarded by some of its inhabitants. My daughter was one morning finishing a water-colour sketch of the old church, when one of the aged female residents came to look over her shoulder, and, in tones of undoubted admiration, exclaimed—"Well! bless my patience, that is beautiful! That is better than all them glasses can do!" So after that verdict we shall have to "dry up." T. Charters White.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

[From our Special Correspondent.]

The fifty-first annual exhibition of this Society opened on Tuesday, the 11th inst. The Earl of Mount Edgcumbe, President, was accompanied on the platform by Sir John St. Aubyn, Bart., M.P., Rev. Canon Saltern Rogers, M.A. (ex-President), Canon Phillpotts, Rev. F. R. Hole (of Constantine), Dr. Barham, Dr. Jago, F.R.S., and Messrs. T. S. Bolitho, Warrington Smyth, F.R.S., Howard Fox, Robert Fox, Alfred Lloyd Fox, Sydney Hodges, F. W. Mitchell, R. N. Worth, F.G.S. (Curator), W. Brooks, E. Kitto (Secretary), J. P. Bennett, N. Carne, and H. Tilly. Among those present were Lord Robartes, Colonel Tremayne, Major Parkyn (Hon. Secretary Royal Institution of Cornwall), the Revs. — Christopherson (Falmouth), J. S. Tyacke (Helstone), A. H. Malan, Messrs. C. H. Fox, W. L. Fox, R. G. Cheesman, E. D. Anderton, E. Bulmore, &c.

The body of the hall and galleries were well filled by a brilliant company. On rising to deliver the Presidential address,

The Earl of Mount Edgcumbe was received with great applause. He commenced by saying that it gave him great pleasure to be associated with the Royal Cornwall Polytechnic Society, which for the last fifty years had done so much to encourage the industries and arts of that county. He had also to congratulate them on the present exhibition. After the special effort made last year to commemorate the jubilee of the Society it might be reasonably supposed there would be something of a reaction felt this year, and rather a falling off in the exhibition. That he was happy to say had not been the case—certainly not in the most important branches of the Society's work, which seemed steadily to progress. The Mechanical Department was excellent, and there were several exhibits for the ventilation of houses and public buildings which were very important. He could not help feeling personally concerned in that matter himself, when he recollected the deep interest his father used to take in it. He also referred to the various departments of the exhibition, making special reference to the late disastrous accident at Wheel Agar mine, and was pleased to see several exhibits intended to prevent the occurrence of such accidents. In reference to the Fine Art Departments he could not say that they were quite so successful as on previous years. He also alluded to the Art Union in connection with the Society, which enabled artists as well as photographers to dispose of their works. His lordship then proceeded to deal with the Photographic Department, and called special attention to Mr. McLeish's view of Durham Cathedral, which he considered was a wonderful example of happy selection and artistic feeling. Mr. H. P. Robinson and others exhibited some wonderfully good figure groupings, which showed a great advance in that branch of the art. In instantaneous photography Messrs. Cobb and Son exhibited some most interesting works of London streets, which he was told were taken from the top of an omnibus. Messrs. Johnson Brothers, of Henley-on-Thames, exhibited some very interesting pictures of Henley regatta, which were little gems in their way; and the Rev. A. H. Malan had some good pictures of express trains going full speed. On the whole, this year's exhibition surpassed all former ones. The great success which attended that department was mainly due to the exertions of Mr. William Brooks, who had intimated his intention of trying next year to induce American photographers to forward pictures for exhibition. He himself had been conducted over the department by Mr. Brooks, and was delighted with the exhibits, which he was sure would be well appreciated by all who was interested in photography. In the department of photographic appliances, there was a very ingenious camera by Mr. George Hare, of London, with all the modern improvements, which seemed very perfect; there were also several exhibits by Messrs. Oakley and Co., of London, in reference to lantern matters worthy of attention.

The President's address was followed by speeches by Sir John St. Aubyn, Bart., M.P., and by Professor Warrington Smyth, F.R.S., and several others.

After the opening ceremony was concluded and the Exhibition declared open, the company proceeded to view the objects of interest exhibited. The Photographic Department came in for its full share of patronage, for during the whole of the day there was scarcely any standing-room in the department. Mr. M'Leish's prize picture readily found a purchaser, as also did several others, and there is no doubt that many of the best will be selected as prizes in the Art Union. It is a pity that photographers do not recognise the fact that by taking shares in the Art Union they are helping their brethren to dispose of their pictures. This is just thrown out as a hint for the future. The tickets are one shilling each, which can be had by post.

JUDGES' REPORT.

Photographic Department.

The judges have great pleasure in congratulating the Society on the success of the display in the department this year. The number of the exhibits is unusually large, and there is also a very marked improvement in the quality and general excellence of all the pictures submitted. The judges also wish to note the entire absence of anything approaching to careless or slovenly work, which was very prevalent a few years since.

In professional portraiture the exhibits are far below the average as regards numbers. Professional landscape work is exceedingly well represented, and there are also a large number of instantaneous works which, in some instances, possess a very high degree of merit. The amateur work is also good.

In the department devoted to photographic appliances there are several very clever inventions and improvements, which are well worthy of notice. This year there are several exhibits of lantern appliances, some of which are very ingenious.

Section I.—Professional Photography.

The Woodbury Permanent Printing Company, of London, exhibit several very important works of a high order, most notably No. 703, *Madame Modjeska*. They also exhibit two charming examples of enlargements on opal which are very fine indeed.

Ir. H. P. Robinson, of Tunbridge Wells, is very strong this year, and judges are much pleased to note the marked improvement over his ibits of last year. To his picture, *A Merry Tale*, a second silver medal been awarded.

Ir. R. Slingsby, of Lincoln, also sends a similar class of work, several mples of which are very clever.

'here are two exhibitors of lantern slides, viz., Mr. Fincham and Mr. G. Gwyer, whose productions show clean and careful work. They are stly by wet collodion, which gives rather too cold a tone.

Ir. Adam Diston sends three examples in his well-known style, the best which is *Gloaming*. Messrs. G. West and Son send a frame of studies yachts, which evidently are elaborately retouched. Mr. G. Higginson two pleasing pictures, *The Lych Gate* and *An Old Water Mill*. Mr. M. Sutcliffe has forwarded some of his pleasing little studies of shipping, , similar to last year's. Messrs. Cobb and Son, of Woolwich, send some raordinary examples of instantaneous work of the streets of London, ny of them taken from the top of an omnibus. To these a second silver lal has been awarded.

n old exhibitor, Mr. J. Milman Brown, has been awarded a first bronze lal for his picture *A Misty Morning*, which shows great artistic taste, g full of atmosphere, and is generally effective. Mr. R. Walter has a careful little bits of *Epping Forest*. Mr. M. H. Chubb sends two ctive productions in portraiture. Messrs. John Chaffin and Sons' ibits this year would have been better if they had received double the osure, being somewhat heavy. Mr. F. W. Broadhead is represented by exhibits in portraiture and a frame of views in Bradgate Park.

'he chief award in landscape has been made to Mr. M'Leish for his rming and effective production, *A Misty Morning on the Wear*, to which been awarded the first silver medal. Mr. Norman May is represented several examples of very careful work. Mr. George Renwick sends it frames of snow scenes. Being all of the same nature, they are some- t monotonous. Mr. J. Jackson sends examples of his work, the best which is *An Old Norman Doorway*. Mr. James S. Catford has some y pretty views, which show careful study.

Ir. H. J. Byrne is awarded a second silver medal for his excellent frame panel portraits. The former exhibits of this gentleman are well in the nory of the judges, who would like to see a larger style of portraiture n him.

Ir. Luke Berry exhibits a few examples of very careful work. Mr. E. Ellery sends some creditable examples of portraiture. Messrs. Day and contribute specimens of vignette portraiture, which are very soft and cate. Messrs. Johnson Brothers, of Henley-on-Thames, exhibit some y perfect specimens of instantaneous photography of Henley regatta. irst bronze medal has been awarded to No. 809 as being the best. They e also some exceedingly good pictures of harvest fields. The whole of ir work is very soft and delicate.

Ir. F. Argall, of Truro, contributes a capital enlargement of *Boathouse the River Fal*. He also exhibits a good enlargement of the late Bishop 'ruro, Dr. Benson, now Archbishop of Canterbury. Mr. W. M. Harrison, Falmouth, sends some very pleasing specimens of fancy portraiture. W. W. Winter contributes a frame of cabinet portraits, which are, in opinion of the judges, spoilt in the mounting, being too gaudy.

Ir. Lyddell Sawyer exhibits two pleasing outdoor studies, *The Rivals* g the best. Mr. T. G. Whaite sends several frames of his well-known lies, which are well worthy of attention.

Amateur Photography.

ome very interesting pictures of life and scenery in the wilds of Labrador Ungara, by Mr. J. R. Holmes, have taken the first bronze medal. manipulation is very good, considering the difficulties under which y must have been taken. Mr. J. G. Horsey sends several examples of work, some of large size; but they are a little too black and cold, and nany instances the subject is placed too low on the plate, which makes hills appear dwarfed. The judges are sure that Mr. Horsey can do er work, and hope that he will profit by these remarks.

Ir. T. M. Brownrigg displays a goodly number of examples of his work, ch are soft and delicate. These consist of Italian and English scenery. C. V. Shadbolt sends some very careful work. Signor A. G. liaferro contributes several instantaneous examples, which are very l. Mr. W. R. Ridgway sends one frame of views in North Wales, ch are fairly good. Mr. C. A. Ferneley, of Reigate, appears to be not ell represented as we have seen him in past years. Mr. E. Brightman n sends some of his careful work. To frame No. 872 a first bronze lal has been awarded.

r. P. H. Emerson sends a selection of views which are fairly excellent. Rev. A. Malan has been awarded a second bronze medal for some antaneous pictures of express trains which are very good. This class icture possesses one important feature, and that is it gives no idea of ion.

Photographic Appliances.

Ir. George Hare, of London, carries off the first silver medal for his patent camera, which appears perfect in every way, with great range ocus and every conceivable action, as swing back and swing front, ing nothing to be desired. Mr. G. W. Tweedy sends an instantaneous ter similar to Mr. S. P. Jackson's, only this one has four openings ead of two, passing one another. Messrs. J. F. Shew and Co., of don, send a shutter, also similar to that of Mr. S. P. Jackson's, with a lating screw to govern the exposure. Their other exhibits are of nary make, possessing no special feature.

essrs. W. H. Oakley and Co., are rather strongly represented in regard ntern appliances. Their model of portable lantern screen is a capital ngement, and the judges recommend it to the special attention of ernists. Messrs. Oakley also send a portable and ingenious reading p, which seems very perfect. They send specimens of their inter- gable mixed and "blow-through" jet, which is extremely well made. most valuable feature about it is that it is fitted with a double regulation cock, whereby, when the gases are once adjusted, a screw plug can be turned which shuts off all the gas, and then can be turned on instantly without any re adjustment, which is a very novel feature. A second bronze medal has been awarded to this cock. They have also some good substantial camera stands.

Mr. Cheney has several exhibits, namely, a changing-bag for dry plates, also a tripod stand and lantern screen elevator. The latter does not seem very substantial, and appears far too complicated to come into general use.

RECENT PATENTS.

FRENCH PATENTS GRANTED.

Class 20.—"A Magic Lantern." Coulon.—*Dated February* 5, 1883.

Class 17.—"Duplicate Box for Photographers." Mader.—*Dated February* 14, 1883.

Class 17.—"Gelatino-Bromic Paper for Photography." Balagny.—*Dated February* 10, 1883.

Class 13.—"Photoglyptic Impressions on Fayence, Porcelain, Glass, or Pottery." Keller and Guérin.—*Dated February* 10, 1883.

BELGIUM PATENTS GRANTED.

"Apparatus for Maintaining and Replacing Negatives or Dry Plates in Photographic Chambers." T. Samuels, of Monken, England.—*Dated August* 7, 1883.

"An Electro-Retoucheur for Photographers." J. Geesbergen, of Brussels.—*Dated July* 28, 1883.

"Photographic Apparatus." H. J. H. Mackenstein, of Brussels.—*Dated July* 26, 1483.

PATENT PROVISIONALLY PROTECTED FOR SIX MONTHS.

"Manufacture of Pliable Plates as a Substitute for Glass for Photographic Purposes." J. J. Sachs, London.—*Dated August* 14, 1883.

APPLICATION FOR PATENT.

No. 4443.—"Method and Apparatus for Measuring and Registering Luminous and Calorific Energy." W. Siemens.—*Dated September* 17, 1883.

AMERICAN PATENTS GRANTED AUGUST 21, 1883.

"Photographic Camera." M. Flammang, Newark, N.J.

"Case for Transporting Photographic Plates." H. T. Anthony, New York.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 26 ..	Bristol	Studio, Portland-st., Kingsdown.
,, 27 ..	London and Provincial	Masons' Hall, Basinghall-street.
,, 27 ..	Liverpool Amateur	Free Library, William Brown-st.
,, 27 ..	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Association, held on Thursday, the 13th instant, the chair was occupied by Mr. A. L. Henderson.

The evening was devoted to a demonstration by M. Hutinet (of Paris) of the use of his gelatino-bromide of silver paper, and the interest taken in the subject was evidenced by the attendance on the occasion, about one hundred being present. M. Hutinet was accompanied by Professor Stebbing.

Professor Stebbing, after expressing himself thankful to the London and Provincial Photographic Association for the opportunity of making a demonstration in such large and convenient rooms, said he had some considerable time since experimented in the manufacture of paper prepared with gelatino-bromide of silver for development, but had found, as he believed was the case with other early experimenters, that the image, instead of appearing bright and on the surface of the paper, had a dull, sunken-in appearance. This defect M. Hutinet had overcome, as would be seen by the specimens now shown. The apparatus required was of the simplest kind. A box, which might be a biscuit tin, would serve to enclose the gas burner—an argand of large size—and the necessary adaptation, chimney, door, and front, could be easily fitted up by any tinman. At the back of the box, or lantern, a large reflector was placed, and in front, instead of a condensing lens, was a sheet of ordinary ground glass. The negative was placed about three-quarters of an inch in front of this glass, and, at the proper distance, the lens. The focus was obtained upon a piece of ordinary white paper, placed in a pressure-frame which stood upon an easel and was kept upright by a hook from the upper part of one of the legs of the easel. After focussing, a piece of the sensitised paper was put into the pressure-frame in the place of the plain piece of paper which had been focussed upon. The exposure given was five minutes, and Professor Stebbing stated that, so different was the photographic power of gas as supplied to different localities, a negative which required four minutes' exposure when London gas was used, would, with Glasgow gas, require an exposure of one minute only. After exposure the print was developed, and the plan used and advised was to have the developer in a flat dish; and, after floating the paper, face down, to pick it up and see that there were no adherent air-bells, and then to immerse, face downwards, occasionally picking it up for examination

until development was complete. The time of development was eight or nine minutes, and the progress of the image was to be judged, not by its appearance as looked down upon, but by how it looked as a transparency. This was necessary, as there appeared to be a veil obscuring the brightness of the shadows. The veil disappeared upon immersing in hypo. Before fixing it was recommended to wash away the developing solution from the print by immersion in two changes of water. Upon the enlargement which had been made being shown round,

Mr. W. H. Prestwich noticed a few blisters, and inquired how that could have been prevented.

It was replied that the water used should have been colder and the print left longer in the hypo. When they did occur, however, they could be removed by pricking with a needle.

Mr. A. Haddon asked whether any colouring matter had been employed in the preparation of the paper, as he noticed that the specimens shown had somewhat of a pink tint in the light.

The reply was that no colouring matter had been used.

Mr. W. E. Debenham suggested that the pink coloration in the lights was a trace of what was generally known as green fog, this showing as pink when viewed as a transparency, the white paper behind sending the light back through the film.

The Chairman remarked that what was wanted was a method of tinting the blacks.

Professor Stebbing replied that in time methods might be found for obtaining warmer blacks, if that were thought desirable. For his own part he preferred a violet-black to the brown colour now fashionable in photographic portraiture, which, he thought, had been introduced by a photographer anxious to make money as fast as possible, and to economise the gold used in the toning-bath. He (Professor Stebbing) then showed a camera arranged for exposing successively portions of a length of gelatine wound upon rollers. There was also a dark slide for ordinary glass plates. No arrangement was made for focussing, the lens being placed at a distance which (he said) would not require variation for any object at a distance of fifteen yards or more. A finder on the camera top enabled the operator to select the limits of his subject. Specimens of film negatives were handed round, together with an enlargement from one of them.

Mr. Haddon said that with film negatives exposed behind a glass there was always some loss of light from reflection—not great when the angle of view was small, but considerable if it were large; some subjects, of course, required such large angle.

Messrs. E. Slater, G. W. Austen, and C. Walker were elected members of the Association.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The monthly meeting of this Society was held on Tuesday, the 4th instant, —Mr. Thos. H. Morton, M.D., President, in the chair.

The ordinary business was preceded by an interesting demonstration given by M. Hutinet and Professor Stebbing, of Paris. The subject was the development of M. Hutinet's new gelatino-bromide paper.

Professor Stebbing, in his preliminary remarks, said that the method he adopted was similar in many respects to that hitherto employed in this country; but the paper manufactured by M. Hutinet was the best of the kind either for enlarging or printing purposes. The firm in Paris had special machinery for coating, and were able to produce four hundred yards, a yard wide, per day, and of uniform quality. He briefly explained the apparatus for enlarging, which consisted of a lantern made of zinc, with argand gas burner, a concave reflector, and a ground glass for softening the light passing through the negative placed in front. The enlargement was effected by an ordinary rectilinear lens fixed in a camera enclosed in a box attached to the lantern. A printing-frame with plate glass, placed on an easel, served to hold the sensitive paper, face towards the lens. The exact focal distance being ascertained beforehand, and the room, of course, darkened, an exposure was made of three minutes. He (Professor Stebbing) said he had given five minutes when in London, but the gas appeared more brilliant and actinic in Sheffield. The exposure was correctly timed, as on development by M. Hutinet a fine enlarged portrait resulted, having excellent half-tones and purity of whites. A trial of paper by contact printing, exposed under a negative of average density for two seconds to a gas-burner, was also successful. Ferrous oxalate, Hutinet's formula, was employed in both cases.

Dr. Morton said that after seeing such splendid pictures made by this process from small negatives, it was a question whether large cameras in the field would be often used or even requisite. He congratulated Professor Stebbing and M. Hutinet on their success, and proposed a cordial vote of thanks to them, which was carried unanimously.

The following gentlemen were elected members, namely, Mr. F. Barker and Mr. Dalton.

It was resolved that the Society's exhibition be held at the Cutler's Hall early in January, 1884.

Messrs. Hadfield and Yeoman were appointed auditors, as this meeting closes the financial year.

A number of fine enlargements on Hutinet's paper were exhibited by Mr. Seaman; stereos. of Cornish scenery, by Mr. Rawson; and contributions by other members. The meeting was then adjourned.

Correspondence.

BOILING EMULSION BY MEANS OF STEAM.

To the Editors.

Gentlemen,—In the very interesting article under the above heading, by Mr. H. Y. E. Cotesworth, in last week's Journal, there appear to me to be one or two difficulties attendant on the use of the "three-ne[ck] receiver" for boiling the emulsion which I cannot quite see how to s[ur]mount.

The first is—Would not the bromised gelatine, as it begins to me[lt,] find its way *into the glass tube* which is inserted in the cork at the bott[om] of the receiver, and thus prove a rather dangerous impediment to t[he] free ingress of the steam from the boiler?

The second is—Supposing the force of steam, from the commenceme[nt,] was sufficiently strong to obviate this, how is one to get the emuls[ion] *out* of this receptacle after the boiling is finished without its runni[ng] down into the tube? If there were a stopcock in the glass tube close[] the neck of the receiver it might then be all easy enough; but witho[ut] something of this sort, or an india-rubber tube with a clip, it seems [to] be an awkward matter. Perhaps Mr. Cotesworth, for the benefit [of] those who wish to try this plan of boiling, would kindly explain h[ow] he himself manages in this respect.—I am, yours, &c.,

September 17, 1883. H. B. Hare.

To the Editors.

Gentlemen,—I have been induced to write to you after reading t[he] various articles on treating the emulsion with steam. I recognise t[he] value of the idea, and will give it a trial in a day or two. It h[as] occurred to me that this process will conduce towards uniformity [in] the manufacture of batches of emulsion.

As far as I can gather from the various articles on the subject it [is] proposed to employ a somewhat large quantity of water from which [to] generate steam. Is this necessary? If it require one drachm of wat[er] to generate sufficient steam to boil (or steam) say five ounces of emu[l]sion for half-an-hour, why use more? As soon as the drachm of wat[er] has evaporated the operation is completed, and I presume that, und[er] similar conditions, a drachm of water would do the same work.

Am I right in believing that by adopting the plan indicated a near[er] approach to uniformity in emulsification may be secured than [by] boiling?—I am, yours, &c., J. D. Lysaght,

Tipperary, September 15, 1883. *Captain 2nd West Riding Regiment.*

SPHERICAL ABERRATION.

To the Editors.

Gentlemen,—Absence from home has prevented me from earli[er] answering Mr. W. E. Debenham's last communication on *Depth [of] Focus.*

Mr. Debenham is courteous in his language and so precise in h[is] statements that I can find fault with none of them, and still do n[ot] quite agree with him. This is, however, I believe, because we are [in] fact arguing at cross purposes.

At the beginning a term is taken which is a misnomer. Whatev[er] interpretation is put upon it the term does not correctly indicate wh[at] is meant. Mr. Debenham puts a restricted meaning on it, making [it] describe a quality which cannot vary except by variation of the ape[r]ture or focal length of a lens, and is entirely limited by these. I wou[ld] use the term in question to express (or would find another suitable [to] express) something wider—what I may call a harmoniousness of d[e]finition—and which would possibly be applied better to the pictu[re] than to the lens producing it. Such a quality, indeed, *might* be pr[o]duced by a well-directed kick at the camera or by one of many oth[er] ways.

I have just received a copy of the Journal for the 14th of Septemb[er] and have read Mr. Brebner's letter. I think if he will re-read t[he] statements in my letter, in reply to Mr. Stillman, in the light of t[he] correction which I now make of a printers' error, he will see that the[re] is no departure from the "normal of truth." Certainly there is e[x]pressed no opinion which I at all incline to modify. Mr. Brebn[er] appears—in my opinion, justly—to incline to take Mr. Debenham[’s] judgment in the matter. I am quite sure that gentleman will agr[ee] with the statements I made when the necessary correction is considere[d.] For "no photographic lens unless it be occasionally used for axial ra[ys] or a portrait lens is without spherical aberration," *read* "No phot[o]graphic lens (unless it be occasionally, and for axial rays only, a po[r]trait lens) is without spherical aberration."

Of course I in no way blame Mr. Brebner for misunderstanding m[y] letter, which was in fact, as it appeared, incomprehensible—the faul[t,] doubtless, lying in my own careless writing. His questions I consid[er] most *apropos*, and I should be glad, had I time, to reply to them to t[he] best of my ability.—I am, yours, &c., W. K. Burton.

Seelisberg, Switzerland, September 16, 1883.

PLATINOTYPE.

To the Editors.

Gentlemen,—Permit me to say, in reply to the Platinotype Com[]pany's letter, that their new circular did not reach me till the wee[k] after my letter on their process had been posted, so that I had [no] directions from them as to development less than a year old. Had [I] received the new directions I should not have made any exception [to] them, as they most satisfactorily supply all the deficiencies.

y the way, if they can publish any process for removing the stains luced by the sepia developer from linen, &c., they would render a vice to some careless people.—I am, yours, &c.,

lorence, September 11, 1883. W. J. Stillman.

THE BRUSSELS EXHIBITION.

To the Editors.

Entlemen,—Whilst I appreciate your notice of my exhibits at the ssels Exhibition, kindly allow me to take exception to your critic's ignating them "well-known snow scenes." They are neither "well own" nor are they "snow scenes." As a matter of fact, they are first of the kind I have exhibited, and they represent the beauty of hoar-frost, no particle of snow having at that time fallen. The dis- tion is an important one.

Vith respect to the poetical quotations I placed under them: I am re that those who would not appreciate the pictures would not be ly to read the poetry. But the converse of this is also true; and ny would accept the pictures as a practical illustration of the beauty hat season of which the poet sings. Hence my quotations.—I am, rs, &c., Geo. Renwick.

urton-on-Trent, September 18, 1883.

OUTH LONDON PHOTOGRAPHIC SOCIETY'S ARTISTIC COMPETITION.

To the Editors.

Entlemen,—Will you please allow me to remind your readers that Committee of the above Society are looking forward with pleasure the next indoor meeting (that of October 4th), and hope to find the ess has been made good use of by the members with regard to the istic competition.

he subjects announced were—Figure: *Falstaff, Fisherfolk, Moving ures, The Milk Maid.*—Landscape: *A Country Road, with Finger t; Landscape, with Merrymaking; A Good Place for a Rest; A er View.*

s since the last meeting there has been plenty of fine weather, the ult should be an unusually good display of pictures.—I am, yours,

F. A. Bridge,
Hon. Sec. and Treasurer.

, Norfolk-road, Dalston-lane, E., September 17, 1883.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the Editors.

Entlemen,—Will you kindly permit me to remind intending ibitors that packing cases from the country must arrive at the lress of Mr. Bourlet, 17, Nassau-street, Middlesex Hospital, London, *later* than Friday next, the 28th instant; also that pictures delivered hand must be left at the Gallery, 5a, Pall Mall East, on the same , before nine p.m.

Any information respecting the exhibition, and also *slides* for the nday evenings with the optical lantern, may be obtained from— urs, &c., Edwin Cocking,
Assistant Secretary.

7, Queen's-road, Peckham, S.E., September 20, 1883.

THE RECENT COPYRIGHT CASE.

To the Editors.

Entlemen,—You rightly adjudge Mr. J. H. Jackson's letter inte- ting, and with your permission I will notice his points.

will firstly observe that neither myself nor your readers nor Mr. kson can have any concern with the price Messrs. Wilson and Frith rge for their landscapes, or the price for cabinet portraits of celebri- ; and it is a gratuitous piece of impertinence for photographers to informed, on this defendant's authority, that if these "celebrities" e charged at a cheaper rate "an immensely larger number would sold."

here is, unfortunately, some ground for this supposition when one s the costermonger's barrows in many of our large towns piled up h piracies of most of our notable photographic portraits, piracies of umerable copyright engravings, and piracies of suggestive if not ecent pictures, which, in the interests of morality, had better be signed to oblivion and ought to be relegated into the hands of the ice. The individuals who minister to these "increased demands" presiding over the destinies of their barrows and their contents ong to the great unwashed fraternity; and they will run over the tents of their stock to the possible purchaser somewhat after this ion:—"Connie Gilchrist, Kate Santley, Light of the World, Ketchi- chi—she's catching a flea in her chemise," and then follows a horrible from what might have been the fellow's countenance, but which *is* egradation of a face in keeping with the degraded smears on sale.

Vhen this defendant alludes to "the best authorities he has been e to meet" on the subject of the Copyright Act, and then endeavours lay down the law himself by stating that "with portraits it is very different," he reminds me of Molière's doctor in spite of himself, who, when in a fix, always rapped out the opinion of the "best authorities" to the utter exclusion of his own. Mr. Jackson is not so modest, but he should apply for information (say) to Mr. Bowen May, who, I dare- say, would kindly enlighten him "for a consideration," and he would learn that our present Copyright Act was passed to amend the old one, which did not apply to photographic piracies because the art of pho- tography at the time of the passing of the old Act was unknown. The new Act was passed mainly at the instance of Messrs. Graves, Gambart, and others, to prohibit the wholesale pirating of their engravings, and the robbing of their brains and the brains of the artists associated with them, by a set of fellows whose only "idea" *they* could "conceive" was the plastering of a work of art against a wall, sticking a camera in front of it, and so long as it was in focus "it was all the same to Sam." They were mechanics enough to go through a certain routine, thereby obtaining a stolen transcript of that which, did they live to the age of Methusaleh, they would never have had brains enough to conceive or to fashion except by their own nefarious manner.

The new Act, recognising the powers of photography, gave to photo- graphers a copyright in their works when duly registered, and whether landscape, composition, or portrait; and I imagine the framers of that Act little imagined the *old evil* would crop up again in a new form, and that a photographer having duly registered his photograph shall in these days be challenged that *with his own hands he did not do the work!*

The trade in photographic portraits is not of such recent growth as the defendant in the copyright case would have us believe. I can well remember portraits I made for sale in 1859; and one remembers Mayall's *cartes de visite* of the Royal Family, and can also recollect the piracies of these which soon followed. With portraits the "saleable value" is directly according to the "skill of the artist," and *not* "according to the popularity of the person represented." Let anyone try the leading retail houses in any large town with a *photograph* of a celebrity in one hand and a *smudge* of this same celebrity in the other, and he will soon gain practical experience. Let him also try the afore- said leading houses with a parcel of photographic celebrities and a parcel of pirated copies from these photographs and he will vastly increase his stock of experience, both commercial and moral.

The sitter is *not* at the mercy of the photographer, for no photo- grapher worthy the name would sell a single copy from one of his negatives without permission, and where the permission has been given the sale can never be "obnoxious." Let me also inform the defendant that it is a very general custom amongst *photographers*, when requested by a client to copy another person's photograph, to reply that they will obtain far better results if they will go to the studio where the negative was taken. These men value professional reputation, which is not increased by reproductions, however good, from paper pictures. The case is different with the "smudgers," who would "copy" anything which comes to their net; I verily believe they would like to dig up Shakespere's skull and "copy" that!

Mr. Jackson seems to stumble over my conceiving an idea. He repeats the phrase as if it were something new to his imagination; and here let me remark that there are amongst us but too many of those intellects which I must term *material*—that which appertains to our grosser nature, that which they can *see* as an action, that they under- stand. The visionary, the beautiful, the ideal, that which requires an exalting effort of mind to realise, that is not—never can be—theirs. I will suppose a case. A number of charming photographs are on view: what is simpler than for greed of lucre to stick them up in rows, plant a camera in front, copy the lot, and undersell the original works from which they were taken? Now this is an act, a material piece of work, requiring no mind; for *mind* would rebel against such malpractice. For the parallel I conjure up a mighty work. There is nothing to *see*, but the whole is complete in all its details; it exists solely in the brain of its creator; it is an "idea conceived" in the mind of genius; it is a con- ception to be made visible by means of chisel or paint, or camera, or lyre. I wish this conception, and the result of this conception, protected; and, whether it appeal to the grosser part of our nature by means of sweet sound or by brilliant colour, I wish the "idea," the "conception," and all the technique through which this inception is made visible to our eyes—I wish this all protected in the name of the man whose genius first created it.

Mr. Jackson charges me with "forgetting that probably Sir Christopher did not first conceive the idea of building the cathe- dral." I could not forget that which neither myself nor history ever knew. Sir Christopher's cathedral is simply in place of the old one destroyed. The notion of having a religious edifice in this locality originated years before Wren was thought of; and this is an excellent example of *Materialism.* This gross part of human nature in the "idea" of a cathedral sees nothing but the stones—the mass by which it is reared. To the artist the "idea" of a cathedral will resolve itself into a visionary fabric full of harmonious detail. The beautiful is formed by the creation of his brain, but the real does not exist till the "man who does the work" steps forward in the shape of the mason; and *his* rude hands, according to the Court of Appeal, are to be dubbed *author's* hands!

To speak candidly, there is no doubt the judges have hitherto mis- construed the strict meaning of the word author. A reference to Skeat's

Etymological Dictionary, published by the University Press, would have saved all this trouble, would have given us not law but justice, and would have rightly designated "the man who went to the Oval" as *the man who did as he was told*.—I am, yours, &c.,

September 15, 1883. AUDI ALTERAM PARTEM.

EXCHANGE COLUMN.

I will exchange gem camera (twelve lenses), Victoria camera (nine lenses), both new, for anything useful to value.—Address, C. P. GEE, Weymouth.

What offers in exchange for 10 × 8, 8½ × 6½, 6½ × 4¾, and 4¼ × 3¼ negatives, only once used, best flatted crown?—Address, M. BATISTE, 29, London-road, Reading.

I wish to exchange enlarging apparatus, with four and a-quarter-inch condenser and duplex lamp, for outdoor whole-plate camera or anything useful in photography. Can be seen at work.—Address, W. F. SLATER, 282, Albany-road, Camberwell, S.E.

Wanted to exchange, a good microscope (three powers) for a light, portable, whole-plate camera with double backs and rectilinear lens.—Address, A. BUGG, photographer, Stowmarket.

I will exchange my No. 2 quick-acting portrait lens, by Tench, two inches diameter, five inches focus, rack-and-pinion, and seven diaphragms in case and in new condition, for 8½ × 6½ bellows-body, dry-plate camera with double back, &c., &c.—Address, J. TUCKER, 4, Samuel-street, Woolwich, Kent.

Wanted, 12 × 10 or 10 × 8 portable camera with double dark slides, in exchange for Dallmeyer's stereoscopic camera, rack-and-pinion, shifting front, and two No. 1 B lenses (coincident), or Marion's nickel-plated cabinet rolling-press, cost £3 3s. Difference adjusted.—Address, T. T., 2, York-street, Covent Garden, W.C.

I will exchange superior cornet with eight connections, "each being different keys," by Ancte. Courtoise, Aine, Paris, for a *carte-de-visite* and cabinet camera—must be good; also, *Illustrated London News* from 1847 to 1853, bound in eight volumes, for Archimedian camera-stand for studio.—Send photographs and particulars to J. S. W., 71, Queen-street, Hull.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

George Patterson, Photographic Studio, Ramsey, Isle of Man.—*Photograph of Storm at Ramsey, May 8, 1883.*

Robert Banks, 73, Market-street, Manchester.—*Photograph of the Hills of the Isle of Man, as seen from Blackpool.*

ALF. WATBURN.—A patent did exist, but it expired some five or six years since.

LYCOPODIUM.—Write to M. Hutinet. He will probably supply what you require.

GRANGER STOCK.—Messrs. Marion and Co. will, no doubt, supply you with brass rims of any size you may require.

W. B. M.—At a future time we may devote an article to the subject, which will afford you fuller information than we can give in this column.

S. BULLEN.—Change the gelatine. What you have been using is not suited for dry-plate work. In place of it employ the "X opaque" of Messrs. Nelson, Dale and Co.

CHARLES SUTTON.—Possibly some photolithographer would supply the paper, but we are rather inclined to doubt it. The paper, when sensitised, rapidly deteriorates. It must be used freshly prepared.

DRY PLATE.—If the plates give green fog they are not suitable for making slides for the magic lantern—even if developed with ferrous oxalate, as then, as a rule, they will be slightly veiled, which will prove fatal.

SOUTHEND.—You will find fuller information in the article on the magic lantern in our ALMANAC for 1877 than it is possible for us to afford you in this column. In the same volume you will find several receipts for varnish.

HOPE.—We fear that with your limited knowledge of photography you will stand a very poor chance of succeeding in any of the principal colonies. Better improve yourself in operating before you start, particularly as you have such a good opportunity, as you say, for so doing.

H. S.—A faded daguerreotype may be restored—or, to speak more correctly, the varnish may be removed—by treating it with a weak solution of cyanide of potassium. You will find full details for renovating and copying faded daguerreotypes in the back volumes of the Journal.

SYNTAX.—Notwithstanding all the care you say you have bestowed on the negatives it is clear that they are imperfectly washed, and the stains are produced by the hyposulphite still remaining in the film coming in contact with the silver paper while printing. The remedy, in future, is obvious.

REDUCE.—All will depend upon the agreement with your clients. If you agreed that they should retain the copyright then, of course, it will not be legal for you to copy the work of any dimensions. The mere fact of your making the copy a smaller size does not exempt you from a charge of piracy and its attendant risks.

J. PARKINSON.—Your best plan of disposing of the apparatus is to advertise in our columns devoted to the purpose. You must bear in mind that very large portrait lenses are but little in demand at the present time, so you must not expect to obtain a very high price for your instrument, although it is by a maker of high repute.

A. FRANCIS.—The lens mentioned is what is known as a "wide-angle" len and will probably include an angle of seventy-five degrees, if you empl it on a ten-by-eight plate. As a matter of course, if you use it on smaller-sized plate it will then become a narrower-angled instrument.

PUZZLED.—The cause of the fog on the plates, which you say always com in the same place—and the examples you have sent prove this—is that tl dark slide is defective. If you examine it closely you will find that tl join at the angles of the bottom of the slide admits light. Probably tl glue has given way, and the joint has opened.

RAVEN.—By "collodion plates" do you mean "dry collodion," or plat by the wet process? If the former, they will keep in good conditio when properly prepared, for many months. If the latter, they will kee as long as you can preserve them in a moist condition. Various plai have at different times been devised for retaining them moist, such treating them with glycerine and similar substances. Then they may kept for several weeks in a working condition.

O. Q. P. J.—1. As you are likely to require a number of copies your be plan will be to make an enlarged negative, and, after retouching it, prin the copies in the usual manner. Or you may make an enlarged cop and, having worked it up in monochrome, re-copy it, and from th negative thus obtained print the required number of copies. This latte is the plan usually pursued when a large number is required; but, c course, it necessitates the possession of a very large apparatus.—2. I you send us a print, together with a postal order for one-and-sixpence we will effect the registration for you.

RECEIVED.—G. A. Herschell, M.D.; Thomas Furnell; F. A. Bridge M. Campbell, &c., &c.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next Month Technical Meeting of this Society will take place on Tuesday next the 25th instant, at the Gallery, 5A, Pall Mall East. The chair will b taken at eight p.m.

BRITISH PHARMACEUTICAL CONFERENCE.—As usual, the peripateti body bearing the above designation has held its twentieth annua meeting at Southport, taking precedence, in order of time, of th meeting of the British Association. The President for this year i Professor John Attfield, Ph.D., F.R.S., F.I.C., F.C.S., &c. Th meetings were held at the Prince of Wales' Hotel, Lord-street, an was more numerously attended than usual. Among those who wer present and whose names are familiar to our readers were Mr Reynolds (Reynolds and Branson), Leeds, and Mr. John Williams London. The President delivered a very able address, bearing on the present relation of the State to pharmacy, which he pro nounced to be very unsatisfactory. After allusion to the depressed condition of pharmacy in this country, and giving his opinion as to the causes of such depression, the President said:—"With all this evidence he thought everyone would admit the following propositions:—First that pharmacy in this country, here and there in a fairly-prosperou state, and nowhere actually *in extremis*, was, nevertheless, in a very seriously depressed condition. Secondly, that the prominent cause o the depression was the loss of trade in drugs of guaranteed quality and loss of professional practice of pharmacy by the responsible, quali fied, and registered chemist and druggist, and the acquirement of trade in drugs of unguaranteed quality by the irresponsible, unqualified, an unregistered trader. As for the professional practice in drugs lost by the qualified druggist, that had not been acquired by the unqualifie druggist, and, therefore, had been lost to the public. Thirdly, an chiefly, this condition of things was seriously prejudicial to the public welfare. Other minor causes influenced the depression. Amongst these were persons taking less physic than formerly. Children in health were not now dosed weekly, even with brimstone and treacle, and healthy adults did not, as a rule, periodically dose themselves. Homœpathy and hydropathy had had their influence in this direction. Medical men had ceased to prescribe those complicated combinations of half-a dozen or a dozen remedial agents which could scarcely be dispensed elsewhere than in the well-appointed shop of a chemist and druggist. They relied now rather on a few active principles, or on the officia single compounds of the pharmacopœia." The Conference has hitherto been held annually at the meeting-place of the British Association, but as the pharmaceutists will not migrate to Canada with the "wise men" of the latter Association next year, it has been arranged to hold next year's Conference at Hastings, the President-elect being Mr. John Williams, F.C.S. (Messrs. Hopkin and Williams), London.

LONDON GAZETTE, *Friday*, *September* 14, 1883.

PETITION FOR LIQUIDATION BY ARRANGEMENT.

E. R. TAYLOR, Edgware-road, Paddington, London, photographer.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1221. Vol. XXX.—SEPTEMBER 28, 1883.

CLOUD NEGATIVES AND THEIR PRODUCTION.
[Second Article.]

In continuation of our article of last week we now come to the question of the actual production of cloud negatives. Most of our readers who have used cloud negatives are more familiar with them in the form of paper negatives than upon glass, though clearly there is no reason, beyond that of convenience, why the latter medium should not be employed. On the score of convenience alone, however, the conditions are so strongly in favour of paper negatives that we shall devote special attention to their preparation rather than to glass ones.

It is, perhaps, preferable, though by no means absolutely necessary, to employ a glass plate for the production of what we may term the original negative. We strongly advise our readers to have nothing to do with "artificial" clouds made with cotton wool or similar "dodges;" but to go straight to nature, and when striking or suitable cloud combinations present themselves to photograph them in the camera. For this purpose, as we have said, it is preferable to use glass plates, though gelatino-bromide paper is also available. We give the preference in this case to glass because the glass negative presents greater facilities for the removal of slight defects, and is, besides, less liable to spots and irregularities than is the case with the gelatine-coated paper. Nothing is more objectionable than a spotty sky. In no part of a picture do small defects show more glaringly than in the sky; hence it is of the utmost importance to secure, in the first place, a negative which is as free from faults as possible. That being gained the rest is comparatively easy.

We will suppose, then, that a cloud negative has been obtained in the ordinary way—upon a glass plate in the camera—and that it has been rendered as perfect as possible. This can, of course, be used directly for the printing-in of clouds in landscapes; but we prefer, for many reasons, to look upon it as a more valuable property, to be used only in the reproduction of duplicates, which, for convenience, may be of paper. Thus the paper negatives, which are economical, especially when home-made, may be cut and adapted to special negatives; each landscape negative may, indeed, have its own corresponding cloud negative specially prepared for it, and so a world of trouble be saved in fitting a suitable set of clouds each time they are required. In occasional instances, where the nature of the sky in the landscape negative will permit it, the cloud negative, if of paper, may be permanently attached to it, and so the printing be done in one operation, which is impossible in the case of glass. Besides this, the paper negatives are less liable to damage, and will, in fact, stand any amount of rough usage.

For the production of the paper negatives nothing is better, or even so good, as ordinary albumenised paper. This is obtainable of such a uniform character as regards texture, and is so completely under control in working, that it is peculiarly adapted to the purpose. It is, moreover, cheap, and requires no special knowledge or manipulation to enable anyone to work it. The only hints we need give in connection with the printing are the following:—First of all a deeply-printed *positive* is produced from the glass negative, and from this the paper negatives are in turn printed. In performing the latter operation let the *back* or *unalbumenised* side of the paper be placed in contact with the negative. In this manner the image is formed in the body of the paper and possesses a considerably greater printing value than when it is confined to the surface. It is not absolutely necessary to tone the paper negatives, though we prefer to do so, as then the strength is not so greatly reduced in the fixing bath and the image is subsequently more permanent.

Having been toned, fixed, and washed in the ordinary manner, the cloud negative may be at once applied to its intended purpose without further treatment beyond smoothing with a hot iron or by any other suitable means. In order, however, to facilitate the printing, as well as to remove any "grain" that may be visible, most operators prefer to render the paper translucent, which may be effected in a variety of ways—as by means of wax, Canada balsam, drying oils, &c., &c. Most of these plans were formerly in use in the days of paper negatives, and all had their objections, chiefly in connection with the gradual decomposition of the material employed and the consequent discolouration of the negative. In the case of a landscape negative this frequently resulted in its serious deterioration, if not absolute destruction, for pictorial purposes; but in the case of a cloud negative the matter is not one of such great importance, while a negative that becomes unprintable is so easily replaced by another that very little trouble need be feared on that score.

Let us suppose, then, that a number of paper negatives have been made as above described, and we wish to render them translucent. We will first try the wax method, using for the purpose the so-called "paraffine wax" or solid paraffine used for candle making, which is far cheaper and less liable to discolour than bees'-wax. Procure a tin dish a little larger than the negatives, and place in it—broken into small lumps—sufficient paraffine to fill it to the depth of half-an-inch when melted; apply the heat of a water bath or gas stove until the paraffine becomes perfectly fluid, taking care not to over-heat. Now take the negatives singly and pass them through the melted wax, taking care that every portion is covered; draw the negative over the edge of the dish so as to remove as much as possible of the superfluous wax, and lay aside until the whole are treated. The paraffine will solidify almost instantly on the removal of the negative from the dish, and the paper will retain an unnecessarily large quantity. In order to remove this the negatives are placed in a pile with alternate sheets of clean blotting-paper or even of unwaxed negatives, and a hot iron is passed over them for a minute or two. In this manner the wax is melted and the excess absorbed by the alternate leaves of bibulous paper.

Such negatives, if bent or creased, exhibit a dark mark resulting from the destruction of the translucence of the waxed paper. This may generally be remedied by passing a hot iron over the negative or by holding it to the fire.

The waxing method is the cheapest, easiest, and quickest, and answers all purposes for cloud negatives; but, if greater transparency be needed, a mixture of one part of Canada balsam with three or four of spirits of turpentine should be brushed over the paper on both sides, each coat being allowed to dry thoroughly before applying the next. If two applications do not produce

sufficient transparency repeat the operation until the desired result is attained. Another but a more tedious plan consists in using a colourless drying oil, such as nut or poppy oil. Very beautiful results are obtained thus; but the negatives take days or even weeks to become thoroughly dry. We repeat, however, that the wax method answers every purpose. We shall next week give a few hints on the use of cloud negatives, our space being exhausted this week.

STUDIOS IN A DANGEROUS CONDITION.

As will be seen from a paragraph in another column, a somewhat serious accident has occurred at Glasgow through the destruction of a photographic studio by the wind. As this is a season of the year when rough weather and heavy gales may generally be anticipated, the occurrence requires more than a passing notice, so that photographers may be forewarned against a similar catastrophe.

The details of the accident are somewhat meagre, but it appears that during a heavy gale which passed over Glasgow on Thursday, the 20th instant, a studio, situated at the top of a four-storey building in one of the crowded thoroughfares, was blown to the ground, and several persons passing at the time were seriously injured by the falling *debris.* We are uninformed as to whether the studio was of recent construction, or if it were one that had been in existence for a lengthened period.

Be this as it may, one thing is quite certain—it was of insufficient strength to withstand the pressure of wind to which it was subjected. We fear there are scores of other photographic studios in existence on the tops of houses in crowded thoroughfares which are equally unable to resist the enormous pressure exerted during what is known amongst meteorologists as a "violent gale," if they happen to be exposed to its full force. Fortunately, inland towns are seldom visited with hurricanes of this description, otherwise we should doubtless more frequently hear of the wreckage of photographers' "glass houses" than we do at present, though the destruction of a studio in London by wind is not an unknown circumstance.

There are many studios now standing which were built more than twenty years ago—during the *carte* mania—at a time when it was considered imperative to have as much light in the room as possible. The sash-bars, in most instances of wood, were generally as slight as they could well be made, while, with a view to obstructing a minimum of light, the roof and side lights were seldom built after the plan usually adopted with greenhouses or conservatories, namely, having stout rafters in the roof and sides, at intervals of a few feet, into which the sashes are fitted. When this method is carried out the structure is manifestly much more substantial than when the former plan is adopted. We have been in several studios constructed with wooden sash-bars so slight, considering the pressure of the roof, that they have bent considerably with the weight of glass alone, and it has been found necessary within a very short period to fit stout iron bars beneath to strengthen them. Considering that many of the old-fashioned "glass-house" studios were built on the lines we have described—frequently at the lowest possible price and without the supervision of an experienced architect—it is surprising that there are not more accidents, particularly if, as was usually the case, the structure was erected in the most exposed situation in order to secure an unobstructed light.

One danger in connection with buildings of the fragile character alluded to is that the exigencies of the building act, in many cases, rendered it practically impossible to secure the structure to the walls of the house upon which it is erected; hence they were simply built upon the roof, without being connected with the main building either at the sides or ends. Unless very substantially constructed in the first instance, buildings so placed, by exposure for many years to the elements, will necessarily become considerably weakened and eventually dangerous during heavy storms. The modern photographic studio differs materially from that to which allusion has been made. It is not now considered necessary to have nearly so much glass as formerly, consequently the studio of the present day, as a rule, is a far more substantial building—the ends and a portion of the sides being usually of brick, and the sash-bars of iron—particularly where the studio is erected in an exposed situation.

That an idea may be formed of the enormous pressure exerted by the wind during a heavy storm, we may mention that in the meteorological reports the force is tabulated as from 0 to 12. In the *Barometer Manual*, compiled for the Board of Trade by the late Admiral Fitzroy, number 12 on the scale is given as "violent," the wind then having a velocity of eighty miles an hour, and at this velocity it exerts a pressure of thirty-two pounds to the square foot. From these data it is easy to calculate the pressure exerted upon a studio of given size. Inland, it seldom happens that we are visited with such very heavy storms as are represented by the highest number; but frequently, during the equinoctial gales prevalent at this season, we have storms which, in force, reach from 8 to 10 on the scale. These are equal to velocities of something like seventy miles an hour, and exert a pressure of about twenty-five pounds to the square foot.

Fortunately it is seldom that a photographic studio receives the full force of the wind "broadside on," as it is usually broken up and considerably modified by chimney stacks or surrounding buildings, otherwise there can be little doubt that many which are slightly built would fare badly during heavy gales; for if the wind should gain access to the interior the whole structure would at once become a perfect wreck.

It is not our present intention to say anything with regard to the necessity of building studios in a substantial manner in the first instance, as that question has been treated on several previous occasions. Our object now is simply to direct attention to the condition of many old and, in some cases, disused studios, which from the length of time they have been standing, their fragile character in the first instance, and the decay they have undergone, are now in a more or less dangerous condition, though little suspected of being dilapidated. This we do in order that their owners may be induced to take such precautions as may be necessary to avoid a similar catastrophe to that which occurred last week at Glasgow.

Apart from the serious loss attending the wreck of a studio, and the suspension of business, the owner is liable for damages for any injury that may be sustained, either to life or limb, or the destruction of adjacent property by the falling materials, if it can be proved that he was cognisant of its dangerous or defective condition.

VARIATIONS IN THE DENSITY OF NEGATIVES.

If the professional enlargers cared to do so we imagine they would be able to give us some interesting details as to the extent to which the negatives now sent to them by their clients vary in density—from the weak and, for printing purposes, useless image, to the dense and almost equally unserviceable negative that requires a day's sunlight to impress the silver paper. We do not refer so much to the varied types of negative affected by different operators. Opinions will always be at variance on the question of the density required for a good printing negative, some operators aiming at a strong deposit for the purpose of gaining richness in their prints; while others, in order that the utmost delicacy may characterise their productions, dread any approach to excessive strength of image lest it should give prints that would be hard or possess too great contrast. We speak more particularly of the different characteristics of the work of a single photographer. In the old wet-plate days every operator had a distinct type of negative in view, and he generally succeeded in reaching it and in obtaining fairly-uniform results; but with dry plates it will be found that an average character is less commonly attained.

Many causes combine to bring about this lack of uniformity—want of appreciation of known facts of dry-plate manipulation being among them. Others we may briefly glance at, so as to afford subject for discussion, in order that some, at anyrate, may be benefited by our remarks.

One matter of high importance is the non-uniform character of the light under which the plate is viewed and its intensity judged

of. In wet-plate work we are aware the same state of affairs exists, yet it has not the same influence on the result; for, as a rule, there is always in the case of wet plates such an excess of light present that even on the dullest day there is usually no difficulty in gauging the strength of the image. But with dry plates, on the contrary, not only is there less initial light under which to scan the negative, but the latter itself requires to be so much more visually opaque before fixing, on account of the apparent loss of strength brought about by the hypo., that the two causes combined often render the judging of the density of a negative a matter of guesswork rather than of observation. If, however, the plate were always examined under one uniform and sufficient light, such as could be obtained by a gas burner, a very important gain towards estimating the strength of the negative under examination would be made.

But a fairly-average density once obtained a factor comes into play which seems to have escaped general notice, and one which is more likely to occur with the careful than the careless. We mean a gradual increase of density which supervenes when an unfixed negative is left for any length of time to soak in water preparatory to fixing. With the photographer who merely gives his plate "a rinse" after developing or "aluming," and then proceeds to fix, no such effect is likely to occur; but when, in order to secure the complete removal of chemicals, plates are allowed to accumulate in the washing trough while others are being developed, those earliest developed would, if examined, be found to have gained a decided increment in density over those last placed to wash, though the operator might imagine all to be alike in that respect, as, indeed, they might have been when first placed in the vessel of water.

If allowance be made for this added density, when judging of the right moment to take the plate out of the developer, there will be less fear of want of uniformity being found in one batch. But the thought naturally will arise that it might be better to leave the plate in the developer until it reaches exactly the right density, as far as can be judged, and then to arrest further action at once. This could be very easily done by immersing it, as soon as withdrawn, in a weakly-acidulated bath. A quarter of an ounce of citric acid to a pint of water would effect all that is required; this will assist in preventing the gradual growth of the inevitable yellow stain, and would aid in giving the much belauded "wet-plate character."

Care would have to be taken that a very thorough washing was given before putting the plate into the hypo., as, otherwise, decomposition would be induced; and, as the acid would have a tendency to create frilling with some brands of plates, it might be combined with alum. There would then be no need at all to wash after this, as after the slightest rinse the negative might be steeped at once in the acid and alum without fear of precipitating alumina within the texture of the film, and so injuring its printing quality; but, again, we would say that copious washing should follow the withdrawal from the acid and alum solution to preserve the integrity of the negative in the future.

With regard to the actual power of obtaining density we now hear few complaints, while a year or two ago many were grumbling at their plates and the impossibility of obtaining dense negatives, though others from the outset laughed at such murmurings. We now hear little of the sort, owing, we believe, as much to increased knowledge as to improvements in the quality of the dry plates of commerce. It is, however, even yet insufficiently understood in what manner the individual chemicals employed must subserve intensifying purposes, and we again repeat that the extent to which ammonia is added influences the density more than anything else. We leave on one side, of course, the strength of deposit in an under-exposed and the weakness in an over-exposed negative; that everyone is aware of. But apart from that we may again point out that whenever the development fails to bring out sufficient strength of image the addition of ammonia will materially assist in increasing it, and, in fact, will generally enable any amount of density to be attained. There is, of course, a limit to the extent it may be employed, seeing that fog—green or grey—will accompany any considerable excess; yet there are occasions when even that evil may be borne with so that increased strength of image may follow.

When a negative is badly over-exposed, density without after-intensification is, as we need scarcely observe, next to impossible to attain with even large doses of bromide; the image will creep up till all is flat. But we find sufficient use is not made of the employment of citrate in the developer in this connection, and we know that there are many photographers who have never even tried it. We would inform them that if, with a very greatly over-exposed plate, a quantity of citrate of ammonia solution (four grains of citrate to each minim of ammonia is the quantity we first recommended, and which we still find suitable) be added to the pyro. solution the development is practically arrested, and the plate may lie in the bath for a long time without fear of further details appearing, and until complete intensification is arrived at, even with a very greatly over-exposed plate. The use of this chemical is of such great value that we do not hesitate thus again to refer to it.

Another cause of variation in intensity may be here referred to, namely, the loss of strength which, especially with some makes of plates, is brought about by prolonged contact with hypo. Plates left to drain from the fixing solution, as we recommended, to avoid frilling will lose density if the draining be permitted to continue for too long a period.

We will conclude by touching upon that other well-known effect—the yellowing of the gelatine film by over-long immersion in the pyro. Sulphite of soda, in quantity four times that of the pyro. present, will greatly retard its appearance, but will not prevent it entirely. The fixing bath, when fresh, will take a fair proportion of colour away; but if it be at all strong the alum and acid bath will be required and will be useful—not only in assisting to produce a uniform class of negative but also in improving its quality. We believe that if more attention be paid to the points we have here lightly indicated there would be not only a nearer approach to uniformity in the density of each worker's negative but also a palpable and decided improvement in their quality.

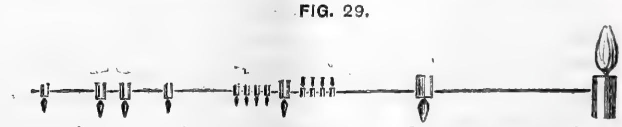
THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XXI.—Optical Contact. Cementing Lenses.

The fewer the reflections in or connected with a lens the better because the invariable tendency of these is the fogging of the plate. Some lenses distribute the reflections all over the plate; in the case of others a concentration takes place upon the centre of the negative. The former is not good, and the latter is highly objectionable.

What we here mean by reflections will be better explained by a demonstration. Take a portrait lens and step with it into a darkened room. Light a candle and place it at a distance of a few feet; then hold up the lens in the line of the candle light, when a repeated duplication of the image of the flame will be seen, some of these images being erect, others inverted in something like the order shown in the adjoining diagram (*fig.* 29). This is a highly-instruc-

FIG. 29.



tive experiment, and costs neither time, labour, nor pecuniary investment to carry it out.

Now, seeing that the fewer reflecting surfaces there are in an objective the fewer will be the number of these reflected images, of course, it follows that the multiplicity of such surfaces is an evi, and for this reason opticians have sought to make the inner surfaces of achromatic lenses "contact curves" as far as possible. The reason for this is obvious: if these inner surfaces be concentric as regards curvature, it is only necessary that they be placed in *optical* contact to ensure a nearly total elimination of the reflections that would inevitably arise were the contact between them merely mechanical instead of being optical. To secure the latter, all that is necessary is to interpose between the two concentric surfaces any clear fluid—such as water, oil, or varnish—when the interior surfaces that could previously be seen by looking down upon them immediately disappear, and the lens appears to be formed of one homogeneous piece of glass.

Of the various substances employed in the cementing of achromatic lenses, that which is most generally preferred is Canada balsam; for it is easy of application, possesses the requisite degree of transparence, and dries quite hard. There is a well-grounded objection to the employment of this substance for large telescopic object-glasses, because the expanding ratio of flint and crown glasses being different, they will be affected by thermal influences, which would cause a strain owing to the two unequally-expanding bodies being securely cemented together. To obviate this a permanently-fluid body—*e.g.*, castor oil—is recommended in preference to balsam for lenses of this class.

The photographer who wishes for ocular demonstration as to the advantages arising from cementing a lens can obtain it in the following manner:—Provide two clean pieces of glass, such as quarter-plates, and, holding one of them in a level position, allow a drop of oil to fall upon it. Now lay the second plate on the top of the other so as to cover and flatten out the drop of oil. Observe how transparent the glasses have become by the cementing of the inner surfaces in the manner described. Wherever the oil touches both surfaces optical contact is secured. The experiment just described serves to demonstrate the difference between optical and mechanical contact, and also to show the brilliancy arising from the cementing of two surfaces of glass.

Almost without exception the front lens of the portrait combination and both lenses of the "rapid" class of objectives are cemented; but the cement not unfrequently undergoes changes and vicissitudes by which the performance of the objective is seriously damaged. We shall here describe the nature of some of these changes and the means of cure.

Occasionally, after a portrait combination has been some time in use, an arborescent growth, commencing with a single, delicate, leaf-like form, appears at one side of the front lens, and gradually spreads inwards. If the balsam has been very thin when applied this arborescence spreads over a large portion of the surface. One of the finest examples of this defect occurred in the back lens of one of our 10 × 8 "rapid" objectives which remained good for about four years after being made, and then had a beautiful mass of shrubbery growing all round the margin. This increased to such an extent as to leave only a small clear spot—the size of a threepenny piece—in the centre. This is, perhaps, the most prevalent form of defect in the cement of a lens.

Another, which also makes its appearance after the lens has been in use for a few years, consists in a discolouration of the cement. All round the margin the lens is found to have become of a yellow colour, which, although at first pale, afterwards becomes more decided, and not unfrequently assumes a green hue. Eventually the lens becomes so slow in its action as to be cast aside, and to have its place supplied by the instrument of another maker. In all cases of this character which we have had an opportunity of examining the defect in question invariably arose from the lens having been burnished (or screwed) into its cell before the balsam had been allowed to harden, in consequence of which an action had set up between the balsam and the brass cell surrounding the lens, resulting in a slow decomposition of the latter, which eventually coloured the balsam.

There are some kinds of balsam which acquire a yellow colour through age; but we are not aware, in our own experience, of any thin film—such as that which forms the cementing stratum of two lenses—ever having become discoloured by light to an extent that could be appreciated. On the contrary, the tendency of light is to bleach it. Time, however, and exposure to the atmosphere certainly imparts a yellow colour—a fact well known to those who have prepared transparent paper by the agency of Canada balsam. It is also known to microscopists that sometimes slides which have been prepared with balsam have, after a few years, acquired a yellow tint somewhat similar to that which results if an excess of heat be applied in the preparation of the slide.

When a defect in the cementing of the lens is observed, or when a discolouration is suspected owing to a lens working more slowly than it did originally, and which discolouration may be detected by laying the lens upon a sheet of white paper and noting its appearance, the first stage in the remedying of the defect—supposing the photographer elects to cure it himself instead of sending it to an optician—consists in removing the lens from its cell into which it is fixed, either by the edge of the cell being turned over its margin or by a screwed ring.

On its removal from the cell, the lens is placed in a saucepan on the bottom of which is laid a small piece of wood to prevent the contact of the glass with the metallic bottom. Slightly lukewarm water is now poured in to a height more than sufficient to cover the lens, and heat is gently applied until the balsam has become so soft as to permit the lenses, when manipulated by the fingers, to be slidden one from the top of the other. When this has been done the water is wiped off and the lenses allowed to become cold. Ether or collodion is now poured over each surface, and gentle friction with a soft cloth applied. By this means the old balsam is dissolved and entirely removed. Oil of turpentine or benzole answer a similar purpose as a solvent. The cleaning of the surfaces is finally completed by means of soap and water.

Some have recommended the use of the carbonates of potash or soda as a solvent for the balsam; but these are bad, on account of their action on the glass.

When quite clean, and wiped dry by means of wash-leather, lay the flint glass on a sheet of paper, concave side up, and deftly apply a large drop of the finest quality of old Canada balsam to the centre, taking care that it is free from air. Arrangements must be made for keeping the lens quite warm during this operation. Now lower down upon it the contact surface of the crown glass, and by gentle pressure guide it so as to cause the drop of balsam to expand equally outwards until it oozes slightly out at the margin. Next lift it up, and by means of a long piece of soft string tie the two together, crossing and re-crossing the string in every direction. This ensures their being kept in a central position. Heat is now gently applied by laying it on the hot plate of a warm but not superheated oven, until upon removing the lens and testing the balsam which has oozed out at the edges it is found to be hard. Then, having allowed the lens to cool slowly, remove the string, and clean thoroughly with ether or benzole. The lens will now be found to have become rejuvenated.

Our attention has been drawn to an expression made use of inadvertently in our last issue in speaking of the recent eclipse expedition. Our correspondent, Mr. H. A. Lawrance, is there spoken of as the "head of the English party." As a matter of fact Messrs. C. Ray Woods and Lawrance shared the responsibilities equally, and forming, as they did, part of the American expedition, they were both subject to the "head" of that party. We must apologise for the slip to both the gentlemen concerned.

Those of our readers who care to read Professor Cayley's address to the members of the British Association will find a most interesting connection between photography and a portion of the subject matter of the learned mathematician's discourse—a connection with one of the most transcendental conceptions of modern mathematics—neither more nor less than four-dimensional space. We may, perhaps, explain. The President said we might, perhaps, imagine rational beings living in a one-dimensional space (a line), though he saw some difficulty in imagining how that being would behave if his straight line of existence became a curved one. He also could imagine a rational being living in a two-dimensional space (a surface); his life, too, would be rather puzzling in the transition from flat to curved planes, and *vice versâ*. We ourselves live, or believe we do, in a three-dimensional space, and, of course, can understand length, breadth, and thickness, but we are not content; we want to conceive of a four-dimensional space, and the nearest approach to it has been made by a sort of what might be termed "stereoscopic projection."

In arriving at some description of this, Professor Cayley gave a very neat description of a perspective representation—that is to say, such a picture as would be taken of an object by a non-distorting lens. He says, in what he admits to be a digression—"In

ɪrspective we represent a point in space by means of the intersction with the plane of the picture (suppose a pane of glass) of ıe line drawn from this point to the eye, and doing this for each ɔint of the object we obtain a representation or picture of the ɔject." This picture he considers imperfect, as not defining the ɪrm of the object, for which "we need two pictures; * * * but is theoretically more simple to consider two projections on the ıme plane with different positions of the eye." This would be ɛactly represented by the two halves of a stereoscopic view, ıe connection of which with the idea of four-dimensional space is ıown where he says "two figures in space, such that the lines ining corresponding points passing through a fixed point, have ɜen regarded by the Italian geometer, Veronése, as representations a figure in four-dimensional space, and have been used for the emonstration of properties of such a figure."

. NEW mineral has been found in America—so far in one State only, [issouri—that might perhaps be of use in photographic manipulaons. Most photographers possess a diamond, though, we do not oubt, its cost is in many cases grudged; but if the accounts to and of the new mineral be in any way borne out by the facts of ıe case we may expect "adamascobite"—for such is the name iven to the "find"—to oust the diamond from its position. It is ated to be able to cut steel easily without in any way diminishing ıe sharpness of the stone.

. WRITER in a contemporary suggests what is, perhaps, the cheapest ater filter ever contrived—cost, one penny. Take a flower pot ıd a brick. Break the bottom out of the flower pot in such a way to leave sufficient edge to hold half a brick-bat. Let one corner the brick stand out through the bottom. Break up the rest of ıe brick into bits about the size of a-quarter of a walnut. Throw ıem into the pot. Soak the whole over night in a pail of water and low it to drain. Let the water you wish to filter drip upon the iddle of the chips of brick. After a few hours the water which ısses through will be wholesome and pure water. The writer ɔes on to point out that not only is a coarse filtration and an fective aëration thus brought about, but a "specific chemical tion as well." He is quite correct, and the filter would be most seful.

HE exciting question—Who is to reign as Queen of Beauty? as ecided by the subscribers to the *St. Stephen's Gazette*—has found s way into the provinces, and a huge board containing the "voting p to date" is to be seen in at least one provincial photographer's indow, thus showing the extent to which photographic influence fects the question. There cannot be a doubt that many a popular ɜauty owes her celebrity to the photographer and his work; but the present instance of the lady at the "head of the poll"—Mrs. angtry—this cannot be said. Almost before she appeared in this ɔuntry the "Jersey Lily" had became famous, *pace* five portraits studies at one Royal Academy Exhibition! There is no doubt ıe will gain wonderful praise, and that photography has not ded her, as anyone will say who is familiar with her photographs.

THE INFLUENCE OF AMMONIA VAPOUR ON THE CAUSATION OF LUNG DISEASE.

ɪ the good old days of wet collodion the dangers to which the ıotographer was exposed were few and easily avoided. It was not sy to drink cyanide by mistake; but if you were so unfortunate to do so there was an antidote all ready in the iron developer—ficacious if you only took it soon enough. Fixing being carried in the open air, the cyanide vapour was so diluted as to be actically harmless. The volatilised ether arising from the collo-on would, indeed, sometimes produce headache, but more often a easing exhilaration resembling somewhat the incipient stage of ampagne intoxication. But now that rapid gelatine is universally ed these dangers have disappeared, only to be replaced by two hers which, although not so palpable, are much more injurious, ɔwly laying the foundation for both disease of mind and body.

The first of these is the ammonia used in development, to the vapour of which the operator is continually exposed in a confined space. It has long been known that the inhalation of the concentrated fumes of ammonia was very dangerous, sometimes causing a rapidly-fatal termination. The presence of more than ten per cent. of ammonia in the respired air gives rise to serious symptoms. Hirt quotes from Castan (*Gazette Hebdom.*, April 7, 1871) a case in point:—A man who worked in an ice-house was exposed by accident to the influence of the gas for five minutes. He was at once taken with symptoms of suffocation, dyspnœa, spasm of the glottis, and vomiting of serous matters. When the physician arrived he was in a state of extreme exhaustion, with pallid face and profuse sweating of an ammoniacal odour. His pulse was small and frequent, and the interior of the mouth and pharynx was of a bright red. But his temperature was normal, and auscultation and percussion of the chest showed nothing appreciably wrong. Under appropriate treatment he finally recovered.

But it is not with cases of this kind that I have to deal now. The injurious action upon the system of ammonia vapour, constantly inhaled *in very small quantities*, although recognised for a long time past has only quite recently become of any great importance, owing to the fact that previous to the general introduction of ammonia and pyro. development into everyday life its ill effects were confined to a comparatively-small class of men, namely, those engaged in the manufacture of ammonia and ammonium carbonate. Now things are altered, and we have a constantly-increasing class who pass a very considerable portion of their lives continually inhaling small quantities in a confined and close atmosphere. The effect of this is already seen in the increase among photographic operators of chronic catarrh of the respiratory tract, with its many possible consequences; and before this evil has assumed any great proportions it is advisable to put photographers on their guard and point out the means by which the evil may be minimised.

As an illustration of what might happen in extreme cases, I will first of all give the history of a typical case of catarrh in its worst form, set up by the continuous inhalation of ammonia vapour in a confined space such as most of the dark rooms of today unfortunately present. At the commencement slight local congestion of the air passages is unimportant, leading at most to some increased secretion from the mucous surface and its glandular follicles. This is accompanied by a tendency to cough and "hawk" for a little while on rising in the morning, until the patient brings up a small quantity of viscid mucus, generally coloured with black specks. After this there is ease for the rest of the day. It is not improbable that this stage has already been reached by the great majority of operators who use a concentrated ammonia solution. But, before long, if the local congestion be perpetuated by the continuance of the cause and the absence of proper treatment, these comparatively-slight symptoms are replaced by others of graver import. The cough, instead of being limited to the morning, is more or less constant, and, especially if other causes of catarrh, such as dyspepsia, gout, or exposure to cold and wet be present, the disease assumes a form quite indistinguishable from the ordinary form of chronic bronchitis, to be inevitably followed, as in the latter complaint, by the complications and sequelœ inseparable from it, and to which it owes most of its dangers. These are, briefly, emphysema, or dilation and rupture of the air-cells of which the lung is composed; bronchiectasis, or dilation of the air-tubes in the lung; and occasionally spasmodic asthma.

It will be sufficient for the present to briefly consider emphysema, as it is most frequently met with and, consequently, of most interest. As in all cases of chronic catarrh, emphysema in its slightest degrees is very often present without causing distinct symptoms. When, however, it becomes considerable either in degree or in extent—which it generally does sooner or later if the chronic bronchitis to which it owes its origin be not cured—it can scarcely escape recognition. The physical sign—that is, the signs obtained on an examination of the chest by measurement, auscultation or the use of the stethoscope, and percussion—comprise alterations in the form and movements, differences in the breath sounds, and resonance of the chest. The latter tends to become dilated in all its diameters, assuming more or less of a barrel shape, and the shoulders become elevated and the muscles of expiration more prominent.

There is an increase of resonance over the whole of the chest, and the breath sounds are enfeebled. The heart and liver are also not unfrequently displaced from their proper positions by the increased bulk of lung. As the presence of any considerable amount of

emphysema interferes materially with the transmission of blood through these organs as well as through the lungs themselves, a backward pressure is set up which inevitably leads to dilatation and compensatory enlargements, or hypertrophy, of the right side of the heart. The systemic veins become gorged with blood, and, owing to the impediment to the free circulation of blood in the capillary vessels of the extremities and internal organs, general dropsy, congestion of the liver, or jaundice with Bright's disease of the kidney very frequently ensue. Furthermore: the retention of mucus or blood in the lung or the formation of small local pneumonias may lead, as Niemeyer has pointed out, to caseous degeneration of portions of lung, and, finally, to a form of phthisis. He also is of opinion that a simple chronic catarrh may eventuate in consumption. To quote his own words (*Clinical Lectures on Pulmonary Consumption*, by Felix Von Niemeyer, page 45):—"On the other hand, it may be that a catarrh has existed for months or years, becoming worse in winter and better in summer, until it spreads at last to the alveoli. In such cases the physician gives up all anxiety * * * . But all at once the scene changes and the signs of consumption are developed." Fortunately, however, for the peace of mind of the photographic fraternity the above list of evils represents a case which would very rarely be met with in actual practice, as the patient would probably have sought medical advice long before he had reached anything like such a serious condition. It may serve to warn us, nevertheless, how dangerous it is to neglect even a slight catarrh, and how important it is to take care that we render as perfect as possible the hygienic condition of the places in which we habitually work.

And now I come to the most important part of our subject. How are we to counteract the injurious action of the ammonia? First of all, by securing proper ventilation in our dark rooms; secondly, by mixing the ammonia with the proper quantity of water before bringing it into the dark room, as is already done in some developers (such as Edwards's), not dropping it neat or nearly so from a stock solution into the developing cup; thirdly, by the use of a naso-oral respirator (procurable at any instrument makers), containing folds of wet blotting-paper, over which the inspired air has to pass before it reaches the lungs.

On a future occasion I shall have something to say about *the other danger* to which I have alluded at the commencement of this article. G. A. Herschell, M.D. (Lond.)

STEBBING'S NEW AUTOMATIC CAMERA.

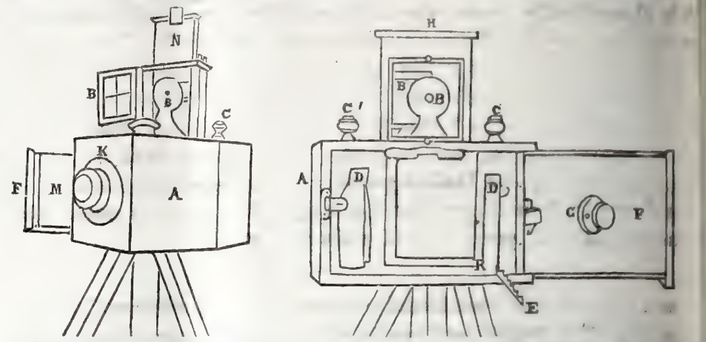
Since 1856, in the beginning of which year Mr. Melhuish introduced his roller slide to public notice, up to the present month, in which Professor Stebbing has brought forward his camera containing in itself the vertical rollers upon which to wind a long band of flexible sensitive material, many changes have been effected in the practice of photography. In the later claimant for photographic favour advantage has been taken of the advanced state to which the mechanics and optics of the art-science has been brought.

We commence a brief description of Professor Stebbing's camera by stating that there is no focussing-glass, the adjustment of the picture being effected by the agency of folding "sights," which are erected on the top. A small frame having a square aperture stands erect at the front, and a piece of metal having a small sight-hole occupies a similar position at the back. Upon looking through the latter the precise amount of subject included on the sensitive surface is seen enclosed within the square frame, to which reference has been made.

The focussing is effected on the well-recognised principle that, when any object at a moderate distance has once been focussed sharply, the lens may be fixed at the place it occupies with relation to the sensitive surface, in the full assurance that in future every object taken under similar conditions as to distance between lens and sensitive plate will be equally sharp. Hence, having adjusting sights on the top of the camera by which to ascertain the composition of the anticipated photograph, the ground glass may be dispensed with altogether.

We may here fittingly introduce the rule by which this depth of definition is approximately determined. When a small diaphragm is employed, allow four feet for every inch of focus possessed by the lens being used, and everything beyond that distance will be pictorially sharp. To adduce an example:—If the focus of the lens be four inches, and a small stop (say) from $\frac{f}{30}$ to $\frac{f}{40}$ be employed, objects ranging from sixteen feet to an infinite distance will possess an equal practical degree of sharpness. Of course it will be understood that a "hard and fast" rule cannot be given to determine this matter on account of the varying ideas possessed by different individuals as to what constitutes sharpness; but the rule just given will afford a fair estimate of what may be expected under the circumstances detailed, especially if the smaller stop mentioned be employed.

Professor Stebbing's camera is of a somewhat pyramidal form—narrow at the front, and expanding to the full width at the back.



A Camera. B B View-meter. C' C Handles of rollers. D D Rollers. E Knife to hold films upon roller. F Back-board. G Screw to push board against film. H Frame bearing glass. K Lens. M Board. N Dark slide. R Ratchet catch.

At each side, and projecting above the top at the back, is a round knob forming the handle or terminal of a vertical roller upon which the sensitive pellicle is wound. This pellicle, being attached by the end of the roll to each of the wooden rollers, can be wound or unwound at pleasure. In front of this gelatine band is a plate of glass the back surface of which is in the focus of the lens, and when an exposure is about to be made the gelatine band is pressed close upon the glass by means of a padded board behind, which is operated upon by a screw. After exposure the rollers are rotated so as to cause the portion just submitted to the action of the light to be wound out of the way, a fresh portion beiug brought into position ready for exposure. This permits of a series of views being taken upon one band, which is cut asunder in accordance with certain marks indented thereon to indicate the extent of each picture.

In addition to the roller-band system, and supplementary to it, the camera possesses the advantage of receiving an ordinary double dark slide containing two glass plates. This is shown in the diagrams given above, when drawn up out of its place. In these diagrams one represents a front and the other a back view of the camera. The various parts are explained by the lettered references. The pictures we have seen which were produced with this camera were very sharp and fine, and the enlargements made from them on gelatino-bromide paper possessed beautiful gradation, thus proving, in an unmistakable manner, its adaptability for the purpose for which it was intended.

British Association.

SOUTHPORT MEETING, 1883.

The Southport meeting of the British Association must be pronounced a decided success. Not only in the matter of attendance, but equally in the interest of the proceedings in the various sections, this year's gathering will compare favourably with its predecessors; indeed, in point of numbers the attendance has been larger even than on the occasion of the jubilee meeting at York. Up to Wednesday evening of last week, the opening day, it was announced that 2,293 members had taken tickets, and on Saturday afternoon the York number had been exceeded by two.

The business of Wednesday was merely formal. At a meeting of the general committee in the afternoon, under the presidency of Sir C. W. Siemens, the report of the Council was read by Captain Douglas Galton, the General Secretary. Allusion having been made to the deaths during the year of Professor H. J. S. Smith, General Sabine, and Mr. William Spottiswoode, it was recommended that the vacancies created by the decease of the two last-named gentlemen as Trustees of the Association be filled by Lord Rayleigh and Sir Lyon Playfair. After other business of a routine character had been transacted, the arrangements for the Montreal meeting next year were discussed. It was announced that upwards of 500 members had already signified their intention of visiting Canada, including 154 members of the general committee. Though it is yet too early to publish a complete programme of the arrangements, the following

details have been settled. The principal Steamship Companies have agreed to a reduction of fares to members of the Association, and the Canadian subsidy will bring about a further reduction to those who were members in 1882. After the meeting there will be excursions in various directions free of cost, so far as transit arrangements are concerned, to all members and associates. Amongst these will be a trip of twelve or fourteen days' duration to the Rocky Mountains; another to Niagara and Chicago, together with shorter ones. It has not been considered necessary to make any alterations in the working arrangements under the exceptional conditions of the meeting, except that an adjourned general meeting will be held in London, at a date to be fixed towards the end of October, 1884, in order to afford an opportunity to those unable to be present in Montreal to vote in the election of officers for 1855. Beyond this slight change the arrangements will be precisely similar to those in ordinary years. A full programme will be issued in due course.

In the evening the opening meeting was held in the pavilion of the Winter Gardens, at which it is estimated over 2,000 persons were present. Sir C. W. Siemens having vacated the chair, Professor Cayley, the President-elect, was introduced to the members and delivered his presidential address, which, as we briefly noticed last week, was of too abstruse a character to be intelligible to any but a few mathematicians. It is, indeed, recognised as "probably the most abstruse of the fifty-three addresses that have been delivered to the Association." However interesting to those who make pure mathematics their favourite study may be the speculations as to the possibility or probability of a fourth dimension in space, we scarcely imagine our photographic readers will care to discuss the question, so we shall not occupy space in reproducing any portion of the learned professor's dissertation.

The real business of the meeting commenced on Thursday morning in the various Sections, most of which opened at 11 o'clock. In Section A.—Mathematical and Physical Science—Professor Henrici delivered the presidential address on *The Teaching of Pure Geometry*, after which the only business even remotely interesting to photographers was in two short papers, by Professor Arthur Schuster, *On some Spectroscopic Appliances* and on *The Absorption Spectrum of Didymium.* In Section B.—Chemical Science—Dr. Gladstone delivered the president's address, his subject being *The Elements*, in the course of which he urged the importance of proper technical education as a foundation for a sound knowledge of chemistry. In this Section a paper was read by Professors Liveing and Dewar *On Sun Spots* and *The Chemical Elements of the Sun*, in the course of which the authors gave the results of their researches in connection with the spectra of sun spots and the solar elements. By means of diagrams, Professor Liveing demonstrated the co-incident of certain of the Fraünhofer lines with lines in the spectra of cerium and titanium, observing that they were too strongly marked to be merely accidental. He said it was a simple matter to account for the presence of certain lines in the solar spectrum by supposing the existence in the sun of certain elementary substances unknown to us in this world; but that was to cut the knot, not to untie it, and was an unsatisfactory mode of explanation. He thought they should hesitate before accepting any theory involving the hypothetical existence of any new elements not known to us on the earth. Professor Perry followed with a few remarks on some solar observations of his own.

In none of the remaining Sections was there anything of interest to photographic readers; though, in addition to the respective presidential addresses, a good day's work was got through in each.

In the evening a *soirée* took place in the Winter Gardens, which was attended by upwards of 2,500 persons, including nearly all the principal members of the general and local committees as well as distinguished visitors. The scene was a most brilliant one, and the pleasure of the evening was enhanced by the strains of the splendid band of the Southport Rifle Volunteers and of the Liverpool Vocalists' Union—a body of well-trained male vocalists.

On Friday, in Section B., Professor W. N. Hartley read the report of the Committee on the *Ultra Violet Spark-Spectra*, and the Rev. W. A. Irving contributed a note on *The Action of Sunlight on Phosphorous Trioxide.* In the evening the first of the popular evening lectures was delivered by Professor R. S. Ball, LL.D., F.R.S., Astronomer-Royal for Ireland, the subject being *Recent Researches on the Distance of the Sun.* The lecture was very well attended, the audience including a large number of the working classes, for whom special facilities had been provided. In the course of his discourse Professor Ball said :—

"It seemed not unlikely that in early ages the distance of the sun was one of the very first astronomical problems which ever attracted speculation. In modern times, as the problem had gradually approached solution, the interest attached to it had increased until it had culminated in the last few months by the occurrence of the transit of Venus. The importance of the problem arose from the fact that the distance of the sun was the base line in terms of which almost every other lineal magnitude in astronomy was to be expressed. One accurate measurement of this base would infuse accuracy into all the other astronomical quantities which sprang from it. When they had learned the distance of the sun they could measure his bulk and diameter. They could measure the great planet Jupiter, or the rings of Saturn, and the scale of the whole solar system became known to them. Again: when they attain the loftiest problem in practical astronomy, and sought to stretch a boundary line over the vast abyss which divided our system from the stars, it was the distance of the sun which we must use as our measuring rod. No pains must be spared to give so fundamental a unit all the precision of which it was capable. To define accurately the magnitude to be measured he must explain that the actual distance from the earth to the sun was not constant. In these autumnal months it was rapidly decreasing. We were at this moment drawing nearer and nearer to the Sun at the rate of a thousand miles an hour, and, next Christmas, we should be about a million and a-half miles closer to him than we were now. At the commencement of the New Year we shall begin to recede, and next Midsummer would find us as far from the sun as possible. Then we should draw in again and arrive next autumn where we were this autumn, and then commence anew the cycle of changes he had indicated. But these changes were at the utmost only a small fraction of the sun's distance. To use the language of mathematics, he might say the distance from the earth to the sun consisted of two parts—a large constant part and a small periodical part. The important and difficult problem was the measurement of the large constant part. This was the question to be discussed in his lecture that evening. The early history of the subject was as easy to sketch as the latter part was difficult. For fourteen centuries the doctrines of Ptolemy were adopted on the distance of the sun, as on all other astronomical problems. But they now knew that the distance of the sun was twenty times as great as that which Ptolemy deduced from his observations. But Ptolemy's result was a great step in advance, notwithstanding the tremendous error by which it was vitiated. It was at all events an honest attempt to solve the problem by a direct appeal to nature instead of trying to evolve the answer from his own moral consciousness, and he succeeded so far as to demonstrate the great truth that the sun was larger than the earth. It was somewhat remarkable that the first reasonable approximation to the sun's distance was obtained by what could only be described as a well-considered guess. The illustrious Huyghens, in the seventeenth century, measured the diameter of the planet Mars and compared it with the sun, and he did the same in regard to Venus. He saw that the earth was also a planet revolving outside the path of Venus, and inside that of Mars. Was it not reasonable to assume that the bulk of the earth might be comparable with that of its fellow planet, and intermediate between the bulk of Venus and that of Mars? This assumption gave the means of guessing the distance of the sun, which was concluded to be about 100,000,000 miles. But this estimate was subsequently corrected first to 95,000,000, and then to 91,000,000 miles. It was, however, now generally thought that the sun's distance must be more than 92,000,000 miles, but hardly 93,000,000 miles. What was still required was to determine the distance accurately to one-thousandth part of its total amount. Was such a degree of accuracy obtainable? He believed it was. Indeed, enough had been done to show that ere long this accuracy might be attained. Of course, they could not measure the distance directly, but the method by which their calculation was made must be absolutely unimpeachable. Proceeding to describe the methods that had been adopted to obtain this result, the Professor referred at length to the observations that were taken in connection with the transits of Venus. There were certain difficulties about this method—arising partly from the extreme amount of uncertainty in determining the times when the contacts took place, also from the atmosphere surrounding the sun, and from irradiation. The more advantageous method to solve the problem, he thought, would be by means of the minor planets. This method he explained in considerable detail, and concluded by stating in eloquent terms that the man who solved this great problem would achieve a work that would remain for countless generations."

Saturday was almost a *dies non* so far as technical business was concerned, the great majority of the visitors devoting themselves to the numerous excursions on the day's programme. In Section A. Mr. James Glaisher, F.R.S., read the report of the Committee on Mathematical Tables; Sections C. and G. did not meet.

On Monday several important papers were read in Section A., which, if not very intimately connected with practical photography, have a bearing in that direction. As a matter of interest to the Sensitometer Committee of the Photographic Society of Great Britain, we give in full Captain Abney's paper, which was read by

Professor Schuster, *On a Standard of White Light.* This contains the results to the present date of the researches of the Committee appointed by the Association.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Monday, September 24, 1883.

ON A STANDARD OF WHITE LIGHT.

By CAPTAIN W. DE W. ABNEY, R.E., F.R.S., &c.

THE last Report of the Committee *On a Standard of White Light* was of a negative nature more than of a positive one, as it indicated briefly what to avoid. In the present report they would have to offer something more determinate, and it is hoped that it indicates the solution of the problem which has occupied so much experiment and labour. There can be no doubt that the standard of white light must be an incandescent solid or liquid. Gaseous matter undergoing combustion is admirably suited for standards of light with which visible radiation due to a low temperature has to be compared; but for high temperatures, such as those emitted at the electric arc light, the absence of the blue and violet rays is so marked that for spectroscopic work it is impracticable to use it with any exactitude. During the last two years a very large number of experiments have been carried out as to this point by means of an instrument which the Secretary to the Committee devised nine years ago, and which he used for comparison of the electric light and gaslight when serving on a Government Committee. The principle of the instrument is very simple. It is provided with two slits with adjustments in a vertical and horizontal direction, and also two right-angled prisms receiving the rays coming through the slits. These rays are reflected on to the collimating lens, and a direct vision series of prisms, or any other prisms which may be found convenient, are placed in the path of the parallel rays, and the spectra from each slit formed by a lens attached to a camera obscura, to which is attached a sliding screen. It will be observed that by this means we have slits of the same colour, due to the lights which illuminate each slit superposed. In this screen is cut a fine slit, through which any portion of the spectra may be observed at pleasure by sliding it along the groove in which the camera back is usually placed. A photograph of the spectrum of iron or sodium suffices to fix the position of the rays, and the position of the scale on the screen for the *d* line is noted as a fiducial point. The intensity of the colours can be equalised in various ways—either by narrowing one slit and registering the aperture; by using a condensing lens for one or both lights of such a ratio of aperture to focus that the collimating lens is quite filled, and then diaphragming one of the condensing lenses till the colour appears of equal intensity, or by placing a rotating disc with movable sectors in front of the light. When comparing with gaslight, a given area from the centre of the flame was usually employed. The imperfectly-luminous portions were cut off by means of a screen. Any one of these plans answers. It is considered better, however, not to alter the aperture of the slit, since it introduces to some small extent an error, owing to the purity of the two spectra being different. One objection has been made to judging intensity when one line of lights is above the other. With practice this difficulty vanishes, but the two lines of light may be examined side by side by using a telescope with a spit lens, and by bringing the central portion of each line side by side, and using a diaphragm in the eyepiece to exclude all but that portion. With this instrument a series of eye observations were taken, which were subsequently checked by photography, the intensity of the images of the blue end being readily compared. As a rule, the photographs in the blue gave greater accuracy than the eye observations when compared *inter se*. This is not to be wondered at, when it is borne in mind that the eye is very slightly sensitive to blue radiations, whilst the photographic plate has its maximum of sensibility in that region. The comparison of incandescence light proved to be highly instructive; and eventually it was found that, for obtaining a standard light of high temperature, nothing could be better except the crater of the positive pole of the electric arc. This latter has invariably the same temperature, as was shown by the Secretary to the Committee and Colonel Festing, in a paper which has recently appeared in the *Proceedings of the Royal Society*. It has, however, one insuperable drawback as a standard of white light, in that it is surrounded to a greater or less degree with carbon vapour, which, though radiating but little energy, yet radiates that energy chiefly as bright bands in the green and blue of the visible spectrum. Could these bands be eliminated there is a temperature which is apparently constant, and which, consequently, will radiate also the same proportionate intensity of rays. Failing this, the incandescence lights offer the next best standard; and, though when compared with daylight of an ordinary character they appear yellow even at their highest practicable temperature, yet they are much whiter, containing more proportionate green, blue, and violet than gaslight, taking the red near the C line as equal in both cases. Again: we have another decided advantage over gas in the fact that the body heated is a solid, and, for practical purposes, black. In gaslight there is a decided preponderance of yellow and orange, compared with a solid heated to the same temperature. Hence the "spectrum range," to coin a word, is more accurate with the incandescent lamp than with the gas.

A point that required investigation was as to whether all carbon threads emitted the same relative proportion of spectrum rays, and it was found that they did so, and that at what is believed to be the same temperature the proportion of these rays remained constant. (The proportion was obtained by comparing it with ignited coal gas.) Hence we arrive at one step in fixing a standard quality of light. The question arises as to the temperature to which the carbon filament may be heated without endangering the existence of the lamp. At one stage of heat in the carbon thread of a well-exhausted lamp there is a peculiar glow which illuminates the bulb of the lamp, and if that glow be examined by the spectroscope it will be found to consist of four or five bright lines, due to carbon vapour in some shape or another; and if that temperature be maintained the carbon is found to be deposited as an impalpable powder on parts of the glass globe, and eventually the thread breaks at the place of greatest resistance. Below this heat the thread will remain unaltered for many hours without any apparent change, always supposing the thread to have been previously heated to such a degree as to give constant resistance at freezing point. This is a matter of some importance, as in the experiments made new lamps increased in resistance after a few hours' ignition as much as five per cent., and after that remained constant when heated to a temperature below that already indicated.

An investigation then took place regarding the intensity of radiation from an incandescent-carbon filament and the energy and temperature. The results of these experiments are given in the *Philosophical Magazine*, September, 1883, in which it will be seen that after a certain temperature (dependent on the thickness of the filament and the temperature of the surroundings) the radiation and the energy expended are directly proportional. A good fiducial temperature is when the carbon thread is just visible to the eye when examined in a darkened room, and is very nearly 530° C. If the energy at this temperature be accurately measured by means of the current and the electro-motive force, and if the resistance be measured at the temperature of melting ice, the temperature of filament at just below the point at which the carbon lines appear can be readily attained by diminishing the resistance of the carbon filament by half. This has been found to be approximately the temperature required. Another check method is to note the radiation by means of the thermopile at the point of first visible incandescence, and to increase the energy expended till the radiation noted is forty times as great. This can be effected with great facility, and the quality of light radiated is in this case invariably the same, as it is indeed if any other proportion be taken.

It may be well to note here the expressions which exist between—Watts, W; Radiation, D; Potential, P; Current, C; Resistance, R; Temperature, T.

$$C = ap + bp^{\frac{3}{2}}$$
$$W = p^2\,(a + bp^{\frac{1}{2}})$$
$$R = \left(\frac{1 - ar}{br}\right)^4 \cdot \frac{1}{r}$$
$$D = m + nW$$
$$T = \frac{k}{r}$$

(This last expression is correct for all practical purposes, but requires a few further experiments to ascertain the correctness of the law with greater exactitude.)

a, *b*, *m*, *n*, and *a* are, of course, constants, which require determination for each lamp.

The mode of ascertaining these constants is as follows:—

The apparatus comprises a lamp which, by preference, should consist of the filament of one simple bend, as in the Edison pattern, and two screens with vertical slits in them, so arranged that the radiation from one leg can fall on a thermopile, which may be of any form, though a linear pile has been used in the experiments quoted (see *Philosophical Magazine*, September, 1883). The screens in front of the thermopile are used to prevent the radiation from the glass of the lamp vitiating the results. It is true that a small portion of the glass radiates on to the pile, but check experiments have shown that the radiation from it is so small as to be negligible. To the thermopile is attached a delicate galvanometer, on which the deflections caused by the thermo-electric current are noted. There is also a movable screen for shutting off the radiation from the pile. The energy employed is calculated by measuring the current and potential from a battery, by means of a tangent galvanometer and a galvanometer placed on a stand with a resistance of about 40,000 ohms. The resistance of the lamp at 0° is first taken by immersing it in melting ice. It is then placed in circuit with the Grove's (or other suitable) battery, increasing the number of cells as increase in current is required. At each increase the deflections on the galvanometers are noted, the movable screen is next removed, and when the radiation causes the needle of the reflecting galvanometer to start its deflection, it is replaced, and the amount of swing of the needle is read, the zero point being, of course, first noted. Five or six observations will suffice for the purpose in view.

By this means a curve of potential and current can be plotted, and the constants *a* and *b* calculated by the method of least squares, if necessary. From the observed currents and potentials the Watts can be calculated, and also from the corrected currents and potential, the

latter being found to be more accurately observed than the former. The same curve is adopted for the resistances. The resistances, current, and Watts will be found to be nearly coincident when calculated from the direct observations or from the corrected curves of current and potential. To find the constant n the observations of corrected Watts and deflections are plotted, the one as ordinates, and the other as the abscissæ to the curves, when it will be found that the curve at any temperature above 530° C. is a straight line, and n is thus readily obtained either by calculation or by a graphic method, as is also m.

The constant k can be obtained by observing the resistance at 530°—the temperature when luminous radiation just commences.

By this plan all constants are known, and any required temperature can be obtained by increasing the potential, and if necessary introducing a known resistance in the circuit. In choosing an incandescent solid, however, there are certain conditions that require attention. In the first place the section of the radiating body should be uniform, and also homogeneous. The carbon threads, such as those prepared by Edison, meet this condition as fully as practicable. This may be readily ascertained by passing a current of such an intensity through the filament as just to cause it to be at a red glow when seen in a darkened room. If the filament be uniform in section and homogeneous the glow will be seen to be equally bright in every part of its length, no dark patches being apparent. Another condition which also should be fulfilled theoretically is that the body should radiate on to matter which is everywhere of uniform temperature, or nearly so. In an ordinary incandescence lamp this is not quite the case, for if the filament be of the form of a simple loop the two legs must radiate one on to the other, and the inner surfaces should have a higher temperature. At the distance apart at which these legs are placed this difficulty does not arise, but in making a standard lamp it is proposed that it should radiate from a single thread. The best method of construction of such a lamp the Committee propose to submit in a subsequent report.

The light which it is proposed to employ as a standard of quality is as follows:—Taking the colour of Professor Vernon Harcourt's standard as a comparison light—the red (at the C line of the solar spectrum) being taken as equal in the two lights—the light at E in the new standard should be 1·5 times that of the gaslight; the increase in intensity of the higher radiations will then follow of necessity. Compared with the electric light this increase in the green is small, as the increase in the green of the crater light (positive pole) is very nearly three times that of gaslight.

When possessed of one lamp of which the necessary constants for the production of the standard temperature are known, any other lamp which has a uniform filament may be standardised by direct comparison with it, by increasing or diminishing the current till the shadows as thrown by the Rumford photometer on a white screen appear of the same tint. It will be found that a very slight alteration in current from the point at which the shadows appear equal in brightness and similar in colour will alter the latter. By this plan the original standard may be preserved for a considerable period, the second lamp taking its place in all photometric or other experiments.

The method of obtaining an exact *quality* of light has now been indicated, and the quantity of light radiated can easily be proved by direct experiment. It is proposed that the amount of candle-light (so called) be obtained by measuring with a photometer the standard light proposed by Professor Vernon Harcourt with the lamp at the given temperature, the observation being made through a cell, the plates of which are one millimetre apart, filled with an aqueous solution of iodine and iodide of potassium, made as follows:—

Iodine	1 centigramme.
Potassium iodide	2 centigrammes.
Distilled water	10 c.c.

The cell, filled with this solution, to be held between the eye and the photometer whilst the observation is made, in order to render each light of approximately the same colour. When using the lamp as a standard of quantity the loop of the filament should be vertical and its plane at right angles to the photometer screen. It will be seen that by this plan a lamp of any "quantity" may be standardised, so as always to radiate the same "quality" of light.

Dr. Huggins next read a paper *On Photographing the Solar Corona without an Eclipse*, which is of sufficient interest to give in full.

ON PHOTOGRAPHING THE SOLAR CORONA WITHOUT AN ECLIPSE.

By William Huggins, D.C.L., LL.D., F.R.S.

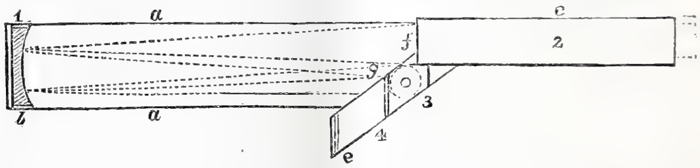
Last December (1882) I had the honour of presenting to the Royal Society a note on *A Method of Photographing the Solar Corona Without an Eclipse*. In that paper I say:—

"If by screens of coloured glass or other absorptive media the region of the spectrum between G and H could be isolated, then the coronal light, which is here very strong, would have to contend only with a similar range of refrangibility of the light scattered from the terrestrial atmosphere. It appeared to me by no means improbable that under these conditions the corona would be able so far to hold its own against the atmospheric glare, that the parts of the sky immediately about the sun where the corona was present would be in a sensible degree brighter than the adjoining parts where the atmospheric light alone was present. It was obvious, however, that in our climate and low down on the earth's surface, even with the aid of suitable screens, the addition of the coronal light behind would be able to increase, but in a very small degree, the illumination of the sky at those places where it was present. There was also a serious drawback from the circumstance that, although this region of the spectrum falls just within the range of vision, the sensitiveness of the eye for very small differences of illumination in this region near its limit of power is much less than in more favourable parts of the spectrum; at least such is the case with my own eyes. There was also another consideration of importance: the corona is an object of very complex form, and full of details depending on small differences of illumination, so that, even if it could be glimpsed by the eye, it could scarcely be expected that observations of a sufficiently precise character could be made to permit of the detection of the more ordinary changes which are doubtless taking place in it. These considerations induced me not to attempt eye-observations, but from the first to use photography, which possesses extreme sensitiveness in the discrimination of minute differences of illumination, and also the enormous advantage of furnishing a permanent record from an instantaneous exposure of the most complex forms."

The photographs described in that paper were obtained with a reflecting telescope of the Newtonian form, by Short, and the restriction of the light to the small range of refrangibility from about G to H was effected by the use of screens of coloured glass, or by a cell containing a solution of potassic permanganate. The photographs showed distinctly coronal appearances around the sun, and I was permitted by Captain Abney, F.R.S., who made a careful examination of the plates, to say that, in his opinion, the solar corona had been photographed on my plates with an uneclipsed sun.

I purpose in this paper to give an account of some further experiments, founded on the same method, made during the spring and summer of the present year.

I am indebted to Miss Lassell for the loan of a seven-foot Newtonian telescope made by the late Mr. Lassell. The speculum, which is seven and a-quarter inches in diameter, possesses great perfection of figure, and still retains its original fine polish. I decided not to use more than three and a-half inches of the central portion of the speculum—partly for the reason that a larger amount of light would be difficult of management, and partly because this restriction of the aperture would enable me to adopt the arrangement which is shown in the diagram.



It will be seen at once from an inspection of the diagram that in this arrangement the disadvantage of a second reflection by the small mirror is avoided, as is also the mechanical inconvenience of tilting the speculum within in the tube, as in the ordinary form of the Herschelian telescope. The speculum b remains in its place at the end of the tube a a. The small plane speculum and the arm carrying it were removed. The open end of the tube is fitted with a mahogany cover. In this cover at one side is a circular hole f, three and a-quarter inches diameter, for the light to enter; below is a similar hole, over which is fitted a framework to receive the "backs" containing the photographic plates, and also receive a frame with fine ground glass for putting the apparatus into position. Immediately below, towards the speculum, is fixed a shutter with an opening of adjustable width, and which can be made to pass across more or less rapidly by the use of india-rubber bands of different degrees of strength. In front of the opening f is fixed a tube c, six feet long, fitted with diaphragms, to restrict as far as possible the light which enters the telescope to that which comes from the sun and the sky immediately around him. The telescope tube a a is also fitted with diaphragms, which are not shown in the diagram, to keep from the plate all light except that coming directly from the speculum. It is obvious that when the sun's light entering the tube f falls upon the central part of the speculum the image of the sun will be formed in the middle of the second opening at d, about two inches from the position it would take if the tube were directed axially to the sun. The exquisite definition of the photographic images of the sun shows, as was to be expected, that the small deviation from the axial direction—two inches in seven feet—does not affect sensibly the performance of the mirror. The whole apparatus is firmly strapped on to the reflector of the equatorial, and carried with it by the clock motion.

The performance of the apparatus is very satisfactory. The photographs show the sun's image sharply defined; even small spots are seen. When the sky is free from clouds, but presenting a whity appearance from the large amount of scattered light, the sun's image is well defined upon an uniform background of illuminated sky, without any great increase of illumination immediately about it. It is only when the sky becomes clear and blue in colour that coronal appearances present themselves with more or less distinctness.

In my earlier work with this apparatus I used cells containing potassic permanganate in solution, which were placed close to the

sensitive surface, and between it and the shutter. I was much troubled by the rapid decomposition of the potassic permanganate under the influence of the sun's light. When apparently clear to the eye, a lens revealed minute particles which precipitated themselves upon the glass plates of the cell, and gave an appearance of structure to any coronal appearance which was in the plate; besides, any diminution of the transparency of the solution by the presence of minute particles would produce scattered light on the plate.

I then tried a solution of iodine in carbon disulphide, but the same inconvenience presented itself. Very soon, under the sun's light, the solution was found by examination with a lens to show signs of commencing decomposition.

Even when the solution was sensibly clear there was some disadvantage from the unavoidable imperfection of polish of the surface of the plates, which reveals itself under the conditions of strong light in which they are placed. If, however, the violet (pot) glass which I used at first could be obtained annealed and free from the imperfections usually present in it, it would serve most usefully as a selective screen.

For these reasons, after some months' work, I decided to give up the use of absorbing media, and I came to the conclusion that the advantages they present, which are doubtless considerable, are more than balanced by the possible false appearances which they might give use to if the solutions were not in a condition of perfect transparency.

As, for the reasons stated above, it seemed desirable to avoid placing media of any kind before the sensitive surface, the selective power upon the light had to be sought in the nature of the sensitive surface itself. The suggestion of staining the film presented itself, but after consultation with Captain Abney I decided to try an emulsion containing silver chloride only. Captain Abney kindly prepared some silver chloride emulsion for me, and the plates were developed with a solution of ferrous-citro-oxalate. The silver chloride film, according to Captain Abney, is strongly sensitive to light from *h* to H, and hardly at all beyond H. Since the middle of July these plates have been used as well as the ordinary silver bromide gelatine plates. A comparison of the two kinds of plates, when used under similar conditions, shows a decided advantage for this work in favour of the silver chloride. All the plates were backed with a solution of asphaltum in benzole.

For the purpose of screening the sensitive surface from the intensely-bright image of the sun, small circular discs of thin brass were turned about $\frac{1}{50}$th of an inch larger in diameter than the sun's image. The brass disc was held close before the sensitive surface by a fine metal arm when the sun was taken in the middle of the field, and attached to the inner edge of a circular diaphragm when the sun's image was placed towards the side of the field. A comparison of photographs taken under similar conditions with and without the disc showed less advantage in favour of the disc than was anticipated. Indeed, it may be that with the short exposures given the scattered light which comes upon the plate, when the sun's image falls directly on the sensitive surface, may be favourable to the setting up of the photographic action by the comparatively-feeble coronal light.

In consequence of the number of diaphragms which it was found desirable to introduce into the apparatus for the purpose of preventing any light but that from the sun and the sky immediately around him from reaching the plate, the extent of field in which the full aperture was in use was small. For this reason it was found of advantage to place the sun's image near the margin of the diaphragm, limiting the field, and afterwards to combine the photographs taken in four different positions.

The moving shutter being placed very near the sensitive surface, and practically in the focal plane, could not give rise to effects of diffraction upon the plate; besides, the opening in the shutter was never less than half-an-inch in width, and often as much as an inch or even more, according to the sensitiveness of the plates used.

The most serious difficulty with which I have had to contend has been the absence of clear skies. On many days of bright sunshine the wind has been in a northerly direction, bringing here the smoke of London, which produces a whity condition of sky, through which it was obviously hopeless to expect the coronal light to show itself upon the plates. The few occasions of a better condition of sky were for the most part of short duration, and did not allow time for a large number of photographs to be taken.

During the summer about three dozen photographs have been obtained, which show photographic action about the sun of a more or less coronal character.

I placed these plates in the hands of Mr. Wesley, who has had very great experience in making drawings from the photographs taken during several solar eclipses, with the request that he would make a drawing for each day on which sufficient photographs had been taken, combining the results of the different photographs in one drawing. This was desirable, as, whenever a sufficient duration of sunshine permitted, photographs were taken on silver chloride films as well as on silver bromide plates. Some photographs were taken with the sun screened by the brass disc, others without it; also photographs were taken with the sun in different positions of the field. As a rule, Mr. Wesley has introduced into his drawings those coronal features only which are common to all the plates taken on that day.

The apparatus is attached to the refractor of the equatorial in such a way that the direction of the length of the plate is in that of a parallel of declination; a line, therefore, across the plate, is in a direction north and south, and from the date of the photograph the angle of position of the sun's axis can be found. On Mr. Wesley's drawings the orientation is marked, as well as the position of the sun's axis.

Four drawings accompany this paper, On one of them (August 13) are seen defined rays. As these are present in three photographs—one in which the sun is in the middle of the field and the shutter in use, a second in which the sun was nearly in the middle but the shutter remained open, and a third with the sun near the margin of the field and screened by a disc—Mr. Wesley has put them in the drawing. In most of the negatives more structure than is shown in the drawings is suspected when the plates are carefully examined.

I regretted greatly that on the 6th of May—the day of the solar eclipse—the sky here was very unfavourable.

Up to the time of writing this paper I have not seen the photographs taken during the eclipse. Mr. Wesley wishes me to say that he has not seen the photographs or any drawings of the eclipse, and that, therefore, he has been wholly without bias in making his drawings from my plates. If these drawings are compared with the photographs taken during the eclipse, it should be borne in mind that the absence of sky-illumination during the eclipse would allow a larger part of the fainter and more distant regions of the corona to be photographed, and that any peculiar conformations or detailed structure of these outer portions could not be expected to be seen on my plates. The comparison should be restricted to the regions of the corona at corresponding distances from the sun's limb. It is probable that the short-exposure eclipse negatives will be found to admit of comparison with my plates better than those exposed for a longer time.

Photographs of the sun have been taken on the days which follow:—

April 2	1 plate.	June 20	1 plate.
,, 3	1 ,,	July 10	3 plates.
,, 6	2 plates.	,, 15	2 ,,
,, 26	5 ,,	August 8	2 ,,
May 23	1 plate.	,, 13	7 ,,
,, 24	6 plates.	,, 20	7 ,,
,, 31	5 ,,	Sept. 4	4 ,,
June 6	3 ,,		

All these plates show a more or less distinct coronal appearance about the sun. On some of the days an unfavourable wind brought here the London smoke, which greatly increased the sky-illumination relatively to the coronal light which could reach the plate. On these days the photographic action on the plates around the sun, though distinctly coronal in character, possesses less definiteness of form. I entertain the hope that it may be possible, by a careful comparison of all the plates, to gain some information, in a general way, of the amount, and possibly also of the character, of any large changes of form or of relative brightness which may have taken place in the corona, or been due to its motion, during the period covered by the observations.

I stated, in my paper read before the Royal Society, that all I could hope to do in this climate, and at the low elevation of my observatory, was to show a method by which, "under better conditions of climate, and especially at considerable elevations, the corona may be successfully photographed from day to day with a definiteness which would allow of the study of the changes which are doubtlessly always going on in it."

"Problems of the highest interest in the physics of our sun are connected, doubtless, with the varying forms which the coronal light is known to assume; but these would seem to admit of solution only on the condition of its being possible to study the corona continuously, and so to be able to confront its changes with the other variable phenomena which the sun presents. 'Unless some means be found,' says Professor C. A. Young, 'for bringing out the structures round the sun which are hidden by the glare of our atmosphere, the progress of our knowledge must be very slow, for the corona is visible only about eight days in a century in the aggregate, and then only over narrow stripes on the earth's surface, and but from one to five minutes at a time by any one observer.'"

Sir C. W. Siemens next read a paper *On the Dependence of Total Radiation and Temperature*, and Professor Vernon Harcourt followed *On a Lamp for Producing a Standard Light.* In the discussion which followed the reading of these papers, Professor Schuster pointed out that Professor Clerk Maxwell had some years ago suggested a similar method proposed by Captain Abney. Professor Harcourt's proposed standard lamp consists of an arrangement by which a mixture of atmospheric air and penthane, in the proportion of one cubic foot of the former to three cubic inches of the latter, is present at a definite temperature and pressure through an orifice a-quarter of an inch in diameter.

Professor STOKES read a letter from one of the observers at Caroline Island of the recent eclipse. He stated that the short-exposure photographs of the eclipse seem to show a condition of the corona inter-

diate between that indicated by Dr. Huggins's photographs of April 1 and June 5th respectively, and expresses his opinion that Dr. ggins's photographs of the corona were certainly genuine up to 8' m the sun's limb.

The SECRETARY exhibited three remarkable photographs of lightning shes, taken at night by Professsor Hansel, of Reichenberg, in Bohemia.

Dr. COPELAND pointed out the great advantage which would be gained taking such photographs at a high altitude, at which the absorption the violet end of the spectrum was greatly diminished.

On Tuesday the presence of Dr. Janssen afforded an opportunity those who attended Section A. of hearing from the distinguished ench astronomer an account of the observations he had made at roline Island, in the Pacific Ocean, during the recent eclipse of the n. Dr. Janssen, who spoke in French, referred to the importance of eful observations on the sun's corona, and remarked on the diffilty of conducting such observations, owing partly to the short ration of time for which the corona is visible—the duration of eclipse (though Dr. Huggins has recently succeeded in photophing it in full daylight)—and partly to the complicated nature the phenomena themselves. It becomes necessary, therefore, for observer to select one or two points for special notice, and during eclipse to concentrate his whole attention on them. Now, Dr. nssen, in 1871, observed that the corona gave a continuous spectrum ssed by dark lines like that given by the sun itself, indicating the stence of matter, probably solid, which reflects the sunlight. This servation has been verified by some astronomers, while others have led to see the dark lines, and the point which, on the occasion the late eclipse, Dr. Janssen set himself to prove was the stence of a spectrum of this nature. He thought that the main use of the failure was the small aperture of the telescopes used— aperture too small to bring to the focus enough of the feeble ht of the corona to render the spectrum visible. He, therefore, d an object glass of fifty c.m. diameter, with a focal length of y 150 c.m., and behind this he placed a spectroscope which allowed passage through the prisms of a large quantity of light. By an enious device a finder was placed alongside the spectroscope, so t the observer could place one eye at the finder while with the other examined the spectrum. In this way he was able to note the exact nt of the corona from which the light under observation proceeded. Janssen found that when the light from near the solar surface s examined he got a continuous spectrum free from dark lines, us indicating in the lower part of the corona the presence of selfninous incandescent matter; but that, when the light came from ortion of the corona at no great apparent distance from the sun's face, a most complicated spectrum, showing Fraünhofer's lines l a continuous bright background, was obtained.

In the discussion Dr. Schuster remarked that during the Egyp-ı eclipse expedition he had succeeded in obtaining a photograph the spectrum of the corona in which the line G was reversed, s confirming Dr. Janssen's observation; but at the same time he ressed his opinion that the differences observed by different ronomers with regard to these lines might be due to real differes in the state of the corona, and not merely to insufficiency ight in some cases. He agreed with Dr. Janssen in attributing reflection to the action of meteoric matter exterior to the sun, thought that the corona faded away gradually and had not a nite limit, quoting, in confirmation of his views, the observations Langley on Pike's Peak in 1878, when it was distinctly seen to end about ten diameters from the sun. Professor Stokes was ined to think it more probable that the reflection of the solar t was due to small particles of matter which had originally been jected as vapour from the sun and had condensed as clouds at a at height above its surface.

'rofessor S. J. Perry asked Professor Janssen for his views as to the tive value of photographic and eye observations of the sun's 'ace, remarking that an observer with his eye continually at the scope was able to take advantage of every favourable change of state of the atmosphere.

ı replying Dr. Janssen referred to the importance of considering effects of the earth's atmosphere in producing an apparent exion in the corona. Short exposure photographs appeared to v a limited corona, while, if the exposure was prolonged, the sunt reflected by the earth's atmosphere interfered and modified the lt. With regard to Professor Perry's question, he called attention ıe fact that the violet rays were the most effective when using ıotographic plate, while with eye observations the results were ıly due to the action of the yellow-green rays.

n the motion of the President the thanks of the Section were d by acclamation to Dr. Janssen for his valuable and interesting munication.

In the Chemical Section a paper was read by Mr. E. C. C. Stanford on *Algine, a New Substance Obtained from Sea-Weed.* The chief interest for us in this substance is that it will probably be found to form a valuable substitute for gelatine in emulsion and other photographic processes. We shall report upon its properties when we have had an opportunity of giving it a careful trial. The final *soirée* was held in the Winter Gardens, the closing general meeting being held at 2.30 p.m. on Wednesday.

It is only just to the local committee and all concerned in the arrangements of the meeting, to say that Southport has not been surpassed by any of the cities and towns at which the meetings have been previously held, in the completeness and perfection of its hospitality. The Mayor (Dr. Wood), the Town Clerk, and other members of the local committee were indefatigable in their endeavours to make matters run smoothly, and it must be said that they have succeeded in a manner that must have given satisfaction to the most fastidious. In connection with the admirable collection of works of art and objects of universal interest brought together in the local exhibition, too much praise can scarcely be given to the Southport authorities for their efforts to add to the attractions of the meeting; and special credit is due to the Liverpool Amateur Photographic Association for the attractive collection of photographs which decked the walls. Seldom at British Association meetings has photography been so well represented, and we must compliment Mr. B. Boothroyd (a resident of Southport) and the Rev. H. J. Palmer, respectively President and Secretary of the Liverpool Society, on the success of their efforts in placing photography in the position it occupied. An interesting memento of the meeting is a group of between seventy and eighty of the members, including Professor Cayley, the President, and many of the general committee, taken by Mr. Silas Eastham, whose name is familiar to the readers of the Journal.

Amongst those present whose names are known in connection with photography were Messrs. F. Galton, F.R.S., James Glaisher, F.R.S., Professor A. N. Hartley, Professor A. S. Herschell, F.R.A.S., Professor Arthur Schuster, F.R.S., Professor G. G. Stokes, F.R.S., Professor W. C. Unwin, and Messrs. H. Greenwood, A. L. Henderson, Lewis Hughes, W. H. Prestwich, R. Reynolds, F.C.S., J. Sidebotham, and John Williams, F.C.S.

Altogether the Southport meeting may be classed as one of the most successful ever held, though in the particular direction of photography there has been as usual little of immediate interest. The total number of members and associates reached 2,714, a number considerably in excess of even the jubilee meeting at York Next year the Association will meet at Montreal on August 27th, and in 1885 Aberdeen has been selected as the meeting-place in preference to Bournemouth, the claims of which remain to be considered on a future occasion.

THE SCIENTISTS AND PHOTOGRAPHY AT SOUTHPORT.

SOUTHPORT, although a town of only some forty thousand inhabitants, can boast of upwards of a dozen photographers. This number does not include the peripatetic brethren who ply the art in its many phases, from the ferrotype to the gelatino-bromide process.

Notable among the art photographers is the well-known Silas Eastham—I might say now the veteran artist—who received me very courteously on my paying a visit to his establishment, and in the course of conversation he revealed some of the secrets which have conduced to his long-continued success, which was largely due to the production of his *specialité*, namely, 12 × 10 opals. The demand for this style of picture is not at all on the wane. They are collodion transparencies on opal, toned with gold—rich, beautifully-brilliant, and handsomely framed. They are indistinguishable from the finest gelatino-bromide opals. In reply to my inquiry as to their permanency, I was assured he had never perceived any trace of fading. I had also placed before me a cabinet photograph, which is to be enlarged for presentation to the Corporation of Southport as a memento of the visit of the British Association to that town. This is a group of upwards of seventy of the principal members of the Association. The negative was taken on a dull afternoon, about 4.30, in a public hall imperfectly lighted. A Dallmeyer's rectilinear lens of nine inches focus was used, and an exposure of twenty seconds given. Considering the difficulties of the situation the group is remarkable. The most recognisable figures in the picture are Professor Cayley (the President), Sir Frederick Bramwell, Captain Douglas Galton, Mr. H. Trueman Wood, and Captain Bedford Pim.

I may say that although I have seen in Southport *carte* photographs at such prices as three for a shilling, the majority of the leading photographers still hold their own as regards prices. I perceive that the charges range from 15s. per dozen for cards and 28s. per dozen for cabinets, down to the low price above named.

I had also the pleasure of introducing myself to a younger member of the fraternity, Mr. B. Wyles—a clever artist as well as photographer—who, like myself, was originally a chemist and druggist, but retired from that business in favour of his present more lucrative and less confining profession. Mr. Wyles is one of the few Southport photographers who issued invitations to the leading members of the British Association to visit his studio to be photographed. I unfortunately missed the opportunity of a chat with Dr. J. H. Gladstone, who was just leaving the establishment after undergoing the pictorial ordeal. The readers of the Journal may remember that I repeated that gentleman's experiments with sulphate of quinine, with the view of obtaining a safer light for dark-room work. Mr. Wyles has just completed a large group of the members of the Pharmaceutical Society, numbering 120. This picture was taken in the open air on a 12 × 10 gelatine plate. A Ross's symmetrical lens of eleven inches focus was used, an exposure of one second, with an $\frac{f}{32}$ stop, being given.

Several photographers exhibited some curious phases of character, which led me to presume they were either fearful that I might learn something or that they might betray professional ignorance. An exception to this line of conduct occurred in the person of a pretty, sharp young girl of about fourteen years of age, who was operating in a tent on the sands, taking positives which were somewhat foggy and out of focus. My companion, Mr. W. H. Prestwich, saw to the adjustment of the chemical and visual foci of the lens while I corrected the developer. I was greatly pleased, on visiting her establishment the following day, to find a great improvement in her work—so much so, that Mr. Prestwich and myself were photographed together, seated on a pair of donkeys. On the background are visible the words—"Welcome to Southport!" I intend to exhibit this picture as "A Group of Distinguished Members of the British *Ass*ociation!"

A. L. Henderson.

ON THINGS IN GENERAL.

The great copyright case has assumed a new phase by the publication of the defendant's letter in the columns of this Journal. I think it is very likely that many besides myself had some feelings of sympathy towards a tradesman who had unwittingly made a slip which had landed him in heavy law costs; but it is evident from his letter that any such feelings are entirely misplaced. By his own showing he is actuated by the feelings of an unmitigated pirate, and he flaunts his want of propriety in a very unseemly manner, with added impertinences that admit of none but literary chastisement. I would call my readers' attention to his plain admission that he copied another man's work, which, he says, "appeared to be one of the many reproductions (of foreign or non-copyright photographs) which are published and sold as originals." I will not question the truth of this statement, but one naturally wonders where in "foreign parts" the Australian group was likely to have been taken. Again: the turpitude of the piracy is cleverly hidden away by the verbiage about "authorship." Reams of this Journal explaining points under discussion will not alter the verdict, which, however, does not touch the morality of the act. There can be no doubt the picture was copied long before the "copier of the copy" knew anything about the personality of its producer, and his only excuse is that the picture had not impressed upon it those few magical characters which, when present, show that in view of the actions of these appropriators of other men's brains the owner of such picture had protected himself by law. Mr. Jackson must be aware that by instituting a punishment for copying other men's work the law recognises the immorality of the act; and that immorality—whether those works be literary or artistic—has been technically and aptly termed "piracy."

Mr. Jackson does not think the present Copyright Act was intended to include photographic portraits from life—a fine excuse, certainly! I should like to know what Justice Field would reply if a burglar were to defend himself on the ground that there was no notification on the house he "burgled" that it was private, nor any ticket on the plate stating it was personal property. Again: he points out the pirated copies of portraits he can buy from other people; *but* "two wrongs do not make a right." The saleable value of a portrait is not the artistic merit it possesses, but the popularity of the original, he states. This is quite an untrue statement; for many beautiful portraits are sold the originals of which had never before been heard of by the purchaser.

Finally: let me call attention to the statement that he sees an absurdity in the fact that a photographer is liable to be prosecuted for piracy if he make a copy of a portrait that another photographer has produced without making any charge for it. We may be quite sure that if it were not a good picture "he or she" would not get it copied, while, if it were worth reproducing, any honest-minded man would grant that the profits of the reproduction should go to the author of the original or the person to whom he had transferred his rights. The contrary suggestion betrays a bluntness of moral perception that is painful to contemplate. When Mr. Jackson compares prices of portraits and landscapes in the manner he does he simply shows his ignorance of the subject he discusses, and so the impertinence must pass.

One of the most interesting personal aspects of photography that has lately arisen is the stir which has been made in the press over Lord Cairns' reported buying up of all the shop pictures of his future daughter-in-law. The task would be Sisyphean, and it is not very likely that he would attempt to arrest the public exhibition of the pictures in that manner. Indeed, I was informed by a gentleman in the confidence of the celebrated firm who have produced these beautiful pictures, that the fountain head—the firm itself—had been asked to discontinue the sale, and that, much against their will, the pictures being so effective, they had consented.

Our friends on the continent are in a state of tumult about the famous Obernetter gelatine-plate process, so much so that all discussion upon it is forbidden at their leading societies' meetings. It seems a very simple issue really. Herr Obernetter has devised a process and made certain statements about it as to its excellence and the ease with which it can be learnt, and has obtained nearly two hundred subscribers who have purchased the secret. A great many of them now turn round and say the process will not do what is promised, and, further, that it needs great skill to work it at all. A protest has been signed and circulated, and there the delectable dispute stands, and appears likely to do. I fancy that such a state of affairs in this country would have been brought to a judicial arbitrament long before now.

I was very much surprised to see Mr. Simmons' account of his balloon exploit in company with a photographer; for it is such a *fanfarronade* of photographic nonsense as I can scarcely believe anyone in his sober senses could write. Leaving on one side the want of preparedness which the shutter failures indicated—that being the photographer's share of the transaction—what could Mr. Simmons have seen in the ground glass of his camera to have enabled him to speak of witnessing the balloon soaring downwards, not to mention the sun, moon, stars, &c.? The whole photographic experience reads like pure figment.

Most readers of the Journal who take an interest in the progress of photography must have been pleased by the engravings given a week or two since by the new luxotype process. I firmly believe photography in the printing-press along with type, &c., for the rough work of a daily paper to be a mere question of time, and I hail each process which brings the realisation of the hope nearer to us, as anyone can see the luxotype does. I consider the pictures, though far from approaching the ideally perfect, to be most successful in their way.

More successful than the experiments with hydrokinone appear to be. So many experimentalists have tried this chemical with the uniform result of finding it inferior in almost every point to "pyrogallic" that I expect it will soon die a natural death. This is a pity, for much promise appeared to accompany it when first introduced.

The former editor of this Journal, Mr. J. T. Taylor, gave an interesting address before the Milwaukee Convention; and, though I am quite willing to admit the beauty of some American photographs, I think he is rather hard in giving, by implication, the decided palm to the Americans for permanency in their work. There is good work and permanent work done here. "One swallow does not make a summer."

Professor Vogel, too, in his address was hardly fair in apportioning his praise to the builders-up of photography as it now is. No one can complain that after Daguerre, Talbot, and Archer had been named as amateurs, the names of Bennett and Kennett also should be linked with emulsion photography. But why not that of Bolton also? Surely the fact of that gentleman now filling the editorial chair of the oldest photographic journal in the world should not rob him of his claim to historical eminence in connection with the modern development of photographic processes.

Free Lance.

TOURIST OUTFITS AND NEW TRIPOD ARRANGEMENT.

The question of the lightest attainable outfit for tourist purposes will continue to afford ample scope for all manner of improvements for some length of time to come. Nothwithstanding that we have already reached a degree of lightness compatible with strength, which in many senses may be considered very satisfactory, still we are all of opinion that much remains to be done in bringing to a minimum an outfit more especially adapted for the tourist, which may be considered as perfected

as possible. Perhaps if I define my meaning of what I consider a completely-perfect outfit a better idea will be gathered of the end to be attained.

First, then, in regard to the size of plate to be used. I consider that for all practical purposes the half-plate may be taken as a fair standard for the tourist. All other sizes, either under or over, are generally admitted more or less objectionable from many points of view. Whilst the tendency of modern photography is towards the smaller plate in preference to the larger ones formerly used, I do not think the best results can be attained, generally speaking, with a smaller size than that stated. Nor am I of opinion that under any ordinary circumstances, with the class of lenses now manufactured, the full plate need be exceeded.

Then, again, the total weight of an outfit, as many tourists only too well know, very much influences the charm of outdoor photography. Assuming a photographer to be on a tour single-handed, I consider that an outfit such as indicated, and which I shall presently describe, ought not to be more than five pounds, or, at the most, seven pounds, in weight. As yet I know of no complete outfit of (say) half-plate size coming within this range, and still I believe it not only possible, but that my limit will ultimately prove excessive. When an outfit exceeds this limit it becomes a toil rather than a pleasure—at anyrate so I have found in my experience.

There is a constantly-increasing class of photographers who turn their holidays into photographing expeditions, and they must be intensely interested to encumber themselves with the unnecessarily heavy and bulky outfits at present used, and to which may be added a quantity of glass plates with domestic luggage in the bargain. This state of things must end sooner or later.

With a view to encourage the introduction of lighter and more perfected appliances, I suggest the formation of an association having for its object the adoption and recommendation of the most approved appliances in relation to photography. It is easy to see there is ample scope in this direction. If certificates of merit, prizes, &c., were offered for the highest skilled productions, such an association might be made self-supporting by the fees accruing from competitors, assisted by private subscriptions.

But the next question arises—What may be considered a complete outfit? In broad terms, nothing short of being able to bring back perfect negatives, finished ready for the printer. It should include camera and set of lenses for instantaneous and general effects; plate-changing appliance; developing, fixing, intensifying, reducing, and varnishing solutions, or the chemicals necessary to make up the same as required; dishes for developing and fixing; portable developing lamp; tripod stand, not to exceed twelve inches in length when folded; instantaneous shutter; an improved slide constructed to carry a quantity of plates or films; focussing-cloth, &c.—the whole to be enclosed in a small hand-bag or knapsack, as preferred, and not to exceed the weight stated. Very useful half-plate cameras are now made weighing little over two pounds, and for changing plates I use a Canton bag, which also serves as a focussing-cloth. In order to dispense with further weight I use an improved slide carrying a dozen plates. As each dozen plates are exposed and made into finished negatives they are repacked and sent home, thus lessening our carrying weight with each day's work. If films be employed there is not the same difficulty.

In order to meet a further difficulty in point of carriage of an article which has always been to us a bugbear—I mean the tripod stand—it occurred to me to utilise an ordinary umbrella or walking-stick, since these conveniences are invariably carried, and do not give the slightest indication of photographic outfit. I accomplish my purpose in the following manner:—Assuming that an umbrella or walking-stick stands thirty-six inches in height, I take two appliances as described below, each twelve inches long over all, and after allowing (say) three inches at each end of the umbrella for fixing the appliances, it will be seen that you have a stand of fifty-four inches—a convenient height for all practical purposes. *Fig.* 1 represents the upper attachment. The collar A is divided into two parts, as shown in *fig.* 2. It is hinged at one end, the other end containing a hinged screw on one part, which fits into a slot in the opposite part to give readiness in securing. A ferrule B is added to the collar to give more firmness of grip. The inside section of the collar and ferrule, as in *fig.* 2, is made square to fit any thickness of stick. The small dots show the position of the hard-drawn steel wires, which are made a fixture by screwing them into the collar. These wires are about three-sixteenths of an inch thick, screwed at one end to fit into the collar, and on the other end a small right angle is bent to fit into and hold the tripod top in position. By screwing these wires into the collar at right angles they spring sufficiently to receive the tripod top when in use, and close again into the smallest compass when packed. Two small thumbscrews placed on opposite sides of the collar and ferrule firmly secure this appliance to the handle of the umbrella.

FIG. 1.

FIG. 2.

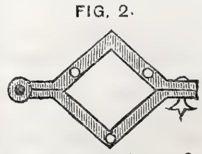


Fig. 3 shows the appliance for the lower attachment, slightly altered from *fig.* 1, though similar in principle. The three hard-drawn steel wires, instead of being made a fixture in the collar arrangement, as in *fig.* 1, are hinged somewhat after the plan of an umbrella frame, to allow for the spread of the feet in use, and to close up again when not so required. The collar and ferrule of this arrangement, instead of being divided into two parts as in *fig.* 1, form one part only, with a round hole of five-eighths or three-quarters of an inch in diameter to receive the lower end of the stick. The thumbscrew placed in the collar secures the arrangement to the stick, whilst the one in the ferrule answers the double purpose of giving additional security and extension of the tripod feet. The weight of the two appliances is about half-a-pound.

FIG. 3.

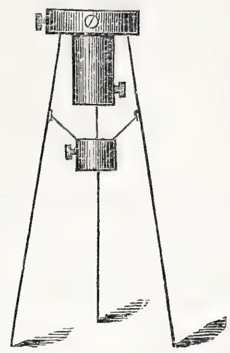


Fig. 4 shows the upper and lower arrangements attached to an umbrella ready for use. I may remark that this form of stand is not intended for heavier work than the half-plate camera; but this is rather an advantage than otherwise, since the tendency now is to take small negatives and rely on enlargement afterwards. It is probable that some of your readers may see some objections to this stand, but in practice the seeming difficulties will disappear. The spread of the feet is sufficient to give all the rigidity needed, and, at the same time, small enough to be fixed anywhere—say on a hill side, as the wires easily penetrate the soil or loose earth sufficient to give the perpendicular needed. To place the stand on a hard surface an arrangement is made in the collar of the lower attachment by which *one* of the wires may be raised or lowered as required; that is, one of the three wire feet is made to fit loosely into the collar of the ferrule and tightened by means of a thumbscrew when adjusted.

FIG. 4.

I do not claim the same rigidity in this stand as in the old form having a much larger extension of feet, still I obtain sufficient for the purpose and for instantaneous exposures, and dispense with considerable weight. It has the further advantage of packing in a hand-bag, out of sight, all traces of a photographic outfit.

With these suggestions, and taking into account the fact that the days of double slides are numbered, and possibly also the use of glass for negatives, it is very probable that such outfits will be offered to the profession in course of time as will bring the carrying item down to the minimum without in the least sacrificing any portion needed for perfect work.

CHAS. J. HALL.

RECENT PATENTS.

NOTICE TO PROCEED.

No. 2,677.—"Apparatus for Changing and Storing Backgrounds." W. E. LINDOP, of Ontario.

PATENT APPLIED FOR.

No. 4,557.—"Apparatus or Electro Appliance for touching up Photographic Pictures." E. G. BREWER; communicated by J. Geesbergen and Geruzet Fréres.—*Dated September* 24, 1883.

AMERICAN PATENTS GRANTED AUGUST 28, 1883.

No. 283-952.—"Photographic Camera Box." E. B. BARKER.

No. 284-073.—"Photographic Exposing Apparatus." R. SCHLOTTERHOSS.

PHOTOMETRIC APPARATUS.

ANY specification of a patent to which the name of Professor Silvanus Thompson, of University College, Bristol, is attached is sure to receive attention. The nature of that for photometric apparatus, which did not pass beyond the provisional stage, will be ascertained from the following:—

This invention, which relates to improvements in photometric apparatus, consists in the employment of interchangeable opaque screens in ascertaining or comparing the intensity of lights. These screens are formed of two members, either plain or coloured, and attached to one another at any desired angle; the double screens thus formed resembling wedges having the ends opposite the apex open to admit of their being placed on a support, either fixed to, or adjustable upon, the horizontal bar of the photometer. The bracket carrying the candles may be either fixed to, or adjustable upon, the bar, which is graduated on the proper portion of its upper face according to the law of universe squares, or the scale may be formed independently of the bar and applied or attached thereto.

The light from the candles is directed upon one face of the double screen, and, in measuring lights below a certain intensity, the rays of the light to be measured are directed upon the opposite face of the double screen, the light being carried in a bracket either fixed to, or adjustable upon, the bar.

For the measurement of lights of higher intensity, the light therefrom is reflected from its position at an ascertained distance on to the proper face of the screen through the medium of a mirror which is adjusted on the photometer bar to the requisite angle. The face of the reflecting mirror may be plane, concave, or convex, as may be desirable. Under this invention the relative illuminating power of two or more lights for different colours may be compared without the use of coloured glasses, and the inconveniences and disadvantages attendant upon their employment are thus obviated.

The observing mirrors required in the "grease-spot" photometer are also dispensed with.

AN IMPROVED PHOTOMETER.

To those who look for the speedy advent of photography by lamp or ordinary gaslight, the specification of Mr. A. J. Beer, of Canterbury, will indicate the means by which, in the estimation of the patentee, the relative intensities of various classes of lamps may be fittingly ascertained. He says :—

My improved photometer for ascertaining the relative value or illuminating power of electric light, gas, oil, or other methods or systems of lighting, as applied to streets, factories, offices, domestic, and other purposes, consists mainly as follows :—

The instrument consists of a plane table or disc, with an indicator supported on tripod or other stand, which disc is so constructed as to assume a level position independent of unevenness of surface of land or other causes to throw it out of level, the indicator being erected perpendicular to the axis of the disc from whence the shadows of light are read off. The form of adjustment consists in a weighted rod or pendulum acting with a universal or similar joint.

In my invention, what is to be noted is the method of determining the relative value of different lights by means of an instrument as described.

ADJUSTING THE FOCUS OF LENSES.

We regret that Mr. Edward Marlow, of Birmingham, has allowed himself to be advised to throw away even such an amount of money as was necessary to secure provisional protection (beyond which stage it has not passed) for his invention, because the screw-method of focussing lenses has both been often described and even patented long ago—first of all by the late Mr. Thomas Grubb. But Mr. Marlow's ideas *re* focussing are quite good, although not original. We allow him to speak for himself :—

This invention has for its object an improved means of adjusting the focus of microscopes, telescopes, field and opera glasses, photographic, magic lantern, and other lenses. And this is effected by taking two of the ordinary cases or tubes for holding the lenses, and cutting through the face of the outer tube a spiral groove and having upon the face of the inner tube a pin or projection working within this groove, so that the act of withdrawing the one tube from within the other causes the pin or projection to travel along the groove and hold the tubes in any required relative position. To assist in making the action of the two tubes work smoothly the outer case or tube is lined with velvet or other soft material. If desired the groove may be on the inner case or tube and the pin on the outer case.

SURFACE BLOCKS FOR PRINTING ALONG WITH TYPE.

That there will be a great future for phototypic blocks is evident. The question arises—Which among the numerous processes now before the public for producing such blocks will yield the best results at the smallest expenditure of time?—for in phototypographic processes, by which to prepare illustrations of current events for newspaper or periodical uses, rapidity is an important element. The process of Herren Allgeyer and Bolhoevener, of Munich, patented in this country by Mr. J. R. Meihe, helps to swell the number of processes for producing surface blocks of the class required.

This invention, says the patentee, has for its object to obtain from drawings, woodcuts, photographs, and other pictures relief plates which give accurate copies of the originals employed, and which may be used for printing simultaneously with letter type.

For this purpose a heliotype (sun print or lichtdruck) is first produced on a plate prepared like ordinary heliotype plates, except that chloride of calcium in the proportion of one part of the chloride to five parts of gelatine or any other substance capable of producing a "grain" has been added. The heliotype plate is exposed to light under a diapositive (transparency) rolled over with greasy ink, and the image is either immediately strengthened by strewing graphite powder or some other suitable coating over it, or an impression is made from it on a gelatine foil, which impression or copy may also be strengthened in the manner just described. By either method a "grained" negative is obtained, which in one case is right-handed and in the other case left-handed.

Under one of these grained negatives a film chiefly composed of bichromate and glue, and prepared in the manner hereinafter described, is exposed to light. The back of this film is subsequently fastened on to a wood block to the exact height of the type to be used with it—those parts of the picture on the wood block, which have not been acted upon by the light, are now mechanically removed by friction with moderate damping and by this means the required relief is produced which may be used, in combination with letter-type, for printing in the ordinary type printing press.

From the same relief plate an electrotype may be produced in the same manner as from ordinary engraved wood blocks.

The exposure of such a sensitive film to light is equally successful with a lined negative (the image of which is composed of lines like an ordinary woodcut).

The film destined to receive the picture and to serve as a printing surface is prepared in the following manner :—

One kilogramme of glue (Cologne glue) is soaked in one litre of water for several hours, then dissolved by adding thirty grammes of bichromate of potash and twelve grammes of glycerine, and placing the vessel containing the mixture in a warm water bath. A suitable quantity of the mixture is then poured on glass plates (mirror plates) which have been previously coated with a solution of ox-gall; the film of prepared glue thus deposited is then allowed to dry in a dark place. When well dried it is scraped perfectly even with an edged instrument, then taken off from the glass plate, and exposed under a negative in the manner hereinbefore described, care being taken to expose that side of the film which has adhered to the glass.

Having now described the invention and the manner in which the same is to be performed, I wish it to be understood that I claim—

1. The production of grained negatives :—*a*, by the direct use of a heliotype plate containing chloride of calcium or any other suitable grain-producing substance, which heliotype plate has been inked in, and the image strengthened by the addition of graphite powder or any other suitable coating; *b*, by the use of an impression taken on a gelatine foil and strengthened in a similar manner.

2. The production of printing blocks by pouring chrome glue over a plane glass plate previously prepared with a solution of ox-gall, allowing the film to dry, exposing under a grained negative (which may be obtained as indicated in the preceding claim), or under a lined negative, that side of the film which has adhered to the glass, attaching the other (back) side upon a base-plate, and developing the relief by means of damp friction, for the purpose of using such blocks directly in the type printing press, or for obtaining printing blocks by means of electro-plating in the manner well known.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 1	W. Riding of Yorkshire	Godwin-street, Bradford.
" 2	Sheffield (Annual Meeting)	Freemasons' Hall, Surrey-street.
" 2	Halifax..........................	*Courier* Office, Regent-street.
" 3	Benevolent	181, Aldersgate-street.
" 3	Edinburgh	Hall, 5, St. Andrew-square.
" 3	North Staffordshire	Town Hall, Hanley.
" 4	London and Provincial	Masons' Hall, Basinghall-street.
" 4	South London	Society of Arts, John-st., Adelphi.
" 4	Bolton	The Baths.
" 4	Leeds	Mechanics' Institute.
" 4	Glasgow	172, Buchanan-street.
" 4	Dundee	Lamb's Hotel, Reform-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the technical meeting of this Society, held on Tuesday last, the 25th instant, the chair was occupied by Mr. J. Spiller, F.C.S.

A question from the box was read asking for an explanation of the following circumstances :—"During the recent hot weather two plates of commercial manufacture—one fairly and the other extra-rapid—were placed in the hypo. bath to fix. The film of the extra-rapid plate dissolved away, whilst that of the other was unaffected."

The Chairman mentioned that having developed a plate and, finding no hypo. at hand, he had mixed some sulphocyanide of ammonia in water to fix with. The gelatine, however, rapidly softened and slipped away.

Mr. A. Cowan thought that, probably, the sender of the question did not employ the alum bath before fixation. It had been suggested to use alcohol in all the solutions when there was any particular tendency in the gelatine to soften.

Mr. William Ackland observed that some rapid plates contained a large proportion of soft gelatine.

Mr. E. Dunmore had had some plates from which, in cool weather, the film had dissolved off in patches.

Mr. C. Ray Woods had lost some negatives by the gelatine coming off in patches during drying in warm weather.

The Chairman, referring to a recent visit made to Germany, said that he had seen no photographs there equal to our English productions.

Mr. Woods said that in Peru he had seen some very good work, and in California some of the finest photographs that he had ever seen; and in both places wet collodion was still used almost exclusively.

Mr. W. M. Ashman believed that the Californian photographs were nearly all gelatinised—"enamelled," as it was called.

Mr. Woods replied that in the case of those to which he had referred that was not the case. The pictures were full of detail, large in size, and good in every way.

Another question was read :—"What is the cause of those markings looking as if spilling or streams had run from the top to the bottom of the plate?" In the printing-frame these markings appeared iridescent.

Mr. Ashman said that in using ebonite dishes, if they were merely washed out after each development, there was an accumulation of stain from the pyro. which would show itself by iridescent stains upon plates developed in them.

Mr. W. Coles thought that iridescent markings were generally due to the plate having been exposed to gas vapours.

The Chairman preferred to develope in a dish made of millboard and coated with paraffine. When any stain showed itself it was sufficient to warm the dish; the paraffine then melted, and a new surface was obtained. He continued by saying that he had read Mr. Woods' graphic description of his journey with the Eclipse Expedition, and expressed a hope that some

f the photographic results would be shown at the forthcoming exhibition.

Mr. Woods replied that he would have some transparencies ready for he lantern exhibition.

It was mentioned that M. Geruzet, of Brussels, had promised to bring England and show to the Society an instrument for retouching by lectricity, and to demonstrate the method of working it.

It was inquired whether any member could explain the method by which etouching was practised so as not merely to add lights but to produce hadows, and this so skilfully that prints from the negatives so worked pon required no retouching themselves.

Mr. W. Bedford said that for landscape work he scraped the film with knife. The result, however, was not a continuous, even tint, but a sucession of small transparent holes.

Mr. Ashman observed that the film was entirely cut away where a hadow was wanted, and colour was then used to make up the tint required.

Mr. Woods suggested the use of emery stone to wear away the film.

The discussion then turned upon methods of intensifying gelatine negatives.

Mr. Coles said that he had sometimes succeeded, and at other times ailed, with Mr. Howard Farmer's method of using silver dissolved in ypo. On mentioning this to Mr. Farmer, that gentleman had stated that t would not succeed if chrome alum had been added to the emulsion.

Mr. Bedford expressed his opinion in favour of Monckhoven's method vith mercury, followed by cyanide of silver.

Mr. Ashman spoke highly of the intensifying solution made by the Platinotype Company.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 20th instant, the hair was occupied by Mr. A. Haddon.

Mr. A. Cowan said that Mr. A. L. Henderson had made the startling ssertion, at a recent meeting, that diluting the developing solution would ause it to bring out more detail, and that a plate so treated would appear nore fully exposed than one that had been developed in the usual way. He (Mr. Cowan) produced two plates which had been exposed exactly alike. One of them had been developed in the usual one-grain pyro. mixture, nd had taken two minutes and twenty seconds in development. The other had been developed in a mixture in which the pyro. was four rains to the ounce strong, and the bromide and ammonia were increased in he like proportion. The action of the developer in this case was completed n twenty seconds. Prints from the negatives were shown together with he plates themselves, and, contrary to what would have been expected if Mr. Henderson's observation had been correct, the plate developed with he stronger mixture had full detail in the shadows and appeared corectly exposed, whilst the others seemed to be rather under-exposed.

The Chairman remarked that the plate developed in the ordinary soluion was somewhat clearer in the shadows than that which had had the tronger developer.

Mr. Cowan thought that the difference in this respect was very slight ndeed, and not more than might be expected from the more complete levelopment that the plate in the stronger solution appeared to have indergone.

The Chairman suggested that, when possible, exhibits should be brought o the meeting in duplicate; as it sometimes happened that before the hing shown had been the round of the members the discussion upon it had ceased, and some other subject was occupying their attention.

Mr. J. H. Hare showed an instantaneous shutter, the moving parts of which consisted essentially of two plates working in contrary directions, having an opening in each which, when the plates were in the middle position, exposed the lens. These plates were set in motion by a lever pivoted centrally at one end of the shutter. The lever had two slots which fitted on to pins—one in the side of each of the movable plates. A prolongation of the lever served as a handle by which the exposure was given more or less quickly as required. By the addition of a spring lightly catching in a notch, it could be felt when the shutter was open to the full, and this would be convenient when longer exposures were to be given.

Mr. A. J. Brown said that the only true position for any shutter opening and closing from the centre, as that did, was between the lenses. Otherwise the margins of the picture did not receive their proper length of exposure, compared with the middle portion.

It was suggested by a member that a shutter actuated by the hand was liable to cause blurring by shaking the camera.

Mr. W. Coles had not found this result when using a somewhat similar shutter.

Mr. W. M. Ashman handed round two plates which had been prepared with collodio-chloride emulsion, and developed with a mixture of the ordinary ferrous oxalate developer and a solution composed of five parts of citric acid, two of liquor ammonia *fort.*, and twenty of distilled water. In the one case ten volumes of this solution had been added to one volume of the ferrous oxalate developer, and in the other case the proportion was fifteen to one. The plate developed in the latter mixture (containing less iron) was somewhat warmer in tone than the other, which, however, was rather the richer of the two.

Mr. Cowan had found it much better to use carbonate of ammonia than liquor ammonia for making citrate developer.

Mr. Brown inquired whether the emulsion had been a washed one, and it was replied that it had.

Mr. W. E. Debenham remarked that collodio-chloride had generally been prepared with excess of silver for direct printing. He inquired whether this sample had been made expressly for development with excess of haloid.

Mr. Ashman answered that excess of silver had been used, but this had been afterwards corrected by the use of bichromate of potash.

A question was read:—"Has any member had experience of the method of reducing the intensity of negatives by converting the image into chloride with chloride of copper and then redeveloping with ferrous oxalate?"

Mr. Coles had tried it, but found it difficult to judge of the amount of intensity acquired, and to know when to remove the plate from the oxalate solution. The resulting negative also had a disagreeable yellow colour.

Mr. J. Barker inquired whether anyone could tell him how to coat paper evenly with gelatino-bromide solution. He had succeeded in preparing a suitable emulsion for development upon paper, but not in obtaining an even film.

The Chairman suggested holding a roll of paper so that its surface should just touch the solution in a dish or trough, and while unrolling with one hand the paper should be drawn upwards with the other.

Mr. Ashman said that the difficulty was that the emulsion ran off irregularly, causing wavy marks. He showed a sheet in which these markings were very evident.

The Chairman remarked that carbon tissue was coated with a solution much thicker with gelatine than emulsion was generally made, and suggested that for coating paper more gelatine should be used than for plates.

Mr. Ashman had tried this plan and with better results.

A member inquired of Mr. G. M. Satchfield whether the thick solution was not the proper method of using gelatino-bromide for paper. The latter gentleman replied that that was so.

Messrs. G. A. Baker, F. J. Brent, F. C. Burnham, A. J. Jarman, F. Miller, H. E. Mone, and E. E. White were elected members of the Association.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

Very indifferent weather favoured the August excursion of the above Society. Messrs. Auty, Borrows, Dodds, Day, Gibson, Pike, and Robinson proceeded, as arranged, to Stocksfield station, and in the neighbourhood of Bywell, during intervals, exposed several plates. Considering the weather very fair results were obtained. The party dined at Riding Mill in the evening.

On Wednesday, the 19th instant, the Durham excursion attracted ten members, viz., Messrs. Auty, Balsdon, Borrows, Dodds, Gibson, Gould, Pike, Ridley, Robinson, and Campbell Swinton. Cameras were at work from 24×18 to $6\frac{1}{2} \times 4\frac{3}{4}$, and about six dozen plates were exposed amidst the beautiful river scenery. Members met at 6.15 p.m. for tea, and after an enjoyable repast returned to Newcastle.

The outdoor meetings have this year attracted a fair average number of members, and a good show of work may be expected at the forthcoming exhibition in November, in competition for the special medal offered for photographs taken at these gatherings.

Correspondence.

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

To the Editors.

Gentlemen,—We notice in the judges' official report of the late Royal Cornwall Polytechnic Exhibition that they state that the instantaneous studies of yachts taken by us were *evidently elaborately retouched*. We should much wish to correct this mistake, as neither the negatives or prints received any retouching whatever, but are truthful representations of yacht racing, and were taken from a small sailing boat, which is considered rather a difficult matter, especially in a rough sea.

By inserting this in your next issue you will greatly oblige,—Yours, &c., G. West and Son.

Gosport, September 25, 1883.

THE RECENT COPYRIGHT CASES.

To the Editors.

Gentlemen,—I am not surprised that a letter which contains so much vulgar abuse as that of "Audi Alteram Partem" should be so singularly devoid of arguments really affecting the matter at issue. Those portions of it which are meant to be personally offensive I can afford to treat with the contempt they deserve, and perhaps your readers will attach more weight to the remarks of Mr. Justice Field than to the vapourings even of an individual who can grasp "the visionary, the ideal, that which requires an exalting effort of mind to realise" with such an evident sense of superiority. I trust also the leading London publishers who "copy" so extensively will not be at all offended at being termed "smudgers" by one who sympathises so acutely with them.

Your correspondent knows little of the cases about which he writes so pompously, as neither in the Court of Queen's Bench nor in the Appeal Court was the point of authorship decided on the grounds stated by him, as he will find if he reads a *verbatim* report of the judgments.

He refers to a lack of modesty in my letter; but his modesty allows him to "speak candidly," and with all the weight of his great authority to decide that "there is *no doubt* the judges have hitherto misconstrued the strict meaning of the word author." Perhaps if he could overcome

his modesty a little more, and allow other less gifted persons to know to whom they are indebted for this extraordinary and weighty decision he might even hope to convince the four of Her Majesty's judges, who are so much inferior to him in "mind" and "understanding."

I leave it to the commonsense of your readers as to whether the man who simply "conceives the idea" of taking a portrait, and who may know little or nothing about photography, is the proper person to be designated the author in preference to the real artist. If the "idea" is sufficient to constitute authorship, then a person who decides to have his own portrait taken, and instructs an artist to take it, must be considered the author, as he certainly first "conceives the idea."

As to the saleable value: the very term "portraits of *celebrities*," is a sufficient proof that the first essential is the popularity of the person; and the more celebrated or notorious the person the greater will be the sale.

There has been a signal proof of this recently with the portraits of Miss Fortescue, the sale of which, since her recent marriage, has been enormous. Surely this is not owing to any improvement in the artistic skill displayed.

With respect to his remark that "no photographer worthy of the name would sell a single copy from one of his negatives without permission, and where the permission has been given the sale can never be obnoxious:" if this were so it is no reason *why* the privilege should be in the photographer's hands. The question is not whether the power would be abused but whether the photographer has a right to it, which he certainly has not unless the sitter wishes him to have it; and experience shows that the sale does often become obnoxious.

For instance: one of the very portraits in dispute in the recent cases was given away in large numbers to purchasers of certain cheap boxes of cigarettes, and such instances are far from being uncommon.

As to whether the leading London publishers who supply portraits for such purposes are "photographers worthy of the name" or not I leave to your correspondent to decide, but it is clear that every British nobleman would not particularly relish the thought of his portrait being put to such a purpose.—I am, yours, &c., JOHN H. JACKSON.

Leeds, September 24, 1883.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

Edward Coe, 6, Anson-street, London-road, Liverpool.—*Photograph of the Mysterious Musicians.*

*** During a brief absence from London it is possible some communications may not reach us in time for this week's issue. We must, therefore, request any correspondents who may not receive attention this week to accept this explanation.

EXCHANGES.—In our next.

R. WALTHEW.—The pinholes in the plates appear to arise from air-bubbles in the emulsion at the time of coating. There is no means of remedying it in the plates already coated.

B. J. S.—You are too late for this year. This is the last day for sending in the pictures. The Technical Exhibition of the South London Photographic Society is held in November.

COPPER.—To prevent the copper depositing on the back of the plate coat it with shellac varnish. The gelatine should not dissolve in the depositing solution if it have been treated with alum.

WILTS.—If you add a small proportion of alcohol to the gum you employ for retouching the print it will preserve it from decomposition. A little carbolic acid or thymol will also answer the same purpose.

S. WAIT.—The collotype process would answer best, decidedly, but it would come somewhat expensive for large numbers. Photolithography would be much cheaper, and, for your purpose, possibly answer quite as well.

S. J. BELMAN.—We fear there is but little chance of your removing the ink spilt on the photograph sent you to copy without injury to the picture. Try the effect of a solution of oxalic acid in water. This may possibly answer.

HYPO.—You evidently are not a reader of the Journal, or you would not have occasion to put a query that has been answered several times of late. You will find an article on the treatment of gold residues on page 470 of our volume for 1880, to which we cannot do better than refer you.

W. MARTIN.—The enamelling collodion you have been experimenting with is clearly not thick enough—that is, it does not contain sufficient pyroxyline. Try the effect of adding as much more as the collodion now contains. If this addition do not give sufficient gloss, add a further quantity.

JOHN HOLMES.—You certainly can precipitate the silver in the manner you mention, but where is the advantage of so doing? You will still have to convert the precipitate into metal. This method will cost six or eight times as much as the "old-fashioned" plan of throwing down the silver as chloride and then fusing.

WM. BRIDGER.—We think you would do better to get a fresh negatives Judging from the print, it will be impossible for anyone to produce a satisfactory enlargement from such a negative, however skilful he may be. Possibly, if the enlargement were "finished" by a clever artist, it might be made satisfactory.

COMPLEX.—Your query is so totally wide of anything photographic that we are unable to afford space for an answer. All queries replied to in this column must in some way pertain to photography.

T. LEWIS.—You had better get some practical photographer to give you a few lessons in photography generally. We cannot afford space to give information of such an elementary character as you appear to require.

A. W. WICKS.—The sample of hyposulphite of soda is, without exception the very worst we have seen. No wonder the prints fixed in a solution of it turned yellow in the washing water. You cannot well expect to obtain a good article for the price you are paying. Good hyposulphite, wholesale, is worth fully double.

S. J. B. says that some emulsion he made last week went very thin and "washy." He made it during a slight thunderstorm, and asks if we imagine that the disturbed electrical state of the atmosphere could have anything to do with the, to him, novel appearance. Those who have had much experience with gelatine often find that thunder sets up a decomposition in a most unaccountable manner.

AJAX.—Yes; the electric light produced from a Bunsen battery will answer perfectly for taking portraits in the studio during the winter months. Probably fifty cells—two-quart size—would be sufficient. The outlay for the battery will be far less than for a dynamo and the necessary engine to work it. You will find the battery somewhat troublesome and expensive in operation, as it will not work much longer than a couple of hours without requiring to be recharged with fresh acids. The fumes given off are also very noxious; hence the battery must be placed in the open air, or in some place where the fumes can be carried away without doing injury. Of course an arc lamp will be required. From the tenor of your letter we surmise you are under the impression that an incandescent lamp will answer. If so you are under a total misapprehension.

☞ Owing to pressure on our space this week we have to leave over articles by W. J. Stillman; T. Furnell; E. Dunmore; besides several communications to hand as we go to press.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday, the 3rd October, 1883, the subject for discussion will be—*On the Causes of Spots on Gelatine Plates: First, Transparent Spots after Development, not Visible before Exposure and not Attributable to Surface Dust; Second, Black Spots after Development with or without nuclei.*

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The first meeting of this Society after the recess will be held at the House of the Society of Arts, on Thursday, October 4th, at eight o'clock, when Mr. J. Traill Taylor will read a paper on *Photographic Matters Connected with America.* The following (from the question-box) will be discussed:—"What is the best method of reducing over-dense gelatine negatives?"

DESTRUCTION OF A PHOTOGRAPHIC STUDIO BY WIND.—During a heavy gale which passed over Glasgow on Thursday, the 20th instant, the photographic saloon of Mr. Thomas Gilfillan, situated on the top of a four-storied building in Trongate, was completely wrecked by the wind. Part of the structure was blown into the street below, which is one of the most thronged in the city. Three persons were seriously injured by the falling glass and timber. Of these two were conveyed to their homes, and the other was taken to the infirmary. Many passers-by had narrow escapes.

LONG-DISTANCE PHOTOGRAPHY.—Mr. R. Banks, photographer, of Manchester and Blackpool, has sent us a remarkable photograph (*carte-de-visite* size) of the Isle of Man hills, taken from the South Pier, Blackpool, a distance of sixty miles. The original negative, he tells us, was taken on May 17th—the hills being only discernible from Blackpool at sunset during the early summer—and was so small that it has had to be many times enlarged to produce even the little picture before us. Quite independent of its unique character as a photograph, it presents a charming bijou view of the sea and far distant mountains, with shipping in the foreground and middle distance.—*Liverpool Daily Post.*

A REVIVED SWINDLE.—Mr. Rudolf Mosse, of Queen Victoria-street thus writes in the *Standard:*—I wish to draw the attention of the residents in the suburbs to a couple calling at different residences, offering to photograph the house, and, after having taken and shown a negative, require payment in advance for the photographs, to be delivered within a week. Six weeks ago I had my house, situated in the north of London, photographed by these people, and paid five shillings in advance. At the same time most of my neighbours did the same. Not receiving the photographs, I applied to the address given—viz., Smith and Taylor, 11, Lark-road, Cambridge-heath—only to find that the party had decamped, and could not be traced anywhere.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

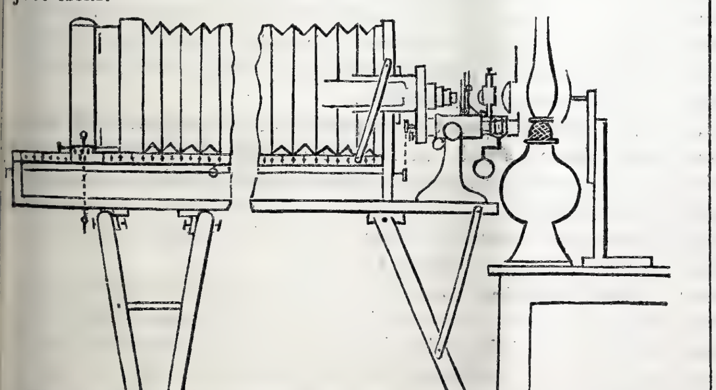
No. 1222. Vol. XXX.—OCTOBER 5, 1883.

PHOTOMICROGRAPHY.

E plan that has been selected for adapting the small camera to microscope may not suffice. It is very possible the student will h to take photographs larger than the quarter-plate will permit. still has the choice of the different methods enumerated for the ployment of a larger camera; yet it is a question whether he will obtain as good photographs by carefully enlarging from a small, d negative as by obtaining direct a large one. Although such a cedure implies extra trouble, still it gives an opportunity of arging to the point at which the defects do not become too minent; for defects, doubtless, there will be to the critical .

ncreased magnification, unless increased structural definition ac- apany it, is not likely to satisfy the microscopist. It is believed t those who have attempted both practices—the obtaining direct ge photomicrographs and the equal enlargements by the secondary n—have generally selected the latter, as ordinarily the most fect, though with gelatine plates granularity is sometimes too dent.

Iowever, as many having larger microscopes and cameras may fer a 5 × 5, or 6 × 6 plate, an arrangement will be now men- ied both handy and satisfactory. The description will be partly en from an article which appeared in The British Journal otographic Almanac for this year, from the pen of Dr. Maddox, h such alterations as may be deemed suitable, whilst the figure t was supplied with that paper will here assist in making this ject clear.



There are two base-boards needed—the smaller one pertaining to e camera, the larger one supporting it and the other parts of the paratus. The large, stout base-board is made of such a length at at least it will furnish four feet and a-half from the position of e stage of the microscope to the left-hand end, and of such a ngth in front of the stage that it will admit having conveniently aced on it the medium or large size microscope, and the lamp with reflector. The width of the large base-board must be in propor- n to the width of the smaller one, and provided with stout guides at are fixed the whole length of the board. The camera slides tween its own guides on the small board. In the diagram the pright, through which passes the tube of the microscope, is a fix- re to the large base-board, whilst in the present plan it is attached to the small one in front; and the end piece, through which the focussing-rod passes in the figure, instead of being attached to the large base-board, is fixed beneath at the position of the camera to the small one, thus forming, with the upright, the two feet to its base-board, as in the plan previously described. The small base-board, with its camera and bellows, slides forwards or backwards as a whole, between the guides on the large board for a short distance, and can be clamped to the larger one; two slots, permitting the clamping screws to pass through, to be fixed by their respective nuts, or it can be clamped at the sides to the guides.

The object of making the camera base-board movable is to enable the operator to readily disengage the microscope, which can then be set vertically for the examination and selection of another object on the slide, or part of it, if the previous image on the screen has not proved satisfactory, as this can then be more readily done than when the microscope remains in the horizontal position and the image is thrown on the screen. The silk cord or braid which works the fine adjustment is, of course, firstly thrown out of gear, as the focussing-rod, which passes through the two supports of the small base-board, belongs to that part and moves with it.

It will be seen by the diagram that in place of the two bellows there is only one, which is fixed at one end to the upright, and at the other to an extra front, which replaces the ordinary one. In using all long base-boards there is some trouble in arranging the best illumination, and judging of its effect on the image on the screen at its full distance from the object, when standing at the microscope. Dr. Woodward employed long rods with which to manipulate the mirror; and Professor Rood, when using a base-board seven feet long, managed to receive the image upon a mirror placed behind the camera. The mirror is hinged to an upright that slides upon the tail-board of the camera at a little distance from the screen, which is now removed, and fixed at such an angle that the image can be viewed by the operator from the microscope end, so as to obtain a general idea of its appearance.

This object in the present plan can be obtained in a different way, by either detaching the camera from its base-board and bellows, or by removing the focussing-screen and closing the camera bellows upon the upright; at the same time throwing the image of the object upon a highly-polished, fine cardboard, cemented to a flat surface, which is fixed vertically at right angles to a foot that slides smoothly between the guides. If this foot be solid and heavy an arrangement can be easily made by which the sensi- tised plate, whether in the plate-holder or alone, can be set to take the exact position of the card, the camera being now drawn back to nearly touch the plate to prevent the reflection from any chance side light when operating in a darkened room under non-actinic light. The microscope in the diagram is provided with a shorter and wider tube than the ordinary one, and has a short draw tube divided into inches and parts, as in the usual draw tube, and this is furnished with a screw at each end, into either of which an adapter carrying an achromatic concave, or an objective, or the "Nicol" prism analyser, can be screwed, and placed nearer to or farther from the objective as required. This draw tube also admits of the lowest ocular being inserted at the outer end, the eyepiece being set in a short tube of the necessary diameter.

The front of the large base-board projects considerably beyond that in the diagram, and on it the microscope and lamp are arranged. The body of the lamp, if provided with a screw, can be screwed into the base-board if the height of the flame suit. This is rarely the case, hence it is better to fix it to a foot that slides between the guides; and the microscope also can be fixed to a board that exactly corresponds to the width between the guides. The highly-polished reflector, in the diagram, is placed on a dove-tailed sliding support, the foot of which also slides correctly between the guides, and can be clamped in position. The bull's-eye condenser is attached to a bit of tube which fits with friction on the stem of the microscope, provided with a mark for centering, and at the lamp end, supports a large, pierced, blackened card diaphragm, as in the diagram.

It will be apparent that with a proper lamp—with its blackened metal chimney, bull's-eye, and reflector of the Fiddian, Bockett, Ross, Swift, Collins, or Parkes' pattern—some advantage may be gained; but many prefer to have the light visible at all times, so that the condition of the wick and flame can be readily inspected. It is, moreover, when using high powers in photomicroscopy, much more agreeable to work with a sufficiency of outside light, the whole of the apparatus otherwise from the sub-stage being protected by the focussing-cloth; and it also enables the operator sitting by the apparatus to be occupied with a book, watch in hand. It is preferable, as previously stated, to have no light pass to the object except what passes through the sub-stage condenser, when employing only transmitted light; hence, some have the sub-stage tube to screw, *correctly centered* into the under surface of the stage plate, the adjustment of the achromatic condenser being made by its own rack. This also enables the paraboloid to be used more easily with the stop lens; but, photographically speaking, we have never been exactly satisfied with this.

If it be desired to use an achromatic prism, instead of the bull's-eye, it can be fixed on a separate tube which fits on the stem of the microscope, whilst the lamp and diaphragm of card are shifted to the off-side of the base-board. If solar light be used, and the prism selected in place of the silvered mirror, which for this purpose should be plane and of a larger surface than the ordinary circular mirror, the microscope end of the camera can be placed outside a window, facing south or south-west; or the camera, with its tripod, arranged alongside the open window. With the rapid dry plates, when using a large Abraham's achromatised prism, there will be little need of a heliostat if the operator be at all expert in the manipulations.

The fine focussing can be done by rotating the rod beneath the small base-board at any part of its length, at the same time that the eye is examining the image. Generally the rough focussing is performed by the ordinary rack and pinion, and also the fine one by hand when within reach; but the focussing-rod which runs through two smooth holes in the feet or supports of the small base-board, and which has at the focussing end a small pulley the size of the head of the fine adjustment screw, which is grooved, is geared with the latter by means of a coarse silk cord or flat braid, is exceedingly handy. The employment of an india-rubber band is not satisfactory; for this will, by its own elasticity, sometimes carry on the motion of the fine adjustment when it should be stopped. The tube of the microscope should slide easily and correctly through the aperture in the upright, which is lined by cloth; and, to make this securely light-tight, a collar of the same material slides on the microscope tube, so that, when pushed against the upright, all light through the junction is excluded. With microscopes, the tubes of which are supported on the Jacksonian plan, there may be a difficulty in employing a shorter and wider tube, also in rendering the junction light-tight in the way proposed; hence it will be desirable to use an adapting tube to work through the aperture, otherwise the cone of cloth to be slipped over the usual milled ring near the eye end of the tube.

The height of the camera is made to suit the wish of the operator by the length of the double tripod legs, which are attached to the under side of the large board. The convenience of the arrangement described is great. It is very portable, yet sufficiently rigid for first-class work; and, if the camera and its own base-board be separated from the large one, it becomes very similar to the small apparatus previously described, and can be used on a table. The camera, microscope, and lamp can each be employed in the ordinary way, whilst the large tripod support is very handy for moderate enlargements, and forms a temporary shelf when not otherwise in use.

If the operator be satisfied with the negatives obtained when the long eyepiece is in position, then the length of the base-board can be very much shortened, and an ordinary long-expanding camera with an extra front be attached to the microscope; or the lens mount may be unscrewed, and a short tube screwed to the flange through which the eye end passes. When the fine adjustment lifts the whole weight of the tube, any extra friction there would soon injure the fine threads of this screw.

A CHAPTER OF PHOTOGRAPHIC HISTORY.

THE inherent usefulness of the present paramount system of photographic practice, the gelatino-bromide process, is shown by the number—which we may fairly term immense—of its more recent practitioners, who are completely ignorant of any, even the slightest, acquaintance with the practice of wet collodion. To the vast majority of the present learners in the art it is a sealed mystery; yet we can very confidently inform our readers that, so far from its being a defunct art, it is a living and very real one, as the makers of collodion could testify, and as the practical working of the enlargers and others demonstrates.

Years ago it was considered the proper way for a beginner in photography always to commence his practice by learning the wet process, although it might be his intention to devote himself entirely to dry-plate work; yet even this rule was by no means without frequent exceptions, as we know and have met in our travels photographers whose knowledge of photography was entirely confined to the practice of one or other of the many dry processes once in popular favour. For such, and to the more recent candidates for photographic fame, our present remarks will possess less interest than for those whose present practice or past experience causes wet collodion still to be "a thing of beauty."

We are led to this train of thought by a note in our contemporary, the *Chemical News*, whose esteemed editor, as our readers may be aware, many years ago occupied the editorial chair of this Journal, the honourable aim of whose proprietor has ever been to advance the science of photography. The note in question is by Professor Bloxam, of King's College; and, again, we are reminded of an esteemed *collaborateur*, whose valuable contributions so often enriched these pages before the state of his health rendered such close application impossible, Mr. George Dawson, who at that time held the post of Lecturer on Photography at King's College, Mr. Hadow, another photographic light, being then Demonstrator of Chemistry at that institution.

The note is upon the properties of nitro-cyanide of silver, and would have passed but for the remark of the writer:—"In the margin of the paragraph on nitro-cyanide of silver in Gmelin I find a manuscript note by Hadow, to the effect that 'crystals found by Dawson to produce *pinholes* in collodion negatives proved to be of this composition. March 17, 1865.'"

Now, while true in a sense, the paragraph is most misleading as to facts. The whole of the experiments upon this subject are detailed in a series of leading articles in the volume of THE BRITISH JOURNAL OF PHOTOGRAPHY for 1865, where we can point with some degree of pride to our record of the first scientific investigation into and demonstration of the cause of pinholes in wet-collodion negatives.

Up to that period the question as to the cause of pinholes had been perennial. No one can take up an old volume of THE BRITISH JOURNAL OF PHOTOGRAPHY, or any other branch of photographic literature, without being met with queries and explanations as to the cause of this rampant evil. The usual explanation was that the bath with constant use became supersaturated with iodide of silver, and that it crystallised upon the surface, and so gave rise to pinholes. The investigations to finally settle this question will be found fully recorded in our Journal for the period named, which describes in detail one main factor in producing the well-known effect.

:ro-cyanide of silver was alluded to, as also the fact that in one e experiments a bath under treatment gave a most plentiful of crystals of this salt. But the bath was one that had been :d for experimental purposes with cyanide of potassium. A :ity equal to about half-an-ounce per gallon having been added, crystals would naturally have produced pinholes had the plate developed; but to that extent only is the curious misconcep- 'ounded upon fact.

e whole purport of our investigation went to show that the :les as usually produced were caused by the accumulation in ath of iodo-nitrate of silver, which soon became saturated with ılt; and when further materials (in the shape of collodionised s) for its production were presented, crystallisation set in within ıpon) the film, with the production of spots of no-action upon opment, and these spots were the dreaded pinholes. These iments, which may fairly be termed "historical," virtually set ıt the question as to the origin of the familiar defect.

fully complete our record, we may call attention to the fact n the next year Dr. Vogel brought forward, among others, the y that the presence of sulphates in the bath might be another ıle cause; and considerable discussion took place on the new He also named nitrate of baryta as a precipitant. For some the question was allowed to repose, but was again brought prominence by Mr. A. L. Henderson's method of completely g pinholes, without the addition of fresh silver, by adding a quantity of nitrate of baryta to the bath. His method was ı to be incontestably efficient; but the precipitation of the as sulphate when the developer was applied—thus giving the a perfectly "sanded" aspect—was so objectionable that, not- :anding it was shown that this granular aspect entirely dis- red upon varnishing, the process did not become by any means rsally adopted, although it was perfectly capable of preventing :currence of a most obnoxious trouble.

ne time afterwards we re-investigated the subject. Among experiments we examined the precipitate from a large quantity th treated with nitrate of baryta, and we discovered it to con- ı the main of sulphate of silver, thus showing that to the ıce of sulphate must undoubtedly belong some share of the : for the presence of the pinholes. Some experimenters sed the use of carbonate of baryta instead of nitrate for ng the bath of such tendency; but as this involved its frequent ng up, which would be highly inconvenient with a large bulk iterial to work upon, it did not appear to gain much favour.

asoning upon the province of the nitrate of baryta in Mr. lerson's method, we were unable to see how it could possess any fic character of its own for preventing pinholes, and we came to onclusion that its only possible province must be the supplying se for the sulphuric acid to act upon and produce an insoluble pitate. If that were so, a very small quantity would be ample ıe purpose. The experiment was easily tried. A few grains only added to a Winchester of bath, which, after the lapse of a few s for precipitation and subsidence, was then passed through a . The case was complete, and now all that is necessary to do to ent a bath giving pinholes, unless it be very old and much used, is ly to add four or five grains of nitrate of baryta to a Winchester. ıd with this hint we conclude, while begging our readers to mber that in old baths it was iodo-nitrate and not nitro-cyanide ver that Mr. George Dawson showed to be the efficient agent.

MOUNTING PRINTS WITHOUT PRODUCING DISTORTION.

r photographers are now fully aware that a photograph when is larger than when it is dry. This is owing to a property h paper, like many other materials, has of expanding when :cted to moisture. It is also tolerably well known that the nsion is not equal in all directions, as paper, like wood, expands : in one direction than it does in another. A deal board, when ed, expands considerably in its width, though its length is but : affected. So it is with paper, when made in continuous lengths, l photographic papers are.

This property frequently gives rise to considerable trouble in mounting photographs—particularly when two or more prints have to be joined, as is occasionally the case with large pictures when they have been printed from two or more negatives. Serious inconvenience may also arise through this unequal expansion of the paper in small portraits, by causing a distortion of the features, as we explained in a leading article in our last volume. Two prints made from the same portrait negative, on paper which had been cut in different directions from the sheet, possessed a palpable difference in the length and breadth of the features when they were mounted wet.

In our volume for 1880 [page 122], we detailed a series of experiments made with different samples of machine-made papers. These papers are made in continuous lengths, and are cut up into sheets afterwards. In these experiments it was found with nearly all samples that, when strips were cut lengthwise from the roll, the expansion, when they were soaked in water, was exceedingly small, but when cut transversely the expansion was very great; and, what is of material importance in mounting photographs, it was found that strips so cut could be stretched considerably more. For example: a strip of Saxe paper, twenty-four inches long, cut transversely from the roll, by being mounted wet and gently stretched while mounting, could be made to measure fully twenty-five inches, and with care, we doubt not, it could be made considerably longer. If the paper be allowed to dry after being wetted and expanded it will contract again; but not quite to its original dimensions, though it does very nearly. Hence, if prints are required of the size of the original negative, as we then explained, they should be dried before mounting, and then wetted as little as possible in the operation. A solution of gelatine containing a large proportion of alcohol was recommended for the purpose. With a view to avoid the distortion sometimes existing in *carte-* or cabinet-sized prints, when they are mounted wet and are liable to be stretched somewhat by the mounter, we advocated the same system and mountant to be employed.

At the meeting of the Photographic Club, on the 26th ult., one of the topics of discussion was on the subject of *Mounting Photographs,* and Mr. A. Cowan showed a method he had employed for *cartes* and cabinets with great success for several years past. By this system the distortion caused by the expansion of the paper, which at times becomes a serious inconvenience, is practically avoided. The method also possesses many other advantages—simplicity and cleanliness not being the least. Although the principle of cementing the print and allowing it to become dry before mounting is not new, yet the method described at the Club differs somewhat from those hitherto published; we therefore give it for the benefit of our readers as communicated to us, as, in consequence of a temporary absence from town, we were unable to be present at the meeting of the Club.

The prints, after they are taken from the washing water, are laid face downwards on a plate of glass—not in a neat pile, as usual when mounting is done wet, but just as they are collected in the tank. The glass, with the adherent print, is then reared on end to allow the superfluous water to drain away. When the prints have drained for a short time they are brushed over with starch paste in the ordinary manner. Each print as it is starched is lifted from the glass (by raising one corner with the point of a knife) and laid out to dry. The drying arrangement is deserving of notice, as being exceedingly convenient when large numbers have to be dealt with, or space is somewhat circumscribed.

Mr. Cowan has a number of wooden frames covered with canvas. In each corner is a screw projecting about a couple of inches or so. When one of the frames is covered with the starched prints another frame is placed upon it—the projecting screws preserving a space of a couple of inches between the two. When the second frame is filled a third is put into position, and so on with any number of frames that may be required. The prints dry quickly on these frames, are preserved from dust while drying, and the whole arrangement occupies but little space. The starched prints also dry without curling up, which is a great convenience in the after manipulations. After the prints become dry they are trimmed, and

are then ready for mounting at once, or they may be kept for any length of time without deterioration. Some of the prints used in the demonstration had actually been starched for several years.

The method of mounting is exceedingly simple:—A pile of cards is placed on the table, and the top one is then slightly damped with a clean sponge moistened with water. This card is now drawn slightly forward on the pack, and the print is then adjusted in position upon it. This is easily done, as the dry, starched surface has no tendency to stick to the card, as it would have if it were wet. When the print is placed in position it is held there by a couple of fingers of the left hand, while the thumb and two fingers (slightly separated) of the right hand firmly grasp the bottom of the card together with the print. In order to prevent the print being misplaced the thumb is pressed firmly enough to bend the card between the fingers considerably. All that now remains is to pass the print and card between the rollers of an ordinary rolling-press, when the print will be found to adhere with great tenacity. Indeed, so firmly adherent is the print after having passed through the press that it was found impossible to separate it from the card without tearing, although the experiment was tried immediately afterwards. Hence the necessity for holding the print and card firmly until they are gripped by the rollers will be apparent. So exceedingly expeditious is the process that many dozens of prints could have been mounted within the time it has taken to write this brief description. It would be superfluous to enumerate all the advantages of this system of mounting, as they will be obvious to every reader.

Although only *carte* and cabinet sizes are mentioned, it is manifest that the same principle of mounting can be applied to pictures of larger dimensions. It may be as well to mention that in the press used in the demonstration the rollers were nickel-plated, to avoid their becoming rusted by continual contact with the slightly-moistened cards.

AMONG the good things of the recent American Convention (and there were many, we assure our readers) was a discussion on dry-plate making from which we may extract a most useful "bit." The cost of dry plates was well ventilated some time since in our pages, and the distinction has, perhaps, not been sufficiently made between the manufacturer and the amateur or professional's standpoints. The cost to a manufacturer, of course, includes rent, labour, interest of capital, waste, and breakages—all of which have to be added to the cost of the raw material before he can make one penny of profit. The items are considerable, and to many an utterly unknown factor. When, however, an amateur, or even a professional, photographer makes plates for his own use without employing extra hands, he, of course, saves all this extra outlay, and to that extent his exchequer is increased over what it would be had he purchased ready-made plates. We cannot but say that a professional photographer must needs have much unoccupied time—his own or his *employés'*—if he can make many good plates without assistance. With regard to the actual cost: the extract we would present from the Convention's proceedings runs thus:—A member says—"I would ask Mr. Smith, or any gentleman connected with the business, what would be the cost of getting ready or preparing to make plates for our own use—what would be the average cost? Can anyone give us an idea of that?" The reply, which contains the whole gist of the matter, was—"You must first find out how many failures the party is going to make, and in that way you may get at the cost!"

WE lately drew attention to the autotype *facsimiles* of the drawings by old masters now on view in the print-room of the British Museum. Attention is again drawn to the value of such trustworthy copies by our contemporary, the *Athenæum*, which gives prominence to the views of a correspondent with regard to certain other hitherto unedited collections. He says, after expressing surprise that "the Leonardo da Vinci MSS. in this country is not dealt with as M. Ravaisson is treating those belonging to the Institut—that is, reproducing them by a photographic process":—"The South Kensington Museum has the services of able photographers at its command, for whom the task of taking negatives of the two Leonardo boo[ks] in the Forster Library would be a matter of no difficulty. A pra[c]tised photographer is almost constantly at work at the Briti[sh] Museum. That he has not yet been directed to take the Leonar[do] MSS. in hand argues insensibility to the importance of one of t[he] chief treasures of the collection on the part of its custodians [and] managers."

WHILE wishing to endorse every word in furtherance of any su[ch] project, the works of one of such a widely-diversified genius as [da] Vinci's, possessing from their singular scope—music, architectu[re,] sculpture, and painting having been alike mastered by his powerf[ul] mind—a special value that would seem to place them before [all] others, we cannot but point out—first, that some works must w[ait] their turn, as everything cannot be photographed at once; secondl[y,] the securing of good negatives of works of art and manuscripts is [a] more difficult and time-absorbing affair than the writer of the lett[er] seems to have any knowledge of. The securing of good, non-distort[ed] copies of objects in line demands close care by experienced hands.

WE may say, too, that though almost every intelligent workma[n] takes an interest in his work, this is about the most monotono[us] and least interesting phase of negative-taking possible when mo[re] than one or two subjects have to be executed. Hence the conclu[d]ing recommendation of the correspondent above-named is little like[ly] to be favourably received at the hands of the amateurs to who[m] he in a sense appeals. He says:—"There are many clever amateu[rs] skilled in the manipulation of photography who might, if this tas[k] was brought under their notice, be emulous of sharing in the honou[r] of its accomplishment." We can imagine the scene that woul[d] be produced by a number of amateurs—skilful, it may be, bu[t] unused to business operations—fussing about the exhibition room[s] at South Kensington or the British Museum, or interfering with th[e] regular workers in photographic departments. No: it is quite plai[n] that, important though the work is, it is not to be taken up by ama[]teurs; indeed it is more fitly work for the professional photographe[r]. We, however, do not imagine they would be much troubled at th[e] prospect of any amateur taking up the copying of pictures an[d] manuscripts; for it requires a combination of skill and experienc[e] and the use of such special apparatus as are not likely to be me[t] with in the possession of many amateurs.

THE description of the cheap and efficient water filter quoted in ou[r] last is by the well-known Dr. Guthrie, and it has met with prais[e] from many quarters. One writer points out a possible danger fro[m] water being allowed to drop slowly direct from the service tap. H[e] gives an instance of a family who were in the habit of allowin[g] water so to drop into a suitable receptacle to be used for drinkin[g] purposes, on account of its being so bright looking, and the seque[l] showed that it became impregnated with lead in sufficient degre[e] to cause lead poisoning in all the members of the family. This[,] however, is a very distant possibility, as it would require specia[l] characteristics in the water that are not often found in that sup[]plied by public companies.

THE members of the British Association who joined the party whic[h] proceeded to Stonyhurst College were by no means favoured with fin[e] weather, but they were received with a courteous cordiality whic[h] helped to dissipate the effect of the elements; and they enjoyed [a] rich scientific treat in the inspection of the various instruments fo[r] astronomical research for which the Observatory is so famous. Fo[r] some time past a series of records of sun spots and observations o[f] stars of the most refined and accurate, not to say beautiful, characte[r] have been made there, and their publication is looked forward to by the astronomical world with great interest. Their battery of prisms in connection with the spectroscope is, by the adoption of the half-prism system, one of the most powerful in existence, and enables spectral examinations of great value to be undertaken. We were interested to learn from the gentleman in charge of the photographic

epartment that the waxed-paper process—so great a favourite ·ith some of our old readers—is still in use at the Observatory. Ve hope at no distant date to be able to bring before our readers ›me interesting details direct from the *personnel* of this vast, nportant, and world-famed educational institution.

BRITISH ASSOCIATION.

›WING to the crowded state of our columns last week, we were ›mpelled to close our report of the meeting of the British Associa-ion without a due tribute to those who were chiefly instrumental ı making it a success. The Southport meeting has been, with ingular unanimity amongst those who were present and who are ıpable of judging, classed as one of the most successful ever held—ot only in point of attendance, but also in the general interest f the papers read.

In connection with photography—a subject which has received omparatively little attention for many years past—there were everal papers of considerable interest, two of which we gave last veek. An energetic and capable local committee, not satisfied with ıaking the usual arrangements for the convenience as well as ecreation of the visitors, laid themselves out to provide also an xhibition of representative objects of artistic, scientific, and anti-uarian interest, and the success of their efforts was sufficiently vinced by the attention paid by the members to the collection uring the time it was open to their inspection. Photography ›layed a not unimportant part in this display, and to a few of the ıembers of the Liverpool Amateur Photographic Association must ›e given much of the credit of this portion of the show.

It is quite impossible to pass in review the whole of the exhibits, ven if they possessed a general interest for photographers, so we hall confine our notice of the exhibition to that portion which was nore immediately connected with our art-science. The Liverpool Amateur Photographic Association exhibited the pictures sent in or the artistic competitions of 1881 and 1882, which, though vary-ng in quality, formed an attractive item in the exhibition. Dr. Watling contributed a collection of the prize pictures of the London Amateur Photographic Association, which were much admired. The Rev. H. J. Palmer's charming series of views in Switzerland and Normandy also attracted a considerable amount of attention, as lid also, within a more limited circle, Mr. Thomas Higgin's admirable photomicrographs (incorrectly described in the catalogue as *micro-photographs*, by the way). These, though produced some years ago, we believe will bear comparison with the best work in the same class of more modern date. A numerous collection of miscellaneous work by other members of the Association—amongst whom we noticed the names of Messrs. Ellerbeck, Boothroyd, Forrest, Wharmby, and other old friends—sufficed to place photography on a footing of importance in the general exhibition.

Amongst the miscellaneous exhibits connected with photography we noticed several lantern appliances by Mr. E. G. Wood, of London. Mr. Joseph Hines, of Southport, exhibited models of a proposed new form of achromatic lens composed of a single kind of glass, and also an ingenious arrangement in which, by means of wires representing the course of the rays passing through the lens, the principle of achromatisation was explained. Mr. B. Boothroyd, President of the Liverpool Amateur Photographic Association, exhibited an inductorium capable of giving a fifteen-inch spark. The sharp, whip-like cracking of this instrument, when at work, attracted considerable attention on the part alike of scientific and unscientific (if we may apply the term) visitors. Amongst the objects sent by the Science and Art Department, South Kensington, the most interesting were a collection of ancient astronomical instruments of the 16th, 17th, and 18th centuries, and also a miscellaneous collection of historical scientific apparatus.

Mr. Rochfort Connor, of Greenock, exhibited a large collection of pen-and-ink drawings of microscopical objects, which, for truth and delicacy of finish, were scarcely inferior to photographs. Particularly noticeable were *Proboscis of Blow-Fly* and a coloured specimen, *Ova of Toad* (injected).

Of the local photographers, several of whom were exhibitors, we mentioned last week Mr. Silas Eastham, whose group taken in the Art Gallery forms almost the only photographic reminiscence of the meeting. In addition we may mention Mr. Henry Sampson, the oldest photographer in Southport, whose name is pretty familar to our readers; Messrs. B. Wyles and Co., Lloyd, W. Howie, Allen and Co., Jones and Co., S. Mallin, and Clarke, all of whom turn out work which does credit to the west-coast watering-place. Photography is, in fact, well represented in the town; and the efforts of the amateurs of the neighbouring city of Liverpool (though, by the way, the President of the Liverpool Amateur Photographic Association—Mr. B. Boothroyd—is a resident of Southport) brought the art-science more to the front at this year's meeting than it has had the chance of being for some time. In only one point did the pleasure of the meeting run a risk of failure, namely, in the weather, which, as a rule, was execrable.

IS PHOTOGRAPHY ART?

THE question raised for the many-hundredth time by Mr. J. Traill Taylor as to the status of photography and photographers in the scale of work and workers gives no perplexity to anyone outside the ranks of the little (?) army who use the artillery of the sun. The artists, who are after all the best judges of what constitutes art and an artist, decide with unanimity that photography is not art in any sense of the word. How, then, can they admit that a photographer as such is an artist? Nor do they.

I remember looking one day at the picture of the American artist, Church, of Niagara, when on exhibition in London—a picture which some of your readers may remember, and which certainly was one of the most remarkable transcripts of the facts of nature ever painted. It was almost an illusion except for the motionlessness of the waves, which had the sheen of running water as I have never seen it painted by any other man; and a rainbow, stretching over the foamy abyss, was so painted that it seemed thrown there by a magic lantern. Meeting Professor Ruskin a few days later, he spoke of the picture, noticing those points, and said that the rainbow actually deceived him, and he looked for the arrangement by which it was thrown on the canvas. "But that," he added, "is not art."

"What is art, then?" every photographer will ask. If a picture which, more than anything else I ever saw, realised what a photographic reproduction of a landscape might be if it were instantaneous—sharp all over the field, and with the natural colours perfectly rendered—is not art, how should a photograph be so considered even under every circumstance most favourable to the completeness of the result? The only difficulty in the answering of the question is that we have no recognised definition for the word "art," or, rather, we have too many. In the highest sense, and that in which we use it when we speak of the fine arts, high art, &c., it means some form of design—the expression of an idea or the realisation of an ideal of form or colour—the putting into form a mental conception. In a secondary sense it means technical excellence; and in this it may apply to the tinman's trade as well as the portrait painter's—to legerdemain or any perfect mechanical operation, as the art of wood turning, stone cutting, &c., &c. In a tertiary sense, again, it is used as equivalent to artifice or deception, as "an artful dodger;" and in the proverb, "The perfection of art is to conceal art," which, if we apply it to art in the primary sense, is the opposite of true, no noble work of any of the arts of design being capable of concealment. One cannot mistake Titian's painting for nature, or imagine that it was intended to imitate nature in such a way as to deceive the eye; nor can we mistake a Greek statue even for a cast from a living model.

Indeed, when we come to use the word "art" in this highest sense we exclude even realistic painting from nature, such as is sometimes, but ignorantly, called "pre-Raphaelite," but properly naturalistic; and a painter who does nothing but paint the literal facts of landscape as everybody sees them is only by courtesy called an artist even amongst painters—they consider him a mere copyist.

With such an ill-arranged nomenclature, of course, we have no possibility of deciding if any given man is an artist or not, even if he be a bricklayer, because he may do his work in an artful or even artistic manner; and in this sense the operator who coats a plate in a faultless way and the other who developes it in a clean, stainless manner—just in its density, clear in its shadows—and can stop the development at the right moment, does his work carefully or artistically, and in this light may be called an artist.

But if we intend to apply the word "art" in the primary meaning of design to photography it is an absurdity. Photography is a process, or combination of processes, of which the efficient agents are light and chemical action. The photographer has no more to do with the result than the engine driver with the traction of a railway train. The photographer poses his model and he may choose the pose and arrange the hair and draperies, which is a matter not of art but of taste, but a barber and dressmaker of taste would do it as well. When the subject is posed the photographer has nothing more to do with it except to move the keys of a machine. All his

thinking will not make one hair blacker or whiter; the result is determined. He may retouch or touch out and paint in on his negative something which was not a part of the photograph, but that is not his work *as a photographer*. Mr. Millais might amuse himself doctoring a negative and make it a different thing from that which light made, but that would not be photography nor make Millais a photographer, or the man who made the negative an artist; and, even if Burne-Jones were to set up a camera and amuse himself photographing his models instead of painting them, it would not be art, however much the photographer in that case would be an artist. If, again, Mr. Jones were to sit down and paint a mass of rock which he wanted to use in a foreground, merely copying indiscriminately what he saw, no one could say that it was not the work of an artist; but we should be compelled to say that it showed none of Mr. Jones's peculiar artistic powers, and that it was not in the distinctive sense of the term art.

I cut from a review of M. Chesneau's *Peinture Anglaise* what seems to me the sound doctrine in this case:—"The most faithful representation of nature, no matter how complete in its faithfulness, is not necessarily art—is, indeed, almost certainly not art at all, but a form of science. Nature is merely the nurse of art at her very best." The term "art photographer," so indiscriminately and ambitiously applied, is only correctly so to men who photograph works of art. We may say of a photographer who has remarkable taste in the selection of his subject and in the adaptation to it of the effect of light and shade which suits it best, the choice of the hour, &c., that he is artistic—that is, the work he does resembles the work of an artist; but in this case it is Nature which furnishes the design and arrangement, so that the photographer has only to choose from the phases she offers, for he cannot in any emergency twist her into his ways. He may cut down a tree that is obtrusive, or put a rock in where there was none in the landscape; but in this case it is as a landscape gardener that he must take credit—not as a photographer. He may show his taste in as many ways as he will—he cannot make photography anything but a combination of processes, and, therefore, cannot make it art.

Even if he combine many photographs in one it does not really better the matter, for not one of the parts is really designed by an artist, therefore is not art. A combination can never be other than of the same nature as the part of which it is combined; and the only sense in which we can use the word "art" in connection with it is in the tertiary sense of artifice, but the art is in using the negatives in such a way as to conceal the artifice.

I have for many years employed a part of my leisure (and sometimes more than my leisure) in painting from nature; and when I was in the early stage of my career I had a controversy with a figure painter on the value of landscape painting, which he considered as not art and systematically abused. I painted a landscape during the discussion with great realism, and had a photograph of it sent to my controversial friend without any explanation. He looked at it and remarked to the bearer, who was a painter also, and interested in the dispute—"Now, what is the use of Stillman and those fellows painting landscapes when we can get such photographs as this from nature!" Instead of being proud of the testimony to the fidelity of the picture, as I was at the time, I should have considered that that was very poor art which could be mistaken for a photograph. It was a *photographistic* study from nature, just as a photograph from nature, which one might mistake for one from a picture, might be called *artistic;* but the former was no more photography than the latter is art. The ambition of photographers to be called "artists" only brings them into ridicule, for no one will recognise the pretension or, outside of the craft, will ever talk of photography as art.

Suppose the Photographic Society of Great Britain were to propose to the Royal Academy to admit a photographer or two as associates on the footing which engravers and architects hold, can any photographer doubt the reply? There have been photographers who have won great reputation for their artistic use of the processes; and, so far as the non-photographic world is concerned, Mrs. Cameron was in England the most successful, though as photography nothing could well be worse than most of her work. But her secret seemed to be that she trusted mainly to accident for her arrangements and generally avoided giving sharpness to her negatives—often, indeed, the model had moved an inch more or less—all which added to the liking of the artists for her work, simply because it made it less like photography in general. Neither an individual nor a craft can change the acceptation of words; and until photography is accepted by the general world as a form of art it is useless, or worse, for photographers to attract attention by calling themselves "artists," while brevets of any kind must be conferred by competent authority—cannot be assumed by whoever will have them. In the greater artistic world men wait to be distinguished as artists *par excellence* for the recognition by the public of their excellence; they do not even say "My art is high art," but let others decide. But the photographer who placards himself as "art photographer" is treated as a joker, and ranked with the American "professors," who may be barbers, elocutionists, or what not. Modesty is not thrown away even in photography; and the craft may assure itself that the effort to assume the distinction of "artist" will only bring derision, while the man who waits for his reputation to precede him may win and wear proudly the epithet "artistic," which is the *ne plus ultra* of the craft.

W. J. Stillman.

Florence, September 17, 1883.

THE DEVELOPMENT OF NEGATIVES SO AS TO PREVENT GREEN FOG.

It is evident from remarks that are constantly being made as to the pest, green fog, that it has not yet been subdued, and is not easily removed when it does occur; but it can be prevented making its unwelcome appearance, or at anyrate rendered harmless, and the deep shadows and protected margins represented by clear glass.

In the course of my experimental work I have used plates of four different makers, and, when sulphite of soda has been used in the developer, two of these invariably gave green fog, but the other two never showed it in the least. I thought one reason of sodic sulphite acting thus was in the acid used to neutralise it; so I tried various sorts of acid and found them differ. Citric acid gave the most green and sulphuric the least; so I then tried to change the nature of the sodic sulphite by neutralising it in another way, and throwing down the objectionable portion of it. By experiment I have succeeded in entirely preventing green fog, and also, at the same time, have gained an immunity from frilling, even when the heat of the weather has been excessive—at least nearly 80° in the operating room.

STOCK SOLUTION.

Sodic sulphite	100 grains.
Alum (ground)	20 „
Water (common)	6 ounces.

When dissolved, allow to stand for about ten minutes to permit the pearl-white, gummy matter to form. Then filter out clear, and add—

Glycerine	100 minims.

The glycerine can be omitted, but it is best with it.

To each drachm of the stock solution add one grain of pyrogallic acid. It will immediately turn a pale brown—sufficient to show colour by holding a piece of paper at the back of the bottle. This solution will keep unchanged for months, and appears to improve by keeping, for some I had over two months old acted better than some freshly mixed.

THE AMMONIA SOLUTION A.

Liquor ammonia ·880	90 minims.
Bromide of ammonium	30 grains.
Water, to make	15 drachms.

For use it requires twenty minims of solution A to each drachm of the pyro. stock solution, of which it requires two drachms to to make up one ounce of developer.

This developer gives the negatives a dark grey colour in one make of plates, and in another chocolate, but in both cases the colour can be made darker by adding to each ounce of stock solution—

Nitrate of soda	12 grains.

With this addition of nitrate of soda the first-named plates are chocolate instead of grey. I do not know if the benefit of this developer rests in my manner of using it, but I use very little water from first to last.

For a 5 × 4 plate I take three drachms of the pyro. stock solution and add nine drachms of water, and pour this over the dry plate to soak in. Then in a minim measure I put sixty minims of A, pour about half of this into the developing measure, and pour off the solution from the plate into this and back again on to the plate. In about twenty seconds the picture makes its appearance and begins to show detail. I then pour into the developing cup the remainder of the sixty minims of A, and carry on the development until the detail is all but lost sight of, but not quite. I then pour off the developer and replace it with about an ounce of cold, saturated solution of alum, and immediately rock it about to redissolve the flaky matter which is at first formed by the alum in contact with the ammonia in the small portion of the developer left

n the dish. Let this remain on for about two minutes and pour ›ff; then pour on a small quantity of water, gently rock and noderately wash, and place in the hypo. When fixed again wash n the same way, and pour on sufficient of the alum solution to :over it. Allow to rest for about five minutes. Remove the plate 'rom this and place gently, face down, in water contained in a spherically-formed vessel, so that only the corners touch. It is left hus, without rocking or disturbing, for about a quarter of an hour, hen the water is changed and left soaking for about an hour. The irst water will sometimes turn yellow and generally turbid from vhat soaks out of the film. After resting thus the film will be ound to have got perfectly clear in the shadows, and the margins rotected by the dark slide will be clear glass. A moderate washing fter this completes it, and as the films quickly dry it is evident all he superfluous salts are washed out.

There appears to be a great latitude in the exposure, for with 'twenty-times" plates and stop $\frac{f}{20}$ two to four seconds' exposure nakes no difference in results, except in the time required to levelope. I have tried it up to eight seconds and still got a fair rinting negative, but, of course, with less of A.

As regards frilling, there is not the slightest sign of it, although lates tried by the usual plan have frilled and blistered half off the lass. This, of course, was during the hot weather.

THOS. FURNELL.

PHOTOGRAPHIC INDUSTRIES.

THE PRINTING AND ENLARGING WORKS OF MESSRS. ELLIOTT AND FRY.

'HE inner life of a large photographic establishment is invariably eplete with interest to photographers, and among those metropolitan stablishments to which will, by universal consent, be relegated a oremost place among the largest is that of Messrs. Elliott and Fry— firm whose name has been before the public as high-class photoraphers for more than two decades.

It is not, however, to the galleries of this firm—which are well :nown to be situated in Baker-street—that we are at present to lirect attention, but to the busy *ateliers* where the whole of their roductive and manufacturing departments are carried on, both for he private customers of the firm and for the profession generally.

Compelled by the frequent brown fogs of London to seek in a avourable spot in the country immediately surrounding the metroolis a place in which to erect their factory, with the certainty of ecuring immunity from the mists, fogs, and darkness so justly ssociated with London, especially during winter—when, owing to hort days, any stoppage of business could be ill afforded—this firm ound in the elevated northern suburb of *High* Barnet those atmosheric conditions which would enable them to continue their printing nd enlarging operations all the year round. In this elevated little own, and near to the station of a branch of the Great Northern Railway, an extensive and very complete art-factory has been rected. To this model place we invite our readers to accompany is for a few minutes.

Under the guidance of Mr. H. Ottaway, the resident manager of he works, we first visited the silver printing department. Here, among other negatives which had been subjected to hard service, ve were shown one of Miss Eveleen Rayne which had been in the rinting-frame for five years and was still being printed from. It vould be stretching facts to apply to this the well-worn proverb, *Ex uno disce omnes;* but it is true that numerous negatives are kept always in a state of continuous use, and many thousands of prints of he popular representatives of the church, the state, the world of cience, and, above all, the drama have already been, and will loubtless still continue to be, made in this establishment. As an nstance of the enterprise displayed to keep these up to the most 'ecent period, we saw three panel and four cabinet negatives of the Right Hon. W. E. Gladstone which had been taken on the Saturday receding our visit, just after his return from his marine trip in northern latitudes. It is not difficult to understand what a strain will be put upon the productive resources of this firm as soon as the roofs from the negatives of the distinguished statesman are shown o the trade. As may be conceived, the subject of the multiplicaion of negatives has professedly engaged the attention of Messrs. Elliott and Fry, and from some specimens shown to us we are ustified in saying that such an amount of success has at length rowned their labours in this direction that prints from reproduced negatives can scarcely be distinguished from originals.

In the sensitising room, which is spacious and convenient, the operaions are conducted pretty nearly the same as in every other establishment. Eighty sheets of albumenised paper per day is the quantity required for the average work of the firm, and for small work each sheet is cut up into twelve cabinets and six *cartes-de-visite*, or thirty-two *cartes* alone, the cutting being effected by shears of a peculiar construction and with great rapidity. The silver bath is of the strength of fifty grains to the ounce, each sheet of paper being floated for three minutes. There is no subsequent fuming with ammonia, no advantage having been found to accrue from its employment. The printing-room, as first stated, is spacious, being fifty-two feet in length. It has a northern aspect. At the time of our visit between four and five hundred frames were in use. The appliance for vignetting consists in a piece of cardboard, having a suitable aperture, attached to the printing-frame. The margin of the aperture is cut inwards all round, so as to permit of its being bent outwards from the negative, thus ensuring a softer gradation. In some instances, however, orange glass vignetting masks were being used; but those of the former description seemed to be preferred, both on account of the command afforded to the printer over the shape of the vignette, and also owing to the shorter time for exposure necessitated—a great advantage in dull weather.

In toning the acetate of soda and gold bath is employed, and it is a peculiarity of the albumenised paper made use of by this firm, and which is prepared specially for them, that a rich tone is obtained without much expenditure of gold. The prints after being toned are transferred to the fixing-bath, in which they remain for fifteen minutes. The toning, fixing, and washing troughs are all constructed of stoneware specially for the purpose intended. Over each of the long array of washing troughs is a water faucet with a rose orifice. With this faucet two water-pipes are connected—one for hot and the other for cold water. The prints are washed for an hour in continually running water, which may either be cold, lukewarm, or hot at the discretion of the person in charge of this room.

Here we may state that there is a water storage of nearly five thousand gallons, and in the basement there is a peculiarly-formed heating appliance, composed of boilers, flues, and furnaces, by which from seven to eight hundred gallons of hot water are always on hand for heating the establishment throughout or supplying hot water for any purpose for which it is required. The object of employing hot water in the heating of the premises in preference to fires or stoves is to avoid dust and dirt. There is a second hot-water supply system from a separate boiler to that required for heating the *ateliers*, both boiler and pipes in this case being galvanised in order to ensure the utmost cleanliness of the water required for drawing off for manufacturing or other purposes.

The drying of the prints is effected by spreading them out, face downwards, on a series of shelves formed of linen stretched upon light wooden frames. This linen is removed once a week and scalded with boiling water.

On passing through the various rooms we saw in one an ordinary printing-press, with cases of types, inking appliances, and the other appointments required therewith. Here an assistant was at work printing the names at the foot of the mounts, which were then stacked away in parcels in the card stock-room, in readiness for the mounters. These were arranged on the shelves in such a manner as to show the names upon each packet. We need scarcely say that this has reference, not to private customers, but only to portraits of public characters intended for sale. These shelves were classified into "literary," "scientific," "theatrical," and so forth. Starch, freshly made every morning, is the mountant employed; and rolling-presses are preferred to burnishers for imparting the finish. The plates of the presses employed range from three feet by two feet six inches down to the smallest. One of the latter, which was purchased at a cost of fifty-five shillings when the firm commenced business, has been in constant use ever since, subject to an occasional "leave of absence," at long intervals, to undergo necessary furbishing up or repairs. During six weeks, three summers ago, no fewer than sixty thousand prints were made and finished here—at the rate of ten thousand a week—and sent out packed and ready for the market. This was in connection with the death of the Prince Imperial of France.

In one room we saw quite a bevy of young ladies engaged in spotting prints, and in another room a staff of six negative retouchers of the sterner sex.

The carbon printing department is well arranged and complete in all its details, from the preparation of the pigmented tissue upwards. There is apparently a large business done by the firm in enlarged carbon opals, of which we saw several in various stages of advancement, mainly portraits of individuals belonging to the upper strata of society. The examination of one picture—that of a lady in elegant figured costume—impressed us with the great advantage of

sharpness, combined, of course, with other qualities, in the negative; for as a result of enlarging a cabinet negative we saw a sharp and exquisite opal, 18 × 15 inches, the details of which would equal those of a similar picture if taken direct. That the parties interested must have felt satisfied was evinced by the preparations that were being made at the time of our visit to carry the enlargement still farther, namely, up to four feet by three feet. But Messrs. Elliott and Fry do not confine their carbon work to opals or paper, for canvas and ivory are also employed as bases upon which to sustain the picture in pigments. The production of a carbon print has been so often described that we do not require here to go through the details of what we saw in this department.

Although in the studio of this firm in Baker-street dry plates are exclusively employed, in the enlarging-room at Barnet all the negatives are made by the wet collodion process. A transparency is first made in carbon by contact with the negative, and this is then executed in the copying-camera—if the term be applicable to a room forty-seven feet long and proportionate in width—so as to face the northern sky. We saw an enlarged negative produced, from the coating of the plate to its being placed in the fixing-bath. Its dimensions were 30 × 24 inches, the exposure given being nearly five minutes with a symmetrical lens of eleven-inch focus. The large easel upon which the sensitive plate is supported during exposure travels upon rails, so that the parallelism of the plate with the negative is ensured. There is a second enlarging camera connected with the south end of the room in order to suit certain exigencies of light which may arise, especially in dark weather.

The carbon-tissue room is warmed by a coil of fifty hot-water pipes, each ten feet in length, and precautions are taken to keep the atmosphere here as free from moisture as possible. The silver wastes are reduced in a furnace erected for the purpose in the basement.

There is evidently a strong sense of the *entente cordiale* existing between the employers and employed, for several of the latter have been connected with the firm for more than twelve years. Many instances were narrated to us which indicate the mutual feelings of respect and esteem prevailing. A neat, comfortable dining-room, with a large table and a cheerful fire, is provided downstairs for the male *employés*, similar provision being made upstairs for the females. Business commences at eight o'clock in the morning and terminates at half-past five in the afternoon, half-an-hour being allowed for lunch. On Saturday work terminates at two o'clock. With the exception of the very youngest in the service, who receive ten days, each *employé* is granted a fortnight's holiday during summer without stoppage of salary, their stipends going on also in cases of sickness. There is little wonder that such consideration and liberality beget in the minds of the various *employés* a strong feeling of attachment to the members of the firm.

The communication between the studio in Baker-street and the *ateliers* in Barnet is confined to a messenger bringing out the negatives and orders twice a day, although, owing to facilities afforded by the railway accommodation, it may, when required, be greatly increased.

TRANSATLANTIC JOTTINGS.

The event of the month in the American journals is decidedly the Milwaukee Convention, and when we learn that the number of members exceeded a thousand we see how easily this is accounted for, at the same time that we appreciate the importance of a profession counting at least that number of acknowledged practitioners in its ranks. The main pabulum that some of the journals offer to their readers consists in a full account of the proceedings of the various sections, one of them amusingly excusing itself for the absence of certain details on the grounds that "the manuscript very mysteriously disappeared from our desk!"

Before gleaning some particulars from the published report, we may call attention to the illustrations in the *Photographic Times* (New York), and that in Anthony's *Photographic Bulletin*. The former, being a portrait of a name well-known in connection with photographic chemistry, Dr. Vogel, is a silver print from a sharp, but rather flat, negative—effective, nevertheless; the latter a mechanically-printed picture, with a disagreeably high glaze, of that wonderful structure—the Brooklyn Bridge. It is very like a burnished silver print, and gives effectively the fairy-like appearance of the structure suspended in air by strands like gossamer, though a close inspection reveals that they readily give support to a number of workmen apparently perched at a dizzy height among the "wires."

We learn from the latter-named journal that carbon processes must be a pretty good thing in some photographers' hands, seeing that at the suit of the owner of a patent—Mr. Lilienthal—the defendant in a lawsuit has been adjudicated to pay fifteen thousand dollars as the estimated amount of his profits in working the process during the time covered by the suit!

As the Convention lasted a week it will be readily understood that its work embraced a large variety of subjects, one of the earliest under consideration being the prices obtained for photographs in various parts of the Republic. The usual indignation at cutting prices was expressed, and a motion was put to the meeting urging, among other things, the "passage of resolutions by your body condemning the bitter rivalry and jealousy existing in many cities, and holding up to scorn and contempt those of the profession who degrade the art by low prices!" By-the-bye, one of the committees formed was for smoothing difficulties and jealousies among members.

One subject that was warmly received was the method which appears to prevail there of stamping the maker's name too conspicuously upon each piece of albumenised paper, one member having estimated the annual loss so brought about at half-a-million of dollars [a footnote of the editor's says this is quite extravagant]. The nuisance was evidently considered very great, and, combined with that from the watermark, almost past patient bearing. Accordingly a motion was agreed to that in the name of the association the manufacturers of Rives paper be requested "to do away with the watermark." We wish for, but doubt, the success of that motion.

Some discussion has at times been carried on in our pages as to the advisability of using three or more separate solutions for use for mixing the developing solution; but we are quite out-distanced by what appears to be a favourite plan with some workers in the United States. They use a formula of Mr. Cramer's, which combines pyro., bromide, and ammonia in one solution, and which is stated to keep for months. We are inclined to doubt the keeping properties, though it is possible our American friends are less exacting than the operators of this country. For example: it is said that one or two 10 × 8 dry plates could be developed by twelve ounces of this developer. We think the last plate out of one dozen that had been developed in one and the same solution, twelve ounces in bulk, would have a very jaundiced look.

According to the report furnished to the Committee by our esteemed predecessor in office, Mr. J. T. Taylor, American dry plates are now practically on a level with the best British plates; yet, really no one would gather the fact from the sentiments expressed by various speakers at the meeting, they being almost unanimous upon one thing if not upon others—that is, the want of evenness in the quality and coating of plates. One member seemed to hit the sense of the meeting in his remark that "if the manufacturers of dry plates would put their emulsion on *one* side, and set that smooth, they might sell them for less money."

It is, however, not to be expected that either users or makers of plates across the Atlantic should fail to pass through the same ordeals, or to require the same dearly-bought experience as the photographers of our own land. One speaker (Mr. Hesler), for example, did not approve of thickly-coated plates. He says—"I wish them to make the plates thinner—not thicker. With a thin film the image passes through immediately." And, after speaking of the importance of this requirement, he says they are making them thinner now, but he wants them with a "still thinner film, that will work more quickly," &c. The disadvantage of thin films is so patent that we should wonder to see even a tyro expressing a preference for their use.

The question of home-made gold was also to the fore. Every one seemed to see its advantages on the score of economy, though there was no unanimity of opinion as to whether it was best to use pure gold or the gold coin of the realm. The illegality of the act of dissolving (or otherwise defacing) gold coins was pointed out. The general consensus of opinion was to the effect that coin of the realm answered very well, and that no steps need be taken to get rid of the gold, thus agreeing with the recommendations contained in a leading article in this Journal some time ago.

We scarcely recognised the name of one gentleman from its appearance in the printed report till we saw a reference to some of the tables upon combining equivalents that were first made for, and printed in, our pages—the tables by Mr. Ackland, given in the report as "Mr. Macland!"

Our notes may be concluded by referring to a suggestion of Mr. J. T. Taylor's, who, as our readers know, always has a good word for the stereoscope. He recommends that stereoscopic transparencies

of portraits should be produced. Reproduced from old negatives there cannot be a doubt they would look superb; but *nous avons changé tout cela*. Retouching has upset any such plan. The retoucher's marks would not be alike on each side, and, slight though they might be, would result in raised patches, spots, or lines.

NOTES BY A PERIPATETIC PHOTOGRAPHER.

[A communication to the Liverpool Amateur Photographic Association.]

The *philosophy* of the peripatetics is a well-worn subject, and one which would hardly find acceptance in a society like our own, which is not wont to bestow its attention upon the wearisome word-splittings of metaphysics; but the *photography* of a peripatetic is another matter entirely, and, although also well worn, still I think that there are, or ought to be, very few wandering photographers whose experience and practice in their artistic quests and results should not, in the recital, possess some amount of interest to their compeers.

At all events, I propose this evening—in default of any more important and interesting matter to lay before you—to give you some account of my this year's peripatetesis abroad, in the company of my camera and friends. Under the impression that *ingrata senectus* was now to deprive me of this annual holiday among the Alps, I this year carried with me for my final visit to Switzerland an unusually large number of plates, my quarter-plate apparatus, and what one of my facetious friends is wont to call "the dog kennel"—that is, a heavy 9 × 7 camera. But, so far from feeling too old for the toils and travails of photographing among the mountains, I found that I was able to do more hard work than I have ever done before. I have come back from the Alps feeling at least ten years younger than when I left home, and bringing with me, in addition, a considerable number of good pictures.

We crossed the channel by night, and thus had no opportunity for the taking of seascapes; but a seascape of another kind undoubtedly was secured by a member of our party. We had betaken ourselves to our berths, in tolerable comfort and confidence, my camera being safely stowed above my head, and the whole of the passengers blissfully sleeping in defiance of the winds and the waves, when a sudden and tremendous crash awoke every snorer in the saloon. My first thought was for my camera and plates; but they were happily in safety above my head. My next impulse was to look after my friend, and I saw him insensible on the floor of the cabin. He had turned over on his lofty perch, in the *ex*citement of a first dream and under the *in*citement of a heavy supper, and had fallen headlong to the floor. Happily his insensibility proved to be merely heavy sleep, and not concussion of the brain; for, notwithstanding a fall of five feet, it was some seconds before he awoke to a sense of his position. But by that time he had successfully aroused himself, and all besides, to the sensation of the motion of the steamer, and we will draw a kindly veil over the horrors of the hours of agony for himself and the other passengers which followed.

A halt at Rouen resulted in the obtaining of many excellent pictures, one of which, the *West Front of the Cathedral*, I pass round. While my friends were "lionising" Paris I took my departure for a day's work in an old, out-of-the-way French cathedral town. Chartres is only some fifty miles west of Paris, and it contains the most superb cathedral, inside and out, in Northern Europe. Its external peculiarity lies in its splendid north and south portals. Usually, the greatest glory of external decoration and sculpture is heaped upon the west front of a cathedral. This is not so at Chartres. The western doors are certainly fine, though there is a quaint Byzantine character about the sculptures and their adornment. But on passing to the *façades* of the north and south transepts the photographer will find subjects for his pencil and camera of an exquisite beauty which it would be impossible to equal or describe. Unhappily, at my visit, the southern portal was a good deal blocked up by the scaffolding of the restorers, and I was only able to include in my negative two of the three superbly-sculptured doorways. Time will not allow of my dwelling on the splendour of the exterior in other respects, or of the many glories of the interior, with its 365 windows of thirteenth-century stained glass; but we pass down to the little river Eure to glance at some of the many pictures it affords of the distant cathedral and the old houses on its banks. There is a tower-gate remaining from the town walls which makes a capital picture from several points of view, and the bridge at the bottom of the principal street, with the gabled houses and the spired cathedral in the background, supplies a *tout ensemble* which it would be difficult to surpass.

The journey from Paris to Switzerland suggests a subject of the utmost importance to travelling photographers. I have usually met with no difficulty in passing my plates through the Custom-houses and the clutches of the *douaniers*. These people have invariably accepted my word, as they did this year, that my packets contain nothing of a contraband character. But a misfortune befel me on my last journey for which I was quite unprepared. My large plates were in my portmanteau, and this w , locked and registered in Paris for Lausanne. On arrival, I found that a tool had been inserted and the lock wrenched open and broken. Some valuable papers and other belongings had been abstracted, a packet of large plates opened, a parcel of hypo. untied and its contents scattered over everything, and, worse than all, a bottle of silver solution, which had been most securely fastened, uncorked (I sincerely hope the scoundrel imbibed a portion of it and blackened his lips and face), and its contents spilt over my books and clothes. The Swiss official to whom I showed the wreck was politeness itself; but he assured me that the thief was a Frenchman, and that the burglary had been committed on the other side of the frontier. I saw at once that, had I made my complaint in France, I should be promptly shuttlecocked into Switzerland again, and, therefore, made up my mind to make the best of it and bear my misfortune philosophically, as a peripatetic should. The only remedy for this kind of thing, as regards sensitive plates, is to see that they be packed in packets of sixes, and carried in a parcel or parcels in the hands, and with the traveller in the railway carriage. Perhaps the number of travelling amateurs will one day increase to such an extent as to enable us to obtain an international arrangement that photographic plates be treated—in the Custom-house, at all events—as inviolable as letters are in the post-office. We halted at Montreux for the sake of the picture in the gorge of La Baie, and also that I might walk to Chillon for a large negative of the Castle, to surpass that of Mr. Ellerbeck. In this laudable intention, however, I signally failed.

My centre of action this year among the Alps was at Brieg—at the foot of the Simplon on the one hand, and of the Bel Alp on the other — and a better centre for this part of Switzerland could hardly be found. The town itself is most picturesque, being somewhat oriental in its appearance from the strange number of minaret-like towers to be seen in all parts of it, many of which are terminated by cupolas. Then, in every direction, the mountain forms rise grandly in the background, with sufficient snow on their slopes to remind one of the proximity of the Aletschhorn and the Oberland on the one hand, and of Monte Rosa, the Matterhorn, and the Italian Alps on the other. Our first walk was to the Bel Alp and the Sparrenhorn, and then, *viâ* the great Aletsch Glacier and the Eggischorn, to Viesch, and so back to Brieg.

I had left home with the full intention of completing my unfinished experiments of last year on the Rigi as to the mode of dispelling heat-haze by means of the interposition in front of the lens of tinted films of transparent glass or gelatine; but during the whole of my three weeks' stay in and about the Rhone Valley, on the Eggischorn, at Macugnaga, and at Zermatt the atmosphere remained perfectly bright and clear. At Bel Alp, where Professor Tyndall has built a nice little cottage for his investigations as to the origin of life-germs, and also into the unsolved problems of glacial action, it occurred to me that the camera would be a most useful assistant as an unerring witness as to the progress and character of glacial phenomena. The great Aletsch Glacier is visible from Bel Alp in its entire length. It certainly does not present a very artistic aspect; but nowhere else that I know of is the majesty of an ice river, with all its wonderful concomitants and surroundings, spread out before the eyes as it is here.

One of my objects in visiting the Eggischorn once more was to secure a photograph of a singular earth-tower, to be found in a gully about half-way up the mountain, between Viesch and the Hotel Jung Frau. Unhappily the hard morning's work of an ascent to the summit of the Eggischorn, and a visit to the ice-lake—the Marjelin See—delayed our walk to Viesch till so late that, on discovering the column (which, by-the-bye, is by no means easy to find), it was close upon sunset. I scrambled along the side of a perilous slope of crumbling moraine, and gave a very prolonged exposure. The result is not worth the danger to life and limb by which it was attained; but it gives some idea of this singular pile. It is about thirty feet high, by five feet in diameter, and fifteen feet in circumference. Sir Charles Lyell called the attention of geologists to this tower in the visitors' book at the hotel; and I had fully intended presenting a print from my negative to the Liverpool Geological Society.

The Simplon Pass, the Val Ansasca to Macugnaga, and over the Monte Moro to Saas and Visp, supplied us with our second excursion of a week's duration. The Simplon is not a very interesting pass to the photographer. On the Swiss side the views are all enhanced in their grandeur by the distant Bernese Oberland; but there are but few really good pictures. The best are those to be found near the Kaltwasser glacier and galleries—about a mile from the summit. The Hospice is only interesting for its size and for the splendid work of humanity which it is doing; but from the village of Simplon, all through the gorge of Gondo, right down to Domo, the difficulty lies in making a selection from the multitude of tempting subjects before the pedestrian.

The very best place in all Switzerland, in my judgment, for photographic work is Macugnaga. Chalêts, churches, waterfalls, foliage—everything one looks for of beauty in this wonderful country—may be combined as a foreground in a picture in which the unrivalled snowy precipices of Monte Rosa bring up the rear.

I am glad to bear testimony to the exceeding usefulness of Mr. J. T. Chapman's combination of albumen and gelatino-bromide in his plates for this class of subject. The slowness of these films, combined with the considerable latitude of exposure which they allow, are of the

greatest advantage when snow peaks appear in the background. Our climb over the Monte Moro Pass gave us some two hours' work among the snow, and it was somewhat alarming, after ten hour's walking, on arriving at nightfall at the one inn at Saas, to find the door besieged by travellers, weary and worn as we were, entreating for admittance and beds. The place was crowded to the doors with English, and there was nothing for it for most of these poor, belated people but to walk back to Stalden or on to Mattmark—in each case an addition of ten miles to the day's work. We were more fortunate, in that we found a "roost" for the night at the house of the village *curé*.

A mishap which befel me at the inn of Mattmark may be a warning to other photographers with "dog kennels." I had engaged a porter at Macugnaga to carry our "belongings" over the Moro to Saas, but the rascal (I suspect at the instigation of the landlady at Mattmark), struck at an inn ten miles short of our journey's end, and refused to proceed any further. This happened to me once before at the same place, and I am uncharitable enough to think that the desire to retain us for the night, and so secure the payment of a bill to his friend the landlady, was at the bottom of the porter's action.

At Saas there is a splendid picture, about half-an-hour from the village, at the entrance of the Valley of Fèe. In the foreground of the composition there is a pretty Swiss chapel, and behind it, above rocks and firs, there rises the highest mountain in Switzerland—the Dom, with gleaming glaciers, quite free from moraine and *débris*, streaming down its slopes.

I will not weary you further by describing any of the unnumbered subjects between Saas and Visp, nor will I describe our next week's excursion to Zermatt and up the Gornergrat. I have already recounted former photographic experience within sight of that most wonderful of all mountain forms and most fascinating of all mountain peaks—the Matterhorn. The "dog kennel" was carried in safety by a porter to the summit of the Gornergrat and some good pictures were secured; but, alas! on the descent, my porter, scenting his supper, bounded down the slope beyond my reach and sight, and dashed my apparatus to the ground, smashing a double dark slide and two 9×7 pictures of the Matterhorn into many small pieces. Here is a specimen of a disaster which has happened to two more of my Zermatt pictures, and of which I have never before had experience. These two negatives were too thin, and I took them to the tap to give them a thorough washing before treating them with mercury and ammonia. After washing they were placed in a rack to dry, and left for a day or two. When I next took them into my hand, with a view to intensification in the usual way, I found them both hopelessly spoilt, as you see.

I will only show you one more picture tonight, and that shall be one of a by no means pleasing character, though not at all a bad picture. This is the *Ossuary at Naters*—a charming little village about a mile from Brieg. In this part of Switzerland, when the dead have lain in the grave for the requisite time, the bones are exhumed and placed in the Ossuary, and the skull, neatly whitewashed (and in some cases with the name written on the brow), is placed as you see in my picture. The skulls of the clergy usually wear the biretta or priest's cap, and those of children are crowned with garlands of flowers, natural or artificial. I found my quarters at Brieg thoroughly well adapted for the development of my plates. Sheets of orange tissue pinned upon the window of my room gave me a flood of light to work by without trace of fog, and the supply of water was unlimited on each floor of the hotel.

Should any of my friends seek a fitting centre in Switzerland with a view to becoming, like myself, a peripatetic photographer, I can cordially recommend Brieg for the purpose; and I hope that these hurried notes may be of some service to brother amateurs in their quest for comfortable quarters in this wonderful country.

H. J. Palmer, M.A.

APPARATUS FOR THE GELATINE EMULSION PROCESS.

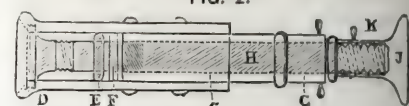
Every one who has tried to prepare his own gelatine emulsion must admit that the division of it into small particles for washing is not one of the most agreeable of photographic operations. It is a comprehensible fact that the washing out of the nitrate of ammonia and of the excess of bromide proceeds more rapidly the finer the emulsion is divided; and in his book on the *Theory and Practice of Photography with Gelatino-Bromide of Silver*, page 105, Professor Eder testifies that, with gelatine emulsion divided into cubes or shreds of from one to one and a-quarter millimetre in thickness, washing from half to three-quarters of an hour in running water suffices.

Those, then, who wish to economise time and water will not cut their emulsion into thick pieces, but will squeeze it through something into shreds from one to three millimetres thick. For this purpose organdie muslin or canvas has hitherto been used; but the squeezing through these materials requires generally the exercise of considerable strength, and has the drawback of a small part of the emulsion being lost, and, on the other hand, by contact with the hand, the latter is often disagreeably affected. It may also happen that the reticulated material may in some places have holes which have become too large, or it may suddenly be torn. In order to avoid these various inconveniences I exerted myself to construct a gelatine-squeezing apparatus, the form and arrangement of which are shown in *figs.* 1 and 2, and this has furnished me with results in every respect satisfactory.

A is a hard-wood, revolving, hollow cylinder, to the lower end of which a wooden ring B may be screwed. An ivory or horn sieve C (with holes c one, two, or three millimetres in diameter) is kept in position by the ring at the lower end of the cylinder. The piston D moves stiffly at the end of the piston rod H in the cylinder A. Upon the piston D a caoutchouc ring E rests loosely, and above it, movable upon the piston rod, the wooden disc F. A massive wooden cylinder, G, furnished with handles, slipping outside the other cylinder, having inside its lower end worms for screws, presses, by means of the disc F, the caoutchouc ring against the piston D, when it is screwed upon the worm which is placed in the upper part of the disc. In that way the caoutchouc ring is expanded and tightly fills the space between the piston and the cylinder A. At the other end of the piston rod a broad, flat knob I is screwed on, and kept in position by the peg K.

FIG. 1.

FIG. 2.



To use the apparatus: the gelatine is, after setting for about two hours, cut into thick pieces with a horn knife and placed in the cylinder A. Then the piston is inserted and, by turning to the right, tightened into the cylinder G. The gelatine is then, without any trouble, pressed through the sieve, the cylinder G being centered upon the piston rod. In order to remove it, the caoutchouc ring is slackened by turning the cylinder G a little to the left.

This apparatus (in the construction of which I have avoided using metal) works quickly and rapidly, may easily be taken to pieces, and, therefore, be easily cleaned. The gelatine shreds do not stick together, and by using several sieves having different sizes of holes it may be obtained of any desired thickness.

In *figs.* 3 and 4 an emulsionising and washing apparatus is represented, the principle of which is not new, but which, on account of the

FIG. 3.

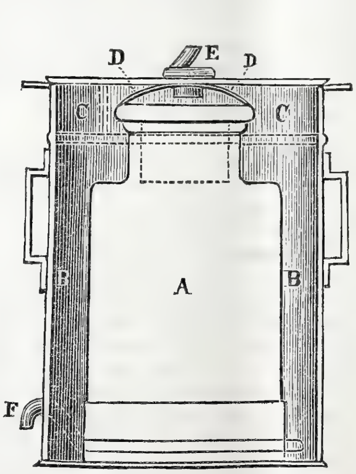
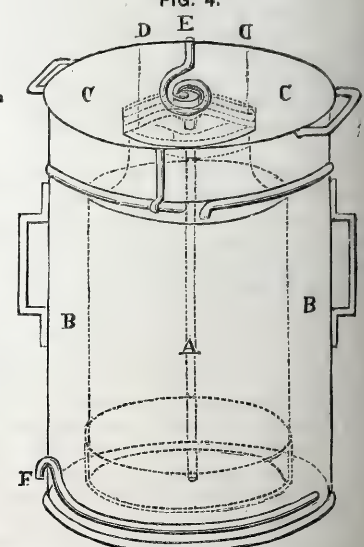


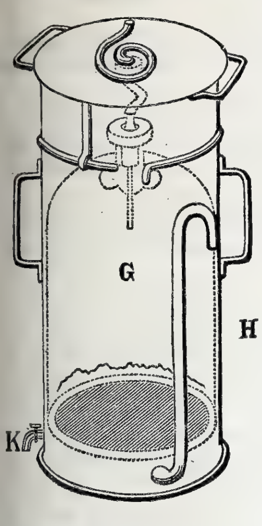
FIG. 4.



simplicity of the way it is used and its practical utility, should arouse some interest. A (*fig.* 3) is a wide-necked bottle which can be inserted down to the bottom of the sheet-iron vessel B, and is closed by a well-ground glass stopper. The lid C closes the vessel B by means of the so-called English closure. At the inner side of the lid a spring, D, is fixed, which, when the lid is closed, presses upon the glass stopper and keeps it in its place, while it allows of the whole sheet-iron vessel being shaken by daylight, either for silver bromising by Obernetter's plan or for emulsifying by the ordinary method. If it be afterwards desired to wash the finely-divided emulsion, use the same apparatus as shown in *fig.* 4. The stopper is replaced by a hollowed-out cork with mull muslin stretched upon it, and through the cork a glass tube, which reaches to the bottom of the bottle, is inserted. A tin tubular worm passes through the lid and is connected with the glass tube by means of a caoutchouc stopper. At the lower outer edge the metal vessel carries the outflow pipe F, which is bent into a semicircle. The tube E is connected with the water supply. The emulsion is kept in constant

motion and washes itself by the pressure of the water, the water driven out escaping through the excisions in the cork and the outflow tube F. The washing may take place in the apparatus by daylight.

FIG. 5.



To anyone who has no water supply at high pressure, and, therefore, perhaps, but a small water reservoir at his disposal, I recommend the method of washing represented in *fig.* 5, which is based upon dialysis. Here the bottle A (*fig.* 3) is replaced by a bell glass, the bottom of which is ground and furnished with a pad, and the larger aperture has mull muslin stretched across it, and is supported on a projection at some distance above the bottom of the metal vessel. A glass tube, which leads into the bell glass through a caoutchouc stopper, is connected with the worm-shaped tube on the lid by a piece of rubber tubing. H is the outflow pipe, reaching half up the bell glass and curved. The other parts of the apparatus are the same as those previously described. The emulsion floats continually in running water. The salts which are washed out fall to the bottom of the metallic vessel in consequence of their greater specific gravity, and, if they are not to be floated off by the outflow tube H, may be completely removed by occasionally opening the cock K.

—*Correspondenz.* LUDWIG DAVID, *K. K. Artillery Lieutenant.*

WHERE TO GO WITH THE CAMERA.

AT OBAN.

You may reach Oban, the beautiful capital of the wild Argyle county, by either water or rail. There is a direct train service from Euston station. You can leave London by the Scotch express at supper time and arrive at Oban in time for lunch. The extension of the Caledonian line from Callander to Oban was completed five years ago. If you are a true photographer you are also an artist, and, being an artist, you will wish that the "iron horse" had halted at Callander; for the intrusion of what Wordsworth called "that whistle" seems a hideous sacrilege amid the lovely loneliness of Loch Awe, and a crime as it wakens strange echoes in the Pass of Brander—one of the most wildly-poetic ravines in the land of bens and glens. The line of steel is carried over the haunches of Ben Cruachan, it skirts the shores of Loch Etive, and you drop suddenly into Oban as if you had fallen from the clouds. Professor Blackie, who had a beautiful house at Oban, has left the place for ever in consequence of this railway intrusion; and I wonder what John Ruskin would say about the defilement, for did he not write when the line was carried through the Peak of Derbyshire to Buxton—"That valley, where you might expect to catch sight of Pan, Apollo, and the Muses, is now desecrated in order that a Buxton fool may be able to find himself in Bakewell at the end of twelve minutes?"

The line itself, to people who admire the exciting triumphs of engineering genius competing with the defiant majesty of nature, is a stupendous achievement. It places easy travelling facilities in the hands of the tourist, to save whom a few hours' time Loch Awe and its lovely pass have been permanently disfigured.

The waterway to Oban is the route the artist in photography will surely select. There are two ways of sailing. He can voyage in a deep-sea steamer, such as the classic "Clansman" of William Black's *Princess of Thule*, and go round the stormy Mull of Kintyre, or he can graduate in the delightful experience of a marine trip such as those floating palaces, the "Columba" and "Iona," present. I have reached Oban by both means. The Atlantic voyage round the Mull (distance from Glasgow to Oban, 173 miles) has the disadvantages of a night journey and the chances of a rough sea. If you are not a victim to *mal de mer* the circuit the vessel takes by the island of Arran has splendid scenic compensations. The Crinan Canal route must, however, be recommended *par excellence*. The distance from Glasgow to Oban this way is reduced to 124 miles. Every mile of it is full of scenic charm, historical association, and changing interest. If you once make this trip you will make it every year, and as soon think of changing Oban as the objective point of your autumn holiday in the Highlands as you would think of changing your wife, your children, or your religion.

The "Columba" leaves Glasgow at seven in the morning. The breakfast on board is a revelation, not only as regards the variety and amplitude of the service but in the superb saloon in which it is served. Everything about the "Columba" is lavishly luxurious. A special article might be devoted to this flag-ship of Mr. David MacBrayne's pleasure fleet without exhausting its claims to admiring attention. Mention of Mr. MacBrayne reminds me that he gives one the best change for three pounds of any tourist caterer I can call to mind after reviewing my holiday experiences. For that sum you may have a week on the water, including your sleeping berth (get a deck cabin) and your meals. Within that week you may sail from Glasgow to Stornoway and back, calling at lonely piers on wild islands. The voyage has all the charm of a yatching cruise without its trouble and expense, and every calling-place invites the camera to take it away to be reproduced at will in places far remote and amid scenes strangely different. But I digress.

The "Columba's" swift route (her pace is twenty miles per hour) takes you down the Clyde, past Greenock, where the dirty industrial river refreshes itself in the Atlantic; and then, amid "the old green glamour of the glancing sea," passes Kirn, Dunoon, Innellan, Rothesay, and other charming spots that have crept down wooded hill-sides to bathe themselves in the clear northern waters. Peaceful nooks these, that make you envy the busy Glasgow men who can leave the coast for their desks in the morning and return to this romantic repose in time for dinner in the afternoon. Rothesay opens out the Kyles of Bute—a winding waterway amid the mountains, where the investing hills at each turn seem to lock in the steamer, when, lo! a turn of the helm opens out an unexpected sea-path, only to find us seemingly land-locked again. Past Colintraive, Tighnabruaich, and Tarbert—geographical names that express, to those who know what they indicate, a wealth of scenic charm. Tarbert is on the wide and stately waters of Loch Fyne, where the picturesque is pushed to the painter's most possible point. Soon comes Ardrishaig. Here you leave the "Columba."

The Crinan Canal, which cuts off the Mull of Kintyre, conveys you to Crinan; and a fresh and novel experience this canal journey is. The word "canal" scarcely conveys an adequate idea of this poetic waterway, amid the sylvan seclusion of Highland scenery. The little boat, the "Linnet," might pause at the locks on purpose for the companion of the camera to take the picturesque children who run on the canal banks bare-footed, bare-headed, blue-eyed, and with hair as shaggy as a Shetland pony. Their cry is "Mulk, sirr?" In one hand they carry a glass and in the other a can of their merchandise. Other children have bunches of heather for their ware. Other "weans" cry with the softest Highland inflexion of voice—"Nitts, sirr?" At Crinan the canal terminates. Passengers and luggage are transferred to the "Iona." A capital dinner on board. The blithe, blue Atlantic salutes you with a caress from the west as you step on deck afterwards, and watch the islands slip past like a panorama—Jura, Scarba, Colonsay, Mull, Kerrera, then, lo! and, behold! Oban the Beautiful.

We left Glasgow at seven this morning, it is now close upon five in the afternoon; yet, how deftly and delightfully the day has gone! Oban has been called the "Charing Cross of the Highlands." It is certainly the centre from which everything of scenic interest radiates. A word as to the place itself before glancing at what it gives access to. People who have never been to Italy instantly compare Oban Bay to the Bay of Naples. I think it has greater charms. The camera would describe Oban better than the pen. The place might have been specially "posed" by Nature for a picture. There is a bold curve of bay, landlocked, save where at the northern and southern points there is a narrow ocean entrance. At the northern point is a ruined castle, just placed where an artist would adjust its position. In front the island of Kerrera breaks the force of the immediate tide. Behind Kerrera, a wide channel separating them, is the island of Mull resisting the Atlantic, and its massive mountains making as majestic a background as the soft and green Kerrera makes a gentle foreground. In the middle distance add the Morven mountains, with the sun playing with light and shadow. The writer of the *Æneid* never saw Oban; but he describes it with topographical accuracy in those noble lines beginning—

"Within a long recess there lies a bay;
An island shades it from the rolling sea,
And forms a port secure for ships to ride,
Broke by the jutting land on either side.
A grot is formed beneath with mossy seats,
To rest the Nereids and exclude the heats;
Down through the crannies of the living walls
The crystal streams descend in murm'ring falls.
No halsers need to bind the vessels there,
Nor bearded anchors; for no storms they fear."

The eye skips over Oban Bay, with its flotilla of "white wings," over the green undulations of Kerrera, and across the strip of sea between that island and the Mull mountains, which from the Oban hills seems an easy jump, but is, in reality, some miles broad. These Mull mountains fill in the background most majestically, but not oppressively, for away to the north-west is the Sound of Mull. You look down this broad highway of old ocean to Ardnamurchan Point, a distance of forty miles. Filling the immediate foreground is the picturesque, pine-plumed promontory on which stands all that is left of Dunolly Castle. The ruins mirror themselves in greys and greens and browns in a looking-glass of liquid light.

In the middle distance, off the long emeraldine shores of Lismore (Gaelic: "the Great Garden"), in a deeper tone of colour, is Duart Castle; beyond are the highlands of Morven, where the sun lies on the hills melting away in ethereal blues until they seem to belong to the land of dreams, where the gods feast and toy and laugh at man. In this rarefied light the mountains draw nearer. Their wild peaks wear a witching smile. The sun catches the granite scars on the two red cones on Ben Cruachan behind to the east. They flash and burn like opals. But verbal art cannot throw this picture into language; photo-

graphy cannot render its colour. The impotent pen trying by a few feeble ink scrawls to translate such beauty seems a presumption—

"what need
Of words to tell of things unreached of words?"

To the north is Loch Linnhe, with the pensive picture of Dunstaffnage Castle, brooding over the traditions of two thousand years, in a green gloom of wood; Ben Cruachan and the Glencoe Hills; and a lovely, lonely labyrinth of sea and mountains, where lake is linked to lake, where there are gulfs within gulfs and islands interlaced by islands, and where, at last, in the poetical perspective, in a dreamy dimness, is seen the bulky Ben Nevis outlined—a massive cloud in the misty blue.

Next to William Black's novels there is one book to be emphatically recommended to the select company of the thoughtful. It is entitled (and I hope most of my readers have already made its acquaintance, and will thank me for renewing it) *A Painter's Camp in the Highlands*. Hamerton is the author, and whoever wants to know the Oban country minutely and photographically will get far more out of this little work than from Robert Buchanan's *Land of Lorne*.

Here I am to the length of my tether, and I have said nothing about the "beauty-spots" that stud Oban as jewels decorate a crown. I should like to describe, as photographers would like to imprison, an Oban sunset, when the sun sets behind the mountains of Mull and Morven, making their precipices so many walls of molten flame, and tinting the Atlantic into so many colours that it looks like a vast cathedral window laid low. I should like to take you, my photographic friend, to Staffa and to Iona, and at the cathedral of the latter enchanting island recite to you the Roman elegies of Doctor Johnson, when he visited the Hebrides in the company of Mr. Spaniel Boswell:—"That man is little to be envied whose patriotism would not gain force on the plain of Marathon, or whose piety would not grow warmer among the ruins of Iona."

There is Skye, too, and the Lewis, to say nothing of the captivating Caledonian Canal—a series of natural lochs of great beauty, amid mountain surroundings, strung together by "bits" of artificial water, like beads on a necklace. There is a steamer trip that includes the Caledonian Canal, and will give you a good idea of all that is characteristic of the Hebrides. I allude to the steamer voyage from Oban to Skye, from thence to Gairloch and to Inverness, and back to Oban. At Skye you have a chance of seeing Loch Courisk and the Coolin Peaks. No description can possibly realise the poetic horror of this gloomy lake. Sir Walter Scott has attempted it. A hundred-and-one other accomplished writers have been inspired by its picturesque savagery. But Loch Courisk has never been described, and never will be described, because it never *can* be described.

You reach Gairloch, fair and green and wooded, on the Ross-shire mainland, after the lonely desolation and sterile waste of the Skye shores. The next day a drive along the margin of Loch Maree to Achnasheen. A night at Inverness. The next day to Oban by way of the Caledonian Canal, Lochs Ness, Oich, Lochy, Linnhe, with views of Ben Nevis, the Glencoe mountains, and other Bens not less beautiful if less bulky. I know no three days' trip that embraces so much and suggests more.

A single day's trip and I have done. There is an excursion by rail and road and steamer to Glencoe. There is a run by rail of a few miles which comprehends Dunstaffnage Castle (out with your dry plate!) and the Connel Rapids (Ossian's "Falls of Cora"); thence by steamer along Glen Etive, shut in by mountains, led by Ben Cruachan; thence a captivating coach drive through some of the most impressive scenery in the world. The ride includes the whole of the wild and beautiful Pass of Glencoe. At Ballachulish you take the steamer back to Oban. The trip exhausts the day. It would be impossible to crowd into so short a space of time an epitome of all that is wild and grand in scenery. More of the Western Highlands in one communication? Commission me, if you please, to dip the Atlantic dry with the proverbial salt-spoon!

EDWARD BRADBURY.

RECENT PATENTS.

GRANT OF PROVISIONAL PROTECTION FOR SIX MONTHS.

No. 3,584.—"Improvements in Frames for Photographs." JOHN F. COOKE.—*Dated July* 21, 1883.

FRENCH PATENTS GRANTED.

Class 14.—"Automatic Washing Machine." BERGE, of Paris.—*Dated February* 16, 1883.

Class 17.—"A Portable Mount for Transparent Photographs." NEUBER.—*Dated February* 22, 1883.

PATENT SEALED, SEPTEMBER 28, 1883.

No. 1,650.—"Improvements in Photographic Shutters for Instantaneous Photography." R. REYNOLDS and F. W. BRANSON, Leeds. — *Dated April* 2, 1883.

GERMAN PATENTS GRANTED.

Class 12.—"Improvements in the production of Cyanides of Alkaline and Terreous Alkaline Metals by means of Nitrogen." V. ALDER, Vienna.—*Dated November* 30, 1882.

Class 57.—"Interior Obturators for Photographic Object Glasses." G. BRAUN, Berlin.—*Dated December* 8, 1882.

THE MANUFACTURE OF BICHROMATES OF POTASH AND SODA.

Certain improvements effected in these manufactures by OTTO NEUHAUS, ADOLF NEUHAUS, and ALBERT NEUHAUS, of Elberfeld, Germany, have been patented in this country by Mr. J. H. Johnson.

The invention consists in the manufacture of bichromates of potash or bichromates of soda by acting with carbonic acid upon the melts. The said melts are obtained by treating a mixture of chrome ore with lime and carbonate or caustic potash (or soda) in a furnace until the process is considered complete.

By preference, the mixture of the melt is regulated in such a manner that the half of the oxide of chromium which is set free in the furnacing process is obtained as chromate of calcium, and the other half as chromate of potash (or soda).

The melt thus obtained is treated in a boiler which is sufficiently strong to stand a pressure of five or more atmospheres, and which contains a stirrer or agitator. Water is added to the melt sufficient in quantity to obtain a thin paste. This paste is well stirred and heated to about 130° Celsius or more if necessary, and carbonic acid is passed or pumped into the boiler until the process is found to be completed. The melt, which is used by preference in a mixture, as above stated, contains about one-half of the chromate in the form of chromate of potash (or soda), which is converted by the action of the carbonic acid into bichromate of potash (or soda) and carbonate of potash (or soda). The other half of the chromate contained in the melt is in the form of chromate of calcium, which is converted by the action of the carbonic acid into bichromate of calcium and carbonate of calcium. The bichromate of calcium is, by the action of the carbonate of potash (or soda), set free, as above stated, first into chromate and then into bichromate of potash (or soda).

The whole of the chromate, when the operation has been properly conducted, is thus contained in the form of bichromate of potash (or soda) in solution.

The contents of the boiler are then thrown on a filter and washed in the usual manner. The bichromate of potash in solution thus obtained is then concentrated by evaporation and crystallised in the usual way.

When soda instead of potash has been employed in the melt the liquor containing the bichromate of soda is concentrated and calcined if necessary.

What is considered to be novel and original, and therefore claimed as the invention secured by the above specification, is—

The manufacture of bichromate of potash or of bichromate of soda by adding, under pressure and heat if necessary, carbonic acid to the chrome melt obtained by furnacing a mixture of chrome ore with lime and carbonate (or caustic) potash (or soda), as hereinbefore described.

Contemporary Press.

PHOTOGRAPHIC COPYRIGHT.

[AUTOTYPE NOTES].

THE interest felt in this subject, as shown by recent attempts to form a Copyright Defence Association, coupled with the fact that a Bill has been prepared for amendment of the law, has been greatly accentuated by a judicial decision on appeal in the case of the Stereoscopic Company *v.* Jackson, which places a large number of registered photographs at the mercy of unscrupulous dealers, so that a few words on the situation may not be unwelcome.

Copyright law is not an easy subject; and probably no lawyer, unless his practice was in that direction, would, without consideration and a search for the interpretations given by the judges to various clauses, furnish an opinion upon a question submitted. Previous to inditing this article, the writer fortified himself by conferences with solicitors and opinions of a "counsel" noted in copyright cases.

The existing Act dates from July 29th, 1862, and is known as Victoria 25 and 26, Cap. 68. It is entitled, "An Act for amending the law relating to Copyright in Works of the Fine Arts, and for repressing the commission of fraud in the production and sale of such works."

Previous to this Act the authors of paintings, drawings, and photographs had no copyright in their works. It was indeed the growing power of photographic art as a factor in the cheap multiplication of copies of art work that rendered protection necessary to the painter, and led to steps being taken to secure legal rights to all the parties concerned.

The Act was prepared by a committee of the Society of Arts; the views of painters, photographers, publishers, and persons interested, were collected and investigated, and although the Act is obscure and intricate enough, it has at least the merit of establishing for the first time copyright property in the work of painter and photographer. Its shortcomings are largely due to the fact that when the Act was framed photography had not developed large commercial firms employing many skilled assistants, but was rather an affair of individual professors of the art.

Throughout the Act under consideration paintings, drawings, and photographs are classed together and share the same treatment; so, for convenience sake, we may omit mention of anything but the photograph, although to comprehend the meaning of certain conditions the reader must sometimes think more of the painter's productions than of his own.

Copyright in the words of the Act consists in "the sole and exclusive right of copying, engraving, reproducing, and multiplying a photograph and the negative thereof by any means and of any size," and it accrues to the author of every original negative for his life and for seven years after, upon certain conditions, of which the most important is registering the work at Stationers' Hall.

This is plain sailing so far; but difficulties arise. The very first clause of this Act, after conferring copyright in the manner stated above, continues with a "provided that when the negative of any photograph shall be made to order for a valuable consideration" the copyright in the said negative shall not belong to its author or producer unless it be specially reserved to him by agreement in writing, made at or before the time of sale or disposition, but that it shall belong to the person who commissions and pays for the work.

Now this seems excellent sense, and not unfair. A man, for example, purchases a painting, and in so doing acquires copyright in the same, unless he agrees in writing to give the artist the copyright. But, unfortunately, the first clause of the Act runs its unwieldy length without an interposing period, and here reaches its second semicolon. At that pause the vendee (or purchaser) is to possess the copyright; but the clause continues and concludes, "nor shall the vendee be entitled to any such copyright unless at or before the time of such sale or disposition an agreement in writing signed by the person so selling shall have been made to that effect."

Those best qualified to judge consider that the semicolon referred to should have the force of a full-stop; that it terminates the definition of rights as between the person who commissions the work and the artist who executes it, and that the last sentence of this intricate clause defines the status of the buyer who does not commission and the artist who sells. In the first case, if no agreement is made the commission carries the copyright; in the second, if no agreement is made the copyright is lost.

Practically this has been a pitfall for the unwary, and this operation of the law has inflicted a wrong on the painter and on the purchaser of his work alike. If no agreement at all is entered into, which has been of the most common occurrence, the copyright is lost! After-thoughts are of no use; no remedy is possible.

Copyright accrues to the author of every original negative, and in this privilege he is classed with the artist who creates a work of genius. This distinction has proved disadvantageous; for in the growth of important photographic industries the legal bearing of this individual authorship has escaped notice. In the ordinary business of life work done to the order of an employer is the property of that employer, and a successful photographer who finds the capital, trains the assistants, and personally conducts and creates a large business, may well stand excused for supposing himself the legal author of negatives produced under his direction, with his own materials, and for his sole use and employment. If in a partnership, he would credit the authorship to his firm.

Common sense, however, is not always a reliable guide through the mazes of an Act of Parliament. There has been a rude awakening to this fact through the decision on appeal in the recent case of the Stereoscopic Company, plaintiffs. The writer of these notes is, however, bound to acknowledge that the judicial decision considered in relation to the terms of the Act appears a reasonable interpretation, and consonant with its meaning and intention. It leads also to the conclusion that the present Copyright Act is very imperfect; that the need of amendment is urgent; and that, pending such amendment, photographers must scrupulously conform to the existing conditions in registering copyright.

What, therefore, are the means of acquiring secure title to photographic copyright is the question to be answered.

1. Copyright accrues to the author of an original negative (or a painting) by virtue of authorship. The primary title is personal; it cannot be originated by a company. But this inherent title of authorship is inoperative till the copyright is registered. Before registration no action for infringement can be maintained. Registration is not *essential* till an artist sells his picture, or a photographer publishes his photograph; but, as a matter of prudence, registration should be effected when the work is produced. A photographer, of his own choice and with his own hands, produces a negative of a view, building, or of any object in which no copyright exists, and is unquestionably the author of such photograph. If before or at the time of disposing of the negative, or selling copies from it, he procures for a penny at Stationers' Hall a printed form, and enters in the proper columns a sufficient description of the photograph to secure its identification, enters his name and place of abode, both as the owner of the copyright and the author of the work, fills up and signs the rest of the form duly, and hands it in at Stationers' Hall with one shilling fee, the particulars will be entered in the book provided for the purpose, a receipt will be given, and he may depart with a sense of having secured an unimpeachable title to the copyright for the term of his life and seven years beyond. He will have found in the registration form a couple of columns headed "Date of Agreement or Assignment" and "Names of Parties to Agreement;" but these do not concern him at present.

2. An original negative of a group of persons, or a portrait study done at his own cost, does not earn the privilege of copyright by authorship alone, for by the common law every man has a property in his own likeness; and the only safe method of procedure is to have a written agreement from the sitter, reserving the copyright to the photographer. It is for such an agreement, and for formal assignments of copyright to purchasers of the same, that the two columns referred to above relate.

3. If a negative be produced for a valuable consideration, the copyright can belong to the photographer, if the customer so agrees in writing. If no agreement is made, the copyright, it is believed, accrues to the person commissioning the work; but in registering the photograph it is essential the name and address of the actual author of the negative is given. Conversely, supposing a photographer has produced of his own impulsion some splendid negative of "Sea and Cloud," and wishes to dispose of the same, unless a written agreement passes as to copyright, and it be reserved either to vendor or vendee, the copyright will be lost. *Caveat emptor!*

4. If a work of art in which copyright exists be photographed, copyright in the original covers or conveys copyright in the resulting photograph. In all probability it so completely conveys protection that the photograph need not be registered, but as a matter of extra caution it is advisable that the photograph should also be duly registered. In registering there is no need to refer to the previous registration of the original work; but there is special need when the photograph is done by a firm that the individual author be correctly referred to and not the firm itself.

5. It follows, from what has been already said, that persons employing assistants have no need to enter into any agreement by which copyright accruing in their work is reserved to the employer. They are commissioned and paid by the employer. If there is any copyright in a negative produced by an assistant it belongs to the employer. The unfortunate defeat of the Stereoscopic Company was not caused by the want of any such agreement, it was only a question of informal registration as to authorship. The defeat was sustained entirely on this point.

6. Finally comes the question of assignment of copyright. An artist after painting a picture and registering the copyright can sell such copyright. He formally assigns it for an agreed sum, such assignment must be registered, and it must be stamped and *ad valorem* duly paid.

The purchaser of the copyright can publish copies by any method: if by photography, he must take care to remember in registering the photograph the importance of *its* author. Copyright in a photograph can in the same way be assigned. Supposing a photographer sells his business: the purchaser must receive a written assignment of each copyright, and register such assignment at Stationers' Hall, or the copyright will be lost; and the assignment must be executed "at or before" the time of sale. Copyright in a great many negatives has vanished from ignorance of these conditions.

To complete this exposition of the Act as a whole requires three or four more short paragraphs.

Works of art on which no copyright exists can be copied by any number of photographers, and each can register his particular view of the subject; but copying registered copies infringes the Act.

Copyright is made personal estate; so that on the death of the proprietor it can be dealt with by his representatives like any other personal property.

The penalties on infringement of the copyright are sufficiently severe. To unlawfully copy or multiply for sale, to import for sale, to exhibit for sale, and to sell, are offences that may be visited with a fine of ten pounds for every individual copy produced, imported, or sold, with forfeiture of all negatives and copies to the proprietor of the copyright.

Heavy penalties are also prescribed for persons forging an artist's name, initial, or monogram—of much more interest to painters than to photographers. The penalties would, however, apply to any person who should follow a Bedford or a Frith in search of the picturesque, and publish his landscape views with the imprint of their names instead of his own. The penal clauses carry the additional weight of action for damages.

The protection is evidently sufficient if the title to copyright is unimpeachable; but there is enough obscurity in the Act to have allowed business men for years past to register insufficiently, leading to a nonsuit with heavy expenses in an action where all the moral right was on the side of the plaintiffs, and placing within the reach of pirates property fondly believed to be under the protection of a special law.

Nevertheless the weak points in the law have been long apparent to legists and others. So long ago as 1869, Lord Westbury drafted a Bill to amend the law, which, if passed at that time, would have prevented the present mischief. It struck at the anomaly of the servant's authorship, made copyright belong to the person ordering and paying for the work, unless otherwise agreed at the time, and proposed thirty years for the duration of copyright, which rendered it independent of an individual life. Thus the two weakest points would have been remedied.

The draft of a new Bill to amend the law of copyright has for a long time been prepared. It is endorsed with the names of Mr. Hastings, Mr. Hanbury-Tracey, Sir Gabriel Goldney, and Mr. Agnew, and adopts most of the improvements suggested by Lord Westbury, and suggests others; but as there is little chance of its early consideration by Parliament, we may reserve for a future occasion examination of its details. W. S. Bird.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 9......	Newcastle-on-Tyne	College of Science.
" 11......	London and Provincial	Masons' Hall, Basinghall-street.
" 11......	Manchester (Annual Meeting)..	Mechanics' Institution.
" 12......	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 27th ult., the chair was occupied by Mr. J. H. Hare.

Specimens of toughened glass for use as measures, evaporating dishes, &c., were shown, and one was put to the test of having water boiled in it and then of being floated on cold water, which it passed through with safety. With the perversity, however, of things which are to be shown off, one of the dishes upon being thrown on the floor, instead of coming triumphantly through the ordeal, only caused a search to be made for the small fragments into which it had become resolved.

Mr. A. Haddon remarked that toughened glass, when it did break, became disintegrated into very small pieces, with which, however, it was difficult to cut oneself, easy as this was with ordinary glass.

Mr. W. M. Ashman said that during the last twelve months that he had used toughened glass measures in his dark room he had not had one broken, whereas formerly breakages were very frequent. He (Mr. Ashman) then showed prints made by the electric light at Mr. A. J. Jarman's works. At the time he had thought that the one which had had thirty minutes to the light was about equal in strength to one printed by daylight from the same negative in half-an-hour. He found, however,

that they were not quite equal, and that, at the distance actually fixed, the exposure should be about double that required by ordinary diffused daylight. He thought that if there were some place in town to which negatives might be sent for exposure to the light in foggy weather it would be worth the while of photographers to avail themselves of the opportunity of getting off any pressing orders.

Mr. W. E. Debenham said that no doubt with the high tension current to be produced by the machine at present in construction, the actinic power of the light would be greater and the necessary exposure shorter. Probably the negatives would bear to be nearer the arc without becoming too much heated.

Mr. T. Norris suggested that the interposition of an alum bath would cut off the heat rays and prevent the risk of injury to the negative.

Referring to the condition of surface of gelatine plates,

Mr. J. Barker said that a small quantity of gum ammoniac added to the emulsion caused a very decided matt appearance.

Mr. G. Bellchambers was elected a member of the Association.

It was announced that the first of the monthly "lecturettes" was to be given on the evening of Thursday, the 11th inst. The subject was to be *Emulsions*, and Mr. W. K. Burton the lecturer. All interested were invited to attend, whether members or not.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

A meeting of this Association was held in the Free Library on Thursday, the 27th ult.,—the Rev. G. J. Banner in the chair.

The minutes of the August meeting were read and confirmed, and Mr. G. H. Wilkinson was elected a member of the Association.

The Hon. Secretary made the following report of the Society's exhibition of pictures at Southport:—

On the return of the Hon. Secretary from Switzerland, he found a note awaiting him from Mr. Morgan, asking for a photographic exhibition at Southport during the visit of the British Association. Thinking that our Society should accept the invitation of the Southport committee, a large number of specimens of photographic work were mounted or got together; and the Hon. Secretary, accompanied by Mr. J. A. Forrest, went down to Southport, on Tuesday, September 14th, with the view of arranging the exhibits. The President, Mr. B. Boothroyd, met the party at the station and escorted them to the Skating Rink—the exhibition room of the British Association *soirées*. Much to their disappointment, however, none of the fittings of the hall were in their places, and the work had to be postponed till the following day. On Wednesday, the 15th ult., the President and Secretary met in the exhibition hall, and, after a hard day's work, by night the exhibits were arranged satisfactorily by them, in five bays of the west side of the hall. The first series consisted of a number of large views by Mr. A. Tyrer, Mr. Boothroyd, Mr. H. N. Atkins, and enlargements by Mr. W. Bedford and the Autotype Company. In the second bay were placed a collection of microphotographs by Mr. F. Higgins. The third group of pictures had in the centre the composition picture, *Wayside Gossip*, by Robinson, exhibited by Mr. H. Greenwood; Mr. R. Crowe's series of instantaneous pictures; some views of Ely Cathedral, from calotype negatives thirty years' old, and exhibited in the Great Exhibition of 1851, by Mr. Craddock; four views of Tal-y-Cafu, by Mr. J. A. Forrest; some prints by the Rev. H. J. Palmer; and an enlargement by Mr. Bedford.. The fourth bay consisted entirely of prize pictures by members of the Amateur Society of Great Britain, exhibited by Mr. Watling. In the fifth compartment were the Rev. H. J. Palmer's collection of views in France, Switzerland, and Italy, taken in 1883; and Mr. Ellerbeck's framed enlargements for last year's presentation print were shown on one of the tables in the centre of the hall. The pictures will remain at Southport on view until Saturday next.

On the whole, the Society may be congratulated on the display of so large a number of pictures of the highest excellence on an occasion of such interest and importance as the visit of the British Association to Southport in 1883.

The Rev. H. J. Palmer then read the paper of the evening—*Notes by a Peripatetic Photographer* [see page 591]—illustrating his remarks by passing round a large number of negatives and prints.

The Chairman, having referred in complimentary terms to the communication, proposed a vote of thanks to Mr. Palmer. Mr. J. H. T. Ellerbeck seconded the resolution, and it was carried unanimously.

The proposal for a last excursion of the season was introduced by the Hon. Secretary, but after some discussion, in which Messrs. Corkhill, Day, Ellerbeck, Twigge, the Chairman, and other members took part, it was found impracticable to make any definite arrangement.

Mr. J. A. Forrest exhibited a number of prints from negatives taken by him at Knaresborough, Fountains, Bolton, and Ripon, and presented the pictures to the collection of the Society.

Mr. A. Beer showed a collection of specimen pictures illustrating his work among the old halls of Cheshire and Lancashire.

Mr. H. N. Atkins exhibited a fine transparency enlarged from a small negative in the camera.

The meeting shortly after adjourned to the last Thursday in October.

BURY PHOTOGRAPHIC AND ARTS CLUB.

The members of this Club held their last outdoor meeting of the season on Wednesday, the 26th ult., at Worsley. The members having mustered in good force proceeded in an open wagonnette and a pair of horses (provided by Mr. Smith, of the Knowsley Hotel) through Agecrof and Swinton, arriving at Worsley in good time.

The light being excellent, numerous cameras were soon at work taking views of the Court House, Old Mill, and various choice "bits" on the Bridgewater Canal. Having viewed the monument erected to the memory of the late Earl of Ellesmere, the members proceeded to the Old Hall, the residence of the Hon. Algernon Egerton. Having secured reminders of this place and the new church, the party adjourned to the Bridgewater Hotel and partook of a substantial repast provided by the landlord, to which they did ample justice. The weather was all that could be desired at this season of the year. The photographs secured were considered good.

Groups of the members having been taken by the Honorary Secretary, Mr. F. W. Livsey, and Mr. H. Dearden, the party returned home, arriving in Bury at 7.30, after spending a very enjoyable day.

Correspondence.

EQUIVALENT FOCUS.

To the Editors.

Gentlemen,—In The British Journal of Photography for January 12th of this year there is a table with directions for ascertaining the equivalent focus of a lens. An object two feet long is set up at a distance of fifteen feet from the lens stop, and, after focussing, the size of image is compared with a set of lines to show without calculation the equivalent focus.

A lens I have tried this way gives a line *longer* than the one marked "*thirteen inches*" by one-fourth the difference between that line and the one marked "*fourteen inches.*" It should, therefore, have an equivalent focal length of *thirteen and a-quarter inches.*

In the Journal for July 20, in the leading article on *Optics*, it is stated that if an object be focussed the same size, and the distance between object and ground glass divided by *four*, the measurement will be *greater* than the equivalent focus by about a-quarter the distance at which the combinations are separated in the mount.

Using the same lens just referred to, the distance between the object and image when carefully focussed same size was *fifty-two inches.* Divided by 4 this = 13. From the inner surface of one combination to the corresponding surface at the other end of the mount the distance was *four and three-eighth inches.* Deducting one-quarter of this from thirteen leaves barely *twelve inches* as the equivalent focus.

Mr. Grubb's method of procedure, as given in the same leader on *Optics*, was also tried. A distant object having been focussed on a mark towards one margin of the ground glass, and a line ruled alongside of the camera on a sheet of paper placed underneath, the camera was rotated so as to bring the same object near the other margin of the glass, and another line ruled on the paper. These two lines were prolonged till they intersected, and on connecting them at their diverging ends, by a line equal in length to distance apart of the marks on the focussing-screen, the distance from this cross line to the point of intersection was found to be *thirteen and a-half inches.* In rotating the camera the diaphragm slot was brought exactly over the front of the camera base-board, and the camera pivoted at this point, so as to be rotated round the centre of the lens. Can you explain the discrepancy between the figures 12, $13\frac{1}{4}$, and $13\frac{1}{2}$?—I am, yours, &c.,

50, *George-street, Richmond, Surrey,* W. Coles.
October 1, 1883.

THE RECENT COPYRIGHT CASE.

To the Editors.

Gentlemen,—Most of us remember the advice—"Bad case; abuse the plaintiff's attorney!" Now, I do not lay claim to this exalted rank. I simply "speak a piece" in the hope that attention may be drawn to the crying evil of piracy.

I must likewise leave Mr. Jackson in undisturbed possession of his adjectives. He is evidently a master in the use of them; but I humbly venture to correct the subjunctive in his second paragraph. I am sorry he is so cross about my deductions on the word "author," but as the *reductio ad absurdum* is one of the most effective weapons at command, suppose we reiterate, even for the delectation of this defendant, who will actually cite, and without a word of apology, the "giving away in large numbers to purchasers of cheap boxes of cigarettes." The giving away of what? Only pirated photographs by wholesale—only men's brains appropriated pell mell, and without one spark of pity or of remorse for the wrongdoing.

Let me resume on the authority of the Lords Justices of Appeal—I have nothing to do with "verbatim reports of the case"—and what do I find? Author of a picture—the man who paints it: the man who lays down the paint; and, therefore, author of a cathedral: the man who lays down the stones, and with his own hands, of course, in conformity with the Act. Slightly absurd I admit, but it is logical, and, above all, it is law on the authority of the judges—as yet; though this special pleader for the pirates seems to think that a judge's decision is immaculate, and that there never was such a thing as for the court above to reverse the ruling of the court below—pardonable pride, perhaps, on part of a defendant writing with all the prestige that a verdict in favour can bestow, but scarcely in accordance with historical fact.

And our friend is *material* after all! I can bestow on him no other designation, for he actually "conceives the idea" that the person who

decides to have his portrait taken is the one who "conceives the idea." Alas! for the grossness of our human nature when man cannot soar—no, not one little inch—towards the beautiful, not even when he is shown the way! And pray what will Mr. Jackson's sitter's "idea" of a picture be? Sitting full butt at the spectator with legs outstretched, one arm akimbo and the hand thereunto appending plastered on the thigh like a lump of clay, while the other arm, equally akimbo, "just rests on the table," with the fist like a shoulder of mutton plumped on a book; the expression of the face resembles nothing in its diabolical ferocity out of Hades? But this, Mr. Jackson, is not an "idea," simply because the "subject" has not been "idealised" by genius. I admit that some faces are such that they *cannot* be "idealised." No, no, Mr. Jackson; the copyright of "ideas" belongs to their creator—to the artist.

"Free Lance" well hits our friend on the subject of *celebrities.* Many, very many, are sold as celebrities solely because the genius of the photographer has elevated their facial expression. They are beautiful and therefore celebrated, and therefore smacked up against a wall and "copied" "to adorn the cheap cigarette boxes;" and I very much beg leave to doubt whether any of the "leading London publishers" lend themselves to this—well, impropriety.

It is certainly some consolation to us to be informed on the defendant's authority that "it is clear that every British nobleman would not particularly relish being supplied for the cheap boxes of cigarettes." I am quite of this opinion, and, therefore, I say—"Thank God! we have a House of Lords." Let us hope they will do their duty; let us hope they will put an etymological construction on the word "author," and so save themselves the degradation of being "copied," and thereby making hideous the "cheap boxes of cigarettes."—I am, yours, &c.,

October, 1883. AUDI ALTERAM PARTEM.

THE BRUSSELS EXHIBITION.

To the EDITORS.

GENTLEMEN,—I am sorry I called Mr. Renwick's photographs of hoar-frost "snow" pictures; but, as I have seen many landscapes when light snow has fallen that would—photographically represented —look very like Mr. Renwick's productions, I hope he will forgive me. Curiously enough, your special correspondent at Falmouth (in your impression of the 21st ult.) has fallen into the same error.

As to their being "well-known," I quite agree with Mr. Renwick. They are not—at least to me. In fact, I never heard Mr. Renwick's name or saw any of his work—to my knowledge—until these pictures came under my notice at Brussels. But *I* did not say they *were*. My copy ran:—"Mr. G. Renwick (Burton) sends some of the finest snow pictures we have ever seen," and how it came to be printed—"Mr. Renwick (Burton) sends some of his well-known snow scenes" I do not know.

With regard to the "poetical quotations" under some of them, I am still of opinion (with all respect to Mr. Renwick) that they "might certainly have been dispensed with." Such a thing may be not only necessary, but desirable, where an artist wishes to show what he intended to illustrate when he painted or arranged his picture. In the present instance, however, *nature* kindly did this, and the artist has only photographed it, and placed under his work a quotation adapted to the subject by his poetical fancy. Again (if I remember rightly), the quotations were in *English*, a language with which not five per cent. of the visitors to the Brussels Exhibition are familiar.—I am, yours, &c., YOUR BRUSSELS CRITIC.

[We must take credit (or blame) to ourselves for the use of the objectionable adjective "well-known." Mr. Renwick will scarcely deny that he has for three or four years past exhibited *snow* scenes, and when our critic spoke of his *frost* effects as "snow scenes" we naturally set them down as some of the same, which are well known to a very large section of the photographic world.—EDS.]

"FIRSTS" *AND* "FIRSTS."

To the EDITORS.

GENTLEMEN,—*Il-y-a des fagots et fagots.* In like manner there are "firsts" *and* "firsts." Messrs. Brown, Barnes, and Bell may be the first who have had a photo-engraved, wiry-gauzy view of a building printed in a newspaper on a fast machine *in Bradford;* but they are certainly not the first who have had a photo-tint block printed in a newspaper on a fast machine. I can claim to be "first" before their "first."

I have been for years supplying my Dallastint photo-graved blocks to printers and others in London and the country, and to some places abroad. Such blocks have been frequently machined. As early as 1872 a series from natural leaves and seeds appeared in the *Garden*. Other tint blocks have appeared in that periodical. One—a remarkable subject, from nature, being a fungus with delicate markings and detail—appeared last year, viz., September 2nd, 1882. Another—an old apple tree—from a drawing in "black and white" wash, done with the brush throughout by Mr. Alfred Parsons, was machined in the number of 1st September of this year. No special care was used, and the block was printed after letterpress matter had been worked on the other side of the paper.

I have not hitherto been very desirous to work down to the level of common newspaper printing, but have sent out blocks designed for ordinary working—without knowing, however, what any enterprising printer might do with them. A curious instance of this disposes of Messrs. Brown, Barnes, and Bell's claim to be the first to have had a photo-tint block printed in a newspaper on a fast machine. In July of this year I supplied to Messrs. Holbrook and Co., of Lowestoft, a block from an ordinary photo. print of a three-horse wagonnette filled with people ready to start on an excursion. I was not told that the block was to be printed in a newspaper, and therefore did not "bite" it of extra depth as I am able to do for common printing; nevertheless, Messrs. Holbrook and Co. machined it (without even "bringing-up") in their newspaper, the *Lowestoft News and Observer*, on the 13th of July last, together with a Dallastype *reduction* I did for them last year—also without knowing that the latter block was for newspaper printing. Several thousands have been printed from these blocks, and they are still being used in the newspaper.

When sending me another order Messrs. Holbrook and Co., with the experience of the former blocks, wrote me:—"We are pleased with the blocks you have already supplied. 'Tis a marvellous process, and so cheap!"

I should ordinarily hesitate to write you anything with the suspicion of "shop," but trust you will excuse the foregoing, as it is as well to give "chapter and verse" from a practical source when unfounded or extravagant claims are being made.

As "firsts" are going about I would modestly "blow my own trumpet," and state that "Dallastype" is the oldest process of photograving for typographic printing, at press or machine, which has been worked commercially in this or any other country; and, in like manner, that "Dallastint" is the oldest photo-graved block process *possessing a true photo-tint* (capable of rendering the minutest detail) which has been worked commercially in this or any other country with ordinary type at hand-press and on slow as well as fast machines.—I am, yours, &c., D. C. DALLAS.

Crane-court, Fleet-street, London,
September 29, 1883.

EXCHANGE COLUMN.

What offers for nine Fallowfield's best Victoria and gem lenses, mounted? —Address, G. P., 65, Talfourd-road, Peckham-road.

I will exchange nine very select gem lenses for anything useful.—Address, GEORGE FEAR, photographer, Market-place, Trowbridge.

I will exchange a good cabinet lens, with stops, for a posing-chair.— Address, MATTHEW NORRIS, 6, Clara-street, off London-road, Preston, Lancashire.

I will exchange a splendid-toned old violin and bow for a half-plate view or *carte* lens.—Address, J. C., 76, Lucas-street, Lewisham High-road, New Cross.

I will exchange fifty gross of half-plate and quarter-plate negatives, patent plate, for anything useful in photography.—Address, STUDIO, Frederick-street, Cardiff.

I will exchange a seven-inch square bellows-body camera, in perfect order, for a magic lantern of good make.—Address, R. J. SHEERMAN, 147, Clarence-road, Lower Clayton.

I will exchange cameras, lenses, dark tent on wheels, tables, pedestals, &c., for Seavey's backgrounds or accessories in good condition; send photograph.—Address, R. EVEREST, photographer-royal, Worthing.

I will exchange a 9 × 7 Meagher's camera, three double and one single dark slides, in case, for a 10 × 8 group and view lens by any good maker.—Address, CHARLES E. WEALE, 36, Church-street, Nuneaton.

I will exchange eleven volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY (from 1870 to 1880) for a good half-plate (or larger) portrait and view lens.—Address, W. BROOK, 62, Town-lane, Shepton Mallet, Somerset.

Studio accessories in exchange for others; posing-chair, with four backs, stonework balustrade and pillar, cottage front (exterior and interior), steps, &c. Wanted, carved table.—Address, MAXWELL, High-street, Barnet.

I will exchange a dark cart, for hand or pony, very light, for plates 15 × 12 and upwards, door behind wheels about forty-five inches, for backgrounds or other accessories.—Address, J. BURROWS, photographer, Dursley, Gloucestershire.

I will exchange a rolling-press and gem camera, with two lenses and rocker bath, all in good condition, for a good quarter-plate lens or anything useful.—Address, J. MEADOWCROFT, 7, Back North Parade, Underbank, Bacup.

What offers, in useful exchange in photography, for a good B flat cocoawood clarinet, thirteen keys? Also two pints of splendid dry-plate varnish and 1,000 best business envelopes?—Address, BUTT, photographer, Blandford.

I will exchange a 12 × 10 glass dipping-bath, in case, with watertight top, an 8 × 5 ditto, in case, and a stereo. ditto. Wanted, a Lancaster's quarter-plate instantograph.—Address, W. WALKER, 156, Noel-street North, Nottingham.

I will exchange a very fine telescope, day or night, by Harris and Son, London, fifteen inches when closed and three feet when drawn, good as new, for anything useful in photography.—Address, M. AUTY, Tynemouth, Northumberland.

I will exchange a 10 × 8 portrait lens, by Kinnear, four inches diameter, velvet posing-chair, and Timperley's old style balustrade, for a biunial lantern or lecture set of lantern slides; price adjusted. — Address, G. HOWARTH, Smithy Bridge, near Rochdale, Lancashire.

Wanted, *carte* and cabinet lenses for a short studio, interior background, posing-chair, and Cadet's studio shutter for hood of lens, in exchange for grass mat, studio borders, two exterior backgrounds, rolling-press with glass bed, oxygen generator, &c. Difference in cash.—Address, J. A. CHADWICK, 22, Victoria-crescent, Eccles.

I will exchange a bellows-body camera, by Moorse, nine and a-half inches square, one double and single slide, with carriers for whole-, half-, and quarter-plates, rising-front, value 45s., also a posing-stand for chair-back, can be raised any height and swings into any position, value 10s., cost six times as much, for Seavey's interior or anything useful. — Address, D. BORDLEY, Newport-road, Stafford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Ellen Kay, 160, St. George's-road, Bolton.—*Two Group Photographs of the Bolton Wanderers' Football Team.*

Robert Thomas Watson, Anlaby-road, Hull.—*Group Photograph of the Right Worshipful the Mayor and Corporation of Kingston-upon-Hull.* Also, *Photograph of the Wesleyan Conference, Hull, 1883.*

John Prise Blair, Penryn, Cornwall.—*Photograph of Interior of St. Gluoin's Church, Hull.*

ERRATUM.—In the first leading article in our number for September 21st, page 552, first column, line thirty from top, for "Coxinodiscus" *read* "Coscinodiscus."

HAROLD SENIOR.—You will find an article on the subject on page 386 of our volume for 1880.

EDWARD WOOD.—The exhibition has been closed some time now. It was only open for one week.

Z.—Full particulars of the standard diaphragms will be found on page 224 in our ALMANAC for the current year.

DITTON.—The patent has expired some time now, consequently the process is open to anyone who chooses to employ it.

BROMIDE.—The patent for the production of the so-called "mezzotint vignette portraits" expired some years back.

MR. CALDWELL.—This correspondent is referred to the leading article on the subject in the last number of the Journal for 1882.

W. A. K.—Probably if you simply back the unmounted print with a piece of cardboard, while burnishing, it will answer the purpose.

COLONIST.—We are not aware of the existence of any society or journal in either place. Indeed we know there is neither the one or the other.

TANGO.—Sepia may be employed for working up opals in monochrome; so may india-ink. Indeed, any colour that taste may dictate can be used for the purpose.

J. W.—The most reliable methods of producing enlargements on canvas for oil painting is either the powder process or the carbon process by double-transfer.

COPY.—This is purely a legal question, and we cannot hazard an opinion during the present uncertain state of the law on copyright. Better consult a solicitor to make yourself secure.

R. H. HART.—The fading of the pink tint is easily accounted for. The colour is produced by tinting the albumen with an aniline colour that is of a fugitive character, and then it has bleached by the action of light.

W. M.—There is no work of recent date on the subject. The manual by the late Mr. J. Wake is now the best you can have, but it is out of print. Possibly you might be able to obtain a copy by advertising for one.

W. A. W.—There is no fear whatever of the gelatine running when the plate is made hot for varnishing, provided the film be quite dry before the lead is applied. You may follow the instructions sent out with the varnish with safety.

G. SMITH.—The best plan of making the hole is to fix a three-cornered file in a brace and use that as a drill, keeping it well supplied with a mixture of sand and emery moistened with water. Some little patience is requisite in the operation.

A. C. BENTON.—A good formula for the "dusting-on" process is dextrine, grape sugar, and bichromate of ammonia—of each half-an-ounce, water twelve ounces. In place of the dextrine gum-arabic may be employed; but, on the whole, we prefer the dextrine.

J. I. (New Zealand).—Ordinary negative varnish should have no injurious action on gelatine negatives. Probably those negatives which have turned yellow have been treated with mercury in one form or other. If this be the case it is the mercury, and not the varnish, that is the cause of the mischief.

J. S. B.—All the information requisite for the preparation of dry plates will be found in our ALMANAC for the past and current years. We cannot in this column give the addresses of private individuals; but if you will send us a letter, addressed to the gentleman named, we will forward it on with pleasure.

F. ALEXANDER.—With simply the indication, an "ordinary silver print," it is quite impossible for us to assign a cause for its fading. It may be due to the mountant, or to the card upon which it is mounted; or, what is far more probable, sufficient care has not been bestowed on the fixing and washing of the print.

COLLODION.—The cause of the "dirty appearance" complained of is that the bath is out of order and yields foggy pictures. Try the addition of a few drops of nitric acid. Unless the silver bath be quite free from fogging propensities it will be impossible to produce clear and brilliant enlargements by the collodion transfer method.

S. P. (Witney).—We fear we can give very little information that will assist you, if all the plates are as much under-exposed as the example forwarded. The only thing we can suggest is to increase the proportion of ammonia a little beyond what you have been using, as the plates appear as if they will stand more, there being no sign of green fog at present.

PHOGENIC.—1. We have not had any experience with the particular mixture in question.—2. You will require a lantern with a chimney to carry off the fumes; also a concave reflector, of white or pale blue calico, to reflect the light on the sitter. Its position must, of course, be dependent upon the effects of lighting you wish to obtain. You can easily determine the best position by a few experiments.

A. HOLT.—The distance the lens is from the negative depends upon the focus of the instrument. The negative should be close to the condenser, as is the case with the magic lantern. The ground glass was used in the demonstration by M. Hutinet. The size of the enlarged image is dependent upon the distance of the paper from the enlarging lens. The closer it is the smaller the image; the farther off the larger.

LIME LIGHT.—Find out the leaky place and cement a piece of the same kind of material of which the bag is made over the hole. This must be done in the following manner:—Take some thick india-rubber solution and smear it over the bag where the hole is. At the same time treat a piece of the india-rubber cloth in the same manner. When both are dry, and not before, put on the patch and rub it well with some hard, smooth substance, such as a bone spatula.

LONDON GAZETTE, *Tuesday, October* 2, 1883.

PARTNERSHIPS DISSOLVED.

ARTHUR WALTON ADAMS and WILLIAM ROBERT SCANLAN, 32, High-street, Southampton, photographers.

ARTHUR WYATT and WILLIAM MORTIS PHILLIPS, Hartland House, 1, West-place, West-street, Fareham, Southampton, photographers.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday, the 10th inst., the subject for discussion will be—*On the Best Method of Toning Ready-Sensitised Paper.*

PRACTICAL INSTRUCTION IN PHOTOGRAPHY.—In our advertising columns Mr. Farmer announces that the second session of his class for an evening course of instruction in the theory and practice of photography, will be held during the Winter months. An introductory lecture on *Artificial Lighting* will be given on Tuesday, the 16th inst., at eight p.m. We refer to the advertisement for further particulars.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For three Weeks ending October 3, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Sept.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
13	30·28	E	57	55	92	69	55	Overcast.
14	30·16	E	58	55	95	72	53	Overcast.
15	29·96	N	58	55	91	70	54	Overcast.
17	30·25	SE	59	52	104	77	52	Hazy.
18	30·24	E	58	54	106	75	54	Hazy.
19	30·16	SE	62	56	108	75	56	Hazy.
20	29·79	SE	61	58	—	64	57	Overcast.
21	29·72	SW	56	55	—	62	54	Foggy.
22	29·68	E	56	54	80	61	53	Overcast.
24	29·73	SW	57	56	85	68	56	Raining.
25	29·82	W	61	58	106	71	57	Cloudy.
26	29·68	SW	63	62	108	70	56	Raining.
27	29·70	W	59	54	101	65	53	Bright & Clear.
28	29·72	W	56	53	105	65	50	Cloudy.
29	29·29	W	53	50	98	66	50	Cloudy.
Oct. 1	29·68	N	50	47	93	56	47	Cloudy.
2	30·00	NW	48	44	93	56	41	Bright & Clear.
3	29·71	W	50	48	—	51	46	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1223. Vol. XXX.—OCTOBER 12, 1883.

OUR FORTHCOMING ALMANAC.

Once more it is our duty to announce that our forthcoming Almanac is in the course of preparation, and that we shall, as in former years, appreciate the kindness of friends who may favour us with contributions.

In addition to the original matter, of which we hope to present the usual supply, the reference portion of the book will be kept up, and many of the standing portions will be revised and re-arranged, in order to adapt them more fully to modern requirements, while several new features will be introduced. The constantly-increasing size of the Almanac renders it necessary to economise space as much as possible, and we, therefore, trust that our friends will endeavour, as far as may be, to express their ideas with brevity, and so render their communications terse and practical.

In order to facilitate the re-arrangement of the work, we cannot too strongly point to the importance of having all matter in hand *at the earliest moment.* We, therefore, hope that intending contributors will bear this in mind.

The Publisher begs to direct the attention of advertisers to the value of the Almanac as a means of bringing their announcements under the notice of photographers of all classes in every part of the civilised world. Circulating as they do, not only in Great Britain and its colonies, but also in every country in Europe and America, and reaching even the most inaccessible corners of the globe, The British Journal of Photography and the Almanac are pre-eminently calculated to secure the greatest possible degree of publicity to any announcements which may appear in their advertising pages. The Almanac, however, possessing the additional advantage of being a permanent handbook, is specially to be recommended to advertisers in all branches of photography, or other branches of science or commerce in any way connected with it. Terms and all information may be obtained from the publishing office of this Journal. Early application is necessary to secure priority of position.

ELECTRICITY AND PHOTOGRAPHY.

From the very earliest period of photography the value of electricity in connection with the art has been fully recognised. Nearly thirty-five years since the electrotype process was employed—first, we believe, by the late Mr. Horne—for the multiplication of daguerreotype pictures. A little later on, the late Mr. H. Fox Talbot, at the Royal Institution, succeeded in producing an instantaneous photograph with a modification of the albumen process, using the momentary light obtained by the discharge of a Leyden battery. In the great Exhibition of 1851 a daguerreotype camera was exhibited, in which the plate was insulated in the carrier and an electric current (supplied from a battery arranged on the stand) was made to pass through it during exposure. It was claimed that by this application of electricity the exposure was considerably shortened (?)

Seeing the extensive uses to which electricity is now being applied in almost every branch of industry, it would be somewhat surprising if it were not utilised in several ways by photographers—directly or indirectly. The telephone is now used by several photographers as a means of communication between the reception-room and the studio, and sometimes the printing-room or another establishment. The telegraph is also employed for a similar purpose. Electric bells are also used for a like purpose—indeed, a "trembling bell" is the cheapest, as well as the most simple, form of telegraph that can be employed in such cases. With it—or rather a pair—a conversation may be maintained with different parts of the establishment with the greatest facility. On some future occasion we may possibly give some practical hints as to how electric bells may be applied for the purpose.

Electricity is also applied to exposing apparatus as a means of ensuring the exposure at the *exact* instant desired. This can be better done by an electric than by a pneumatic arrangement. The latter, though exceedingly rapid in its action, is not so quick as the former. In America, for some time past, an electrical apparatus has been in use for retouching negatives; and another form of apparatus for the same purpose is shown at the present Exhibition. The principle of the apparatus is this: the point of the retouching pencil is kept in continual motion by an electro-magnet actuated by a small battery, so that the marks made with the pencil, instead of being in straight lines or strokes, are a series of fine dots or stipple, the fineness or coarseness of which can be regulated at pleasure.

The most important applications of electricity to photography at the present time, and those most generally used, are the electrotype and the electric light—the former being now extensively employed in the production of metal plates for printing from. It may be mentioned that the value of this process was fully recognised long since; for over five-and-twenty years back the late Paul Pretsch succeeded in producing, commercially, intaglio plates, which were printed by the ordinary method of copperplate printing, and some most excellent results were produced by Pretsch at that period.

The first Woodbury moulds, both by Mr. Woodbury and Mr. Swan, were made by taking an electrotype from the gelatine relief. This was before the lead squeeze was thought of. The beautiful productions of MM. Goupil et Cie, known as "photogravure," are the joint production of photography and electricity. A gelatine relief, with a grained surface, is produced by photography, and from this relief a copper printing plate is obtained by the electrotype process. Several firms beside that of MM. Goupil et Cie are utilising electricity in conjunction with photography for a similar end—Messrs. Dawson and Co. and the Autotype Company amongst others.

In the present Exhibition is a frame containing several examples by the latter firm, which they term "auto-gravure"—both the plates themselves and prints from them being shown in juxtaposition. These plates are of copper, but they have been coated with either a thin film of iron or nickel—this also being done by electricity. The object of thus coating the copper plates is this:—Copper is soft, and a plate with fine detail rapidly deteriorates in the printing. Indeed, after some forty or fifty impressions have been taken from an ordinary engraved copperplate, there is a manifest

deterioration in the quality of the prints from those first produced. But when the plate is coated with iron—"steel faced," as it is termed—the surface is as hard, and the plate will therefore wear quite as long, as an engraved plate in steel itself. A further advantage of this iron coating, it may be mentioned, is that when the "steel face" shows signs of wear the whole of it may be entirely removed and a fresh one applied, as in the first instance. Hence the plate, for practical purposes, may be termed everlasting, as the last prints taken from it may be as good as those first produced.

Those who may wish to experiment with the electrotype process for making printing plates need not be deterred on account of the imaginary expense of the necessary apparatus to begin with, as one or two cells of a Daniel's or Smee's battery will suffice for all experimental purposes. Indeed, these forms of battery are largely used when working on an extensive scale. There are other and cheaper sources of electricity than the battery when working on a large scale. MM. Goupil, we believe, employ a Clamond's thermopile, and the Autotype Company, we are told, use a dynamo machine.

The electric light is now utilised in several studios in London, and also on the Continent, for taking portraits when daylight is not available; and very successful are the results obtained when proper judgment is displayed in its management. In the production of relief blocks the electric light is largely utilised for making the negative. For when printing blocks have to be produced commercially—frequently at a few hours' notice—it would be out of the question to rely upon daylight, which at this season of the year, or indeed at any other in the metropolis, is exceedingly uncertain. Hence most establishments that undertake this class of work are provided with the electric light. The electric light is also used in printing Woodbury reliefs during dull weather.

Up to the present time the electric light has not been used commercially for silver printing; but, as we mentioned a short time back, Mr. A. J. Jarman is at present engaged on the construction of a dynamo machine which he anticipates will be very efficient for the purpose and, at the same time, economical. That the electric light can be made available, both for silver and carbon printing, was demonstrated some months back, when Mr. Trueman Wood kindly placed the electric light appliances of the Society of Arts at the disposal of a number of practical photographers, and again, recently, by experiments made at Mr. Jarman's factory.

Next week we shall probably have something more to say with reference to the subject of electric lighting in connection with photography.

PHOTOGRAPHY AND PHYSIOLOGY IN PARIS.

In continuation of the article on this subject in our number of the 21st ult., we cannot do better than give an extract from M. Marey's own description of his method and arrangements, as worked at *La Station Physiologique de Paris*, contributed to *La Nature*.

We spoke in our last article of a black screen or background, against which the figure (if human—draped in white) is photographed. Of this Professor Marey says:—"The black screen is composed of a sort of shed, three metres deep, fifteen in length, and four in height. This height is necessary when photographing birds on the wing, otherwise they would not be long in leaving the black field of view. In studying the gait of men or animals the opening of the shed or screen is narrowed by means of frames covered with black cloth suspended from the upper portion; these prevent the access of extraneous light into the shed and so render it more obscure. In addition: a band of black velvet, two and a-half metres in depth, occupies the back of the shed, and in this manner nearly all the light reflected from the interior of the shed is suppressed."

A man clothed entirely in white walks across the black screen. The track upon which he moves is slightly inclined in such a manner that a direct ray from the lens just escapes touching the ground. This condition is necessary in order that the walker's feet may be quite visible, while the ground is not. Without this arrangement the light reflected by the ground would impress the sensitive plate at the same points where the feet should be reproduced, and so render the latter indistinct.

The track is raised about twenty centimetres above the surrounding surface, and against the whole length of this raised portion leans a board, upon which are painted alternate divisions in black and white, each having a length of one metre and a-half. This divided scale is depicted on the photographs and serves as a measure of the distance between two successive images, the proportions of the subject, the extent of his movements, and the displacement of each part of his body.

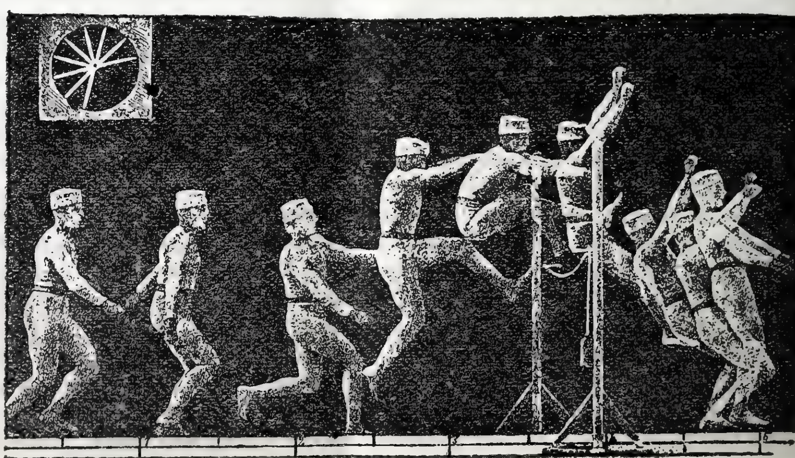
In order to measure the rapidity of motion M. Marey describes an apparatus which he designates a "photographic chronograph." This consists of a clock face covered with black velvet, upon which revolves, at a uniform rate of one revolution per second, a bright finger or pointer, round the edges of which are placed at regular intervals polished nails, which serve to mark the divisions of the circle. It is plain that if the revolving disc of the photographic apparatus (described in our last article) revolve only once in a second, but one image of the pointer will be produced, while if it revolve six times in the second there will be six images, and so on. When the speed of the disc is uniform the distance between the images will be also uniform; and so it is easy to calculate by the angle representing the distances between the images of the pointer the fraction of a second separating the interval between the images of the object photographed.

The application of this system will be better understood by reference to *fig.* 1, which represents a leaper clearing an obstacle. The series of photographs commences at the moment when the leaper starts for his preliminary run, and finishes when the leap is complete and the drop on to the ground has nearly extinguished the force of the movement.

If the diagram be analysed it will be found that the leaper, as well as the finger of the chronometer, are represented in nine different positions during the experiment. Each rotation of the disc bringing the aperture before the lens exposes the sensitive plate for a brief instant, which is sufficient to produce an image. The various images are formed on different parts of the plate because the leaper himself occupies varied positions against the screen when each individual exposure is made. By means of the data provided by the chronograph and the scale below the figure it is easy to calculate the distance which separates any two images and also the time occupied in the movement.

When a number of pictures representing successive movements are taken on the same plate, to render the result as successful as possible naturally the number is multiplied to the greatest extent in order to show the different phases; but when the motion is not rapid the frequency of the images and the consequent superposition cause confusion. To remedy this a result is obtained which may be termed a "partial photograph." This is obtained by clothing the object—a human being in this case—in *black* instead of in *white*,

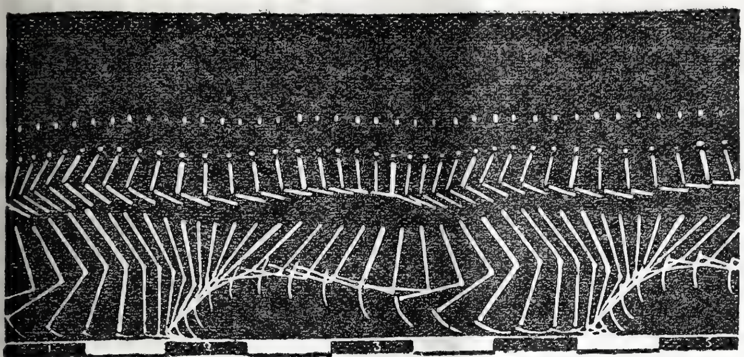
FIG. 1.



and placing a bright spot on his cap to represent the head, another on the shoulder, while a line is carried down the arm and leg. In

this manner the body is, so to say, "suppressed," and the narrow line representing the various phases of the movement enables a larger number of images to be compressed into a given space and time without producing confusion. The result of such a picture is exhibited in *fig.* 2.

FIG. 2.



Without analysing the different positions of the figures we have given, it will be easy for our readers to comprehend the system adopted by M. Marey, as well as the machinery he adopts. Though, to the million, the game may seem to be "not worth the candle," these researches are of undoubted interest to scientific men no less than to artists who lay themselves out to study the anatomy of the figures they paint. Photographers since the introduction of gelatine plates have found that truth in the representation of moving figures—that is, instantaneity—does not mean "art," and cannot be art in the conventional sense.

CORKS AND THEIR USE.

In the whole range of photographic apparatus few articles have so great an importance and few are so intrinsically small in value as the subject of our notice; yet their use is as insufficiently known as their employment is frequently neglected. Every photographer who has any care for the quality of his work and the integrity of his chemicals should always make a point of having by him a number of corks of assorted sizes and shapes ready for any emergency, such as the loss or breakage of one in use, whose absence would otherwise have to be repaired by a twist of paper or the use of an old cork from an empty bottle, which might carry serious contamination.

Such an assortment of corks, too, should be of the best quality; for nothing is more annoying than, after carefully selecting and fitting one to a bottle, to have it break short off at the neck at some critical moment, or, perhaps, discharge a shower of dust into some liquid that is especially required to be kept clear. Although we speak of their intrinsically low value, they are to be purchased of a quality that commands a price that would most likely astonish many of our readers. A fair sample of cork, suitable for small bottles, may be purchased for a less sum than one shilling per gross, while a much finer quality, usually termed "velvet," would run up to two or three times that price, and this is the quality we would recommend the photographer to purchase. As an example of the store set upon the quality of a cork by some people we may instance the champagne makers, who frequently, though buying almost by millions, give upwards of a penny each, and sometimes close upon three-halfpence each, for the kind they employ.

Such corks have just the qualities that every one kept in store by the photographer should possess—elasticity and softness; and though these may be improved by manipulating the cork, they require for their effectual production a fairly-good sample with which to commence. It is, however, astonishing how greatly a cork may be improved by a little careful pressing or rolling.

The chemist usually keeps for this purpose a cork-presser or cork-tongs, by means of a few simple, gradually-applied presses from which an obstinately hard cork is rendered amenable to "persuasion" so as to enter a bottle neck of the narrowest dimensions. Photographers, however, are rarely possessed of this most useful instrument, and when they wish to modify the hardness of a cork will, perhaps, give it a few nips between their teeth—a useful plan, but much to be deprecated on account of the undesirability of the presence of moisture often thus imparted. The better method, in the absence of a cork-presser, is to wrap the cork in a few folds of paper and roll it lightly under the foot. It will then be found greatly improved in softness and elasticity. Sometimes immersing corks for a time in boiling water will also materially improve them when an inferior sample is employed, such as is frequently the case in the bottles of chemicals direct from the dealer; for the cork will be so hard as to cause it to break in extracting—an accident often followed by a large piece dropping or being pushed into the bottle.

In such a contingency it should be at once removed, both for the sake of appearance and the purity of the chemical itself. We do not know anything that looks worse on a chemical shelf than one or more bottles with corks lying at their bottom. The readiest way to remove corks so dropped or pushed into a bottle is one often adopted by the expert, namely, to double a piece of string, and, holding both ends in the fingers, introduce the loop thus formed into the bottle, and by a little manœuvring enfold the cork by the string and carefully draw it up to the neck, when a smart pull will bring it out of the bottle.

Many persons prefer glass stoppers for their bottles, and for corrosive liquids they are necessary if a prepared cork be not available; but the glass stopper as ordinarily met with is so badly fitted that it might be replaced with advantage by a suitably-prepared cork, which possesses the advantage of not becoming fastened in the neck in the manner that a glass stopper does too frequently.

To prepare a cork so as to render it suitable for securing very volatile liquids—such as ether, collodion, &c.—from evaporation, the following will be found an excellent plan. Take—

Gelatine or good glue	½ ounce.
Glycerine	6 drachms.
Water	1 pint.

Dissolve the gelatine in the usual manner, and add the glycerine. The solution should be heated to about 130° or 140° Fahr., and the corks placed in it and allowed to remain for several hours. They will then be so impregnated with the solution that, after taking them out and placing to dry in a place free from dust, they will, when carefully fitted to a bottle, act better than nineteen stoppers out of twenty in securing the contents from evaporation.

When the liquid to be secured is of an acid or corrosive nature it is evident that an ordinary cork, or one treated as above, would very rapidly disintegrate and become useless, and fall in small particles into the liquid. To prevent this occurring, however, another method of treatment is available. The corks, after being softened by the press or rolling under the foot as described, are immersed in a mixture of vaseline (a well-known petroleum preparation) and white, solid paraffine, in the proportion of about two parts of the latter and seven of the former, the whole kept for some time while the corks remain in it at a temperature of about 130° Fahr. Upon removal they should be gently wiped with a soft cloth, and when cold stored for use. Corks thus treated will, while they are kept cool, be entirely protected against the action of acid so long as it is at the ordinary temperature of the atmosphere.

We will conclude by drawing attention to the usefulness of corks for making a wash-bottle or a collodion pourer, the latter being most useful for the chromotype and other processes where a clean film of collodion is desirable. This little apparatus can be made by anyone, and the latter in particular will be found most useful. All that is required is to bend a piece of glass tube either into the shape of a syphon or merely curved at one end, and then to insert it, with also another slightly curved piece for a mouthpiece, into a cork previously pierced with holes carried through the ends. This piercing is done by cork-borers—brass tubes ground at one end so as to form a circular cutting edge. They can be purchased of all sizes from any dealer in chemical apparatus. To use them the cork is placed against a solid object—such as a wooden bench, &c.—and the "borer" applied with a gentle pressure while being continuously screwed round. The cork is soon pierced with a fine, round aperture, which closely clips any glass tube of the right diameter that is inserted in

it. Many most useful little pieces of apparatus can be put together by the aid of corks so bored; and we think a set of cork-borers might well find a place in the dark room of every professional and amateur photographer.

THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XXII.—Lens Grinding.

To effect the conversion of a piece of plain glass into a lens is a class of mechanical work demanding no special degree of skill, although care is necessitated. Where genius is required is in the determination of the curves to suit the special requirement and of the glass best adapted to the purpose. An able mathematician can, as the result of his calculations, send to the manager of a lens-grinding establishment a formula or specification for a lens as to which he can predicate before the work is commenced everything as regards its capabilities and performance. This, however, belongs to the "fine-art" department of the business and to the higher mathematics. We must here confine ourselves to the more material aspects of the construction of a lens.

The density of the glass determines the curvature requisite in making a lens of a definite focus; but the following rules and explanations will serve to afford an average or general idea of the relation between focus and curvature. On the supposition that we are dealing with crown glass: if a circle be made on a sheet of paper with any opening of the compasses—say three inches—and a portion of this circle be cut off by a straight line, such portion will represent a plano-convex lens of three inches radius, and its focus for parallel rays will (assuming the convex surface to be directed outwards) be nearly upon the line of the circle opposite to the lenticular slice. This is more tersely expressed in treatises on mathematical optics as follows:—

Rule for Finding the Principal Focus of a Plano-Convex Lens.—When the convex side is exposed to parallel rays the focal distance will be equal to twice the radius of its convex surface, diminished by two-thirds of the thickness of the lens.

Rule for Finding the Principal Focus of an Equally Double-Convex Lens.—The focal distance is equal to the radius. In the drawing which we have imagined above if, instead of the portion of the circle having been separated by a straight line, a curved line of the same radius as the circle had been employed, the lens formed would have come under this category, namely, equally double-convex, and its focus would have been approximately in the centre of the circle, or three inches.

Rule for Finding the Focus of a Double Convex Lens of Unequal Curvatures.—Multiply the radius of one surface by the radius of the other, and divide twice this product by the sum of the same radii. This last lens is usually designated a "crossed" lens.

In the case of a meniscus with parallel rays we must divide twice the product of the two radii by their difference, and the quotient will be the focal distance required.

These rules must not be considered absolute, for with every different sample of glass there may be a departure from them, and, in some cases—*e.g.*, dense flint—the departure will be very considerable; but with ordinary crown or plate glass they are, probably, as near as can be framed in popular language.

Having determined upon the diameter and curvature of the lens to be made, the first thing to do is to obtain grinding tools of the radius of curvature required. They consist of a pair—namely, a convex and a concave—and can be purchased of any radius from those who make a speciality of this department of business; but an amateur will, doubtless, prefer to make them for himself. To do this he must make two templates of thin sheet brass or zinc, by turning one piece to exactly three inches in diameter, assuming that a radius of three inches is to be employed; the other piece to have a hole of this diameter cut in it, and afterwards divided into two pieces. To make a concave grinding tool: provide a thick and substantial piece of brass or gun-metal in the form of a chuck, and with a suitable turning tool hollow out the end so as to fit the curvature of the round template. This may necessitate several trials if the amateur be inexperienced in the use of lathe tools. A second piece of brass is now turned in the same way, but so as to be the exact counterpart of the preceding; that is, its outer end must be rounded, and this curve must be gauged by the hollow template. Both tools having been finished by the lathe tool as well as possible, they are next ground one upon the other by friction, with the interposition of a little fine flour emery and water until they fit each other with great nicety.

The glass having been nibbled or "shanked" to a round form is cemented by pitch or sealing-wax to a suitable handle, and is rough ground, either on a grindstone or in an iron mould with coarse sand, until it is nearly the shape required. For small lenses this may be effected in the turning lathe with a sharp steel cutting tool, which must be kept constantly wet with spirit of turpentine, benzoline, or one or other of several liquids of a similar kind, which have been found to answer the purpose equally well. In either this or the rough-grinding method the template must be occasionally applied as a means of ascertaining progress. It being desirable to save the brass tools as much as possible, the more effectively the first grinding is done in the coarser tool the better will it be for the chances of the finishing tool preserving its form unimpaired for a long period.

Grinding proper is effected by means of emery, of which several grades are employed. In large cities opticians' emery is a commercial article. Those who prefer to make it for themselves may do so by taking a quantity of flour emery—say a pound—and placing it in a clean jar. To this add water and stir it about until it is all wet and of a pasty consistence. Now add water to fill up the jar, stir the whole contents well round, and, after waiting for a little till the heavier particles subside, pour off the water, in which is mixed up the lighter portions, into a second jar, which fill up with water and stir vigorously as before, pouring off the water, after five minutes, into a third jar. This is repeated, a longer time for settling in each case being given. The result of this washing process is that while in the first jar the deposit consists of the coarsest portions of the emery, the deposit becomes finer and finer as the washing is allowed to proceed, till at last the water holds in suspension only the very smallest atoms of the emery, which, when precipitated, forms the finest emery capable of being procured.

To smooth the roughly-ground surface of the lens the coarsest of these deposits of emery is first employed, mixed, of course, with water. When upon examination with a magnifier the surface is homogeneous, the grinding is repeated with a finer, succeeded by a still finer, grade of emery, until at last the convex surface of the glass is so fine as to present the appearance of being ready to burst into a black gloss. At this stage the operation with the emery terminates. It need scarcely be said that in the grinding with the various grades of emery careful washing must be resorted to between each, and that the grinding with any one class of emery must be continued until every mark made by its predecessor has been removed. Also, in course of the grinding it is well that the counterpart of the tool be applied, with a little emery and water, so as to ensure its being kept in shape.

To impart a final polish we have seen several methods adopted. One, and the most primitive, is to cement on the face of the grinding tool a piece of textile fabric of a fine nature from which the nap has been removed by a hot iron. Some employ woollen cloth, others fine linen. It is cemented on the face of the tool by pitch or other cement, the counter tool being employed to preserve the curve. Some fine lenses have been polished by the means just described. Rouge, a mixture of rouge and putty powder, or, not unfrequently, putty powder alone moistened with water, is employed to give the final polish. When the finest surface possible to be obtained is desired, instead of polishing upon cloth or linen the tool is faced with pitch. This is applied by warming the tool and then rubbing over it a piece of pitch, which melts and coats the surface in a uniform manner. It is spread more evenly by the application of the counterpart tool. A little rouge or putty powder is spread over the surface and moistened with water. On applying the surface of the lens to this with rapid friction it immediately receives a fine black polish.

The est way to make putty powder for this purpose is to dissolve tin in *aqua regia* and precipitate by diluted ammonia. Wash the peroxide in several changes of water, and, after drying, expose in a crucible to a low white heat, by which the particles acquire the property of polishing quicker and better. Owing to the white colour of the putty powder many prefer to mix with it a little rouge or crocus—not alone to modify its polishing properties, but also to enable it to be seen when on the cloth. The polishing powder must not be too wet, but sufficiently so to take a partially-glazed appearance from the action of polishing.

The edging of the lens is effected by cementing it upon a chuck, and while rotating in the lathe the reflection of the flame of a candle is observed. If it remain quite steady all is right; but, if not, it must be shifted slightly before the cement hardens until it do so. A piece of copper or brass well supplied with emery and water is then applied to the lower edge, an even pressure being given until the edge is smooth and the lens quite round.

When lenses are not large and are to be ground to shallow curves, a considerable number may be cemented on a block and operated upon simultaneously. In this way upwards of two dozen may be ground and polished in the same time that one would take. For grinding the commoner class of lenses, such as spectacle glasses, machinery is employed in connection with the block system.

THE PHOTOGRAPHIC EXHIBITION.

[First Notice.]

The annual Exhibition of the Photographic Society of Great Britain was inaugurated on Saturday evening last, the *soirée* being more than usually well attended. On Monday morning the doors were thrown open to the general public, and during the day there was a large and continuous influx of visitors present. In point of numbers this year's collection is the largest ever brought together by the Society; for, while the pictures catalogued pass previous totals by nearly a couple of hundred, a very large number had to be left unhung from sheer want of space. As regards quality the present Exhibition may also be spoken of favourably, the standard being decidedly higher than in previous years. The negative work is almost entirely upon gelatine plates; indeed, collodion appears, at last, to be practically entirely superseded.

A new feature in this year's programme is a weekly lantern exhibition every Monday evening during the time the collection is open to the public. The first of these was given on Monday evening last, when a considerable number of slides were shown in the limited time devoted to the lantern—from 9 to 10 p.m. Mr. J. Cadett took charge of the lantern.

The Judges had this year a difficult task in awarding the medals allotted to them; indeed, they were unable to confine their awards to the regulation twelve, but had to increase that number by three. The jury was composed of the President of the Society; three members of the Council—Captain Abney, Messrs. Francis Bedford and Leon Warnerke; and three members of the Society—Messrs. Fred Hollyer, Joseph Paget, and Robert Slingsby. As in former years, we shall devote our first notice to the prize pictures, after which we shall take the remaining exhibits in rotation.

First amongst the medallists we find the name of Mr. W. Mayland, whose frame of *Sea Studies* (No. 23) contains some remarkably good work. Two pictures of *Breaking Waves* are very fine, as are also *Gathering Clouds* and *Early Morning;* but perhaps the most effective is "*There is a Sorrow on the Sea: It cannot be Quiet*"—a splendid study of wave and foam, which, in the form of an enlargement, has brought a medal to the Autotype Company. The remaining pictures in this frame, though good, are not so striking.

Mr. H. P. Robinson is again well represented, the medal ticket having been attached to his picture, *A Nor' Easter* (No. 59)—a masterly composition, containing a single figure with accessories of boat, beach, sea, and sky. The lighting of this picture is particularly happy. *The Launch of a Deal Galley Punt* (No. 57), though rather tame in tone, is a clever specimen of instantaneous work. Some of the haymaking scenes are specially bright and well posed; but in *Carrying Hay* (No. 62) there is a stiffness in most of the figures of the girls in the foreground, who, as a matter of fact, are raking, or supposed to be so doing, where there is no hay.

Mr. Seymour Conway is again the recipient of a medal for a frame of very fine Swiss views. We regret that we cannot individualise the contents of the frame, as no titles nor even distinguishing numbers are attached to the pictures. We can only say that we have seldom seen the foregrounds and distances of Swiss scenery rendered so perfectly in harmony as they are in these productions.

Mr. Herbert B. Berkeley exhibits a number of pictures printed in platinotype, the best of which is unmistakably *Noontide* (No. 132), to which a medal has been awarded. This is one of the most pleasing pictures in the Exhibition—simple in its details, but perfect in composition—a few cows enjoying the grateful coolness of a shallow stream, overshadowed by trees, during the noontide heat, while in the distance is a glimse of the village church. It is altogether a very fine composition, the heaviness of the shadows in the centre portion of the picture being its only defect, if even that may be charged against it.

Mr. W. F. Donkin has secured a medal for his wonderful Alpine views. These are pretty well known to the majority of our readers who have visited former exhibitions. This year, however, Mr. Donkin has surpassed himself; for, while the quality of his pictures is, if anything, higher, the altitude at which they were taken has been still higher, and the labour, the skill, and the judgment involved in their production necessarily also higher.

Messrs. West and Sons have undoubtedly scored a success in their studies of *Yachts* (No. 223), the centre piece of the frame being, perhaps, *the* picture of the Exhibition. Two other pictures in the lower corners of the frame are also good; but the remainder rather detract from the general excellence of the exhibits.

The Autotype Company's work in the way of enlargements is so well known that we need scarcely make much allusion to it in connection with the medal award, which, as we have said above, is given to an enlargement of one of Mr. Mayland's sea studies. We shall probably have to speak of other of the Company's productions in a later notice.

Mr. Adam Diston receives a medal for his little study entitled *Industry* (No. 291), which is, however, inferior to his last year's picture, *Gloamin'*. The lighting of *The Poor of the Village* (No. 292) is, we think, scarcely up to his usual careful mark.

Mr. T. G. Whaite has several frames (Nos. 316-19) of street views of the same character as those exhibited by him on one or two previous occasions. It is scarcely possible to judge between so many, but we are inclined to think his pictures in the quaint streets of *Quimper* are amongst the best. Some studies of Breton character are also good.

Of the exhibits of Mr. J. Bullock, of Leamington, the best are a couple of enlargements on gelatino-bromide paper (Nos. 314 and 335), to the latter of which the medal label is attached, though we cannot avoid expressing the opinion that the former, *Mischief*, should have had it. These are both very attractive pictures, and at a short distance have all the appearance of line engravings.

Mr. W. Cobb has been awarded a medal for his clever studies of London street life, the pictures having been taken from the top of an omnibus. As they are of whole-plate size the difficulties involved may be imagined.

A medal has also been awarded to M. A. Lugardon, of Geneva, for a very surprising collection of instantaneous pictures of circus horses in the act of leaping. These, while the exposure has evidently been of the very shortest, show every detail, the negatives being apparently well exposed.

Mr. A. Common receives a well-deserved medal for his splendid photograph of the *Great Nebula in Orion* (No. 472)—a picture which has created a vast sensation already in astronomical circles.

In the department of processes medals have been awarded to Mr. W. B. Woodbury for his stannotype process, and to Messrs. T. and R. Annan for specimens of photo-engraving by Klic's process. These exhibits are of a technical character, and their excellence can only be understood by personal inspection.

We shall resume our notice of the general exhibits next week.

We had intended to commence this week our illustrations of leading pictures in the Exhibition; but circumstances have prevented our

artist preparing in time the sketches for the foregoing notice. We hope to commence the illustrations in our next number.

In accordance with our promise of last week we are able to give to our readers a most interesting account from Stonyhurst Observatory of the valuable astronomical instruments at the command of the reverend fathers, and of the photographic processes employed there. We are indebted to the kindness of the Rev. S. J. Perry, F.R.S., for a very complete, succinct, and practical paper, which will be found in another column.

Last week we made a note of some investigations on cyanide of silver made at King's College, and another branch of the subject has been continued by the same writer in the last issue of our contemporary, the *Chemical News.* The subject is interesting on account of its connection with mercuric intensifying processes—*A Reaction between Silver Cyanide and Silver Nitrate in the Presence of Ammonia*—but is too technical to extract. We more particularly call attention to it on account of a paragraph which would mislead many readers. The writer states that "ammonia does not precipitate a solution of mercuric cyanide or silver nitrate when separate." Now, as a matter of fact, ammonia will, as our readers well know, precipitate silver largely from a solution of its nitrate, though it does not throw down the whole of it.

At a meeting of the French Society for the Encouragement of National Industry, held a short time ago, some most interesting experiments were made upon the incombustible paper and colours made by M. G. Meyer. An interesting application of the materials might be made for photographic purposes, and we are told that both paper and colours are little more costly than the materials usually employed; so that important documents, scenery, wall papers, &c., might be made so as to resist the heat of melting glass, yet almost as cheaply as the articles now employed. We should imagine that autotype prints in infusible pigments might be effectively produced in the paper as a support, while, if desired, there possibly might be produced pigments sufficiently finely ground to serve for colouring these pictures. We should then have imperishable pictures without the expense and risks attendant upon the production of enamels.

Referring to the presence of iron in hydrochloric acid, as stated in a letter quoted by us not long since, another gentleman writes to say that he has had a similar experience. A sample of coloured acid examined by him owed its colour not to organic matter, but to iron, which was found in very large quantities. Though it is not likely that every person would use a coloured sample of hydrochloric acid for delicate work—either for platinotype printing, chloride of gold making, or so forth—it is well to draw attention to the probability of the presence of this impurity in such samples.

Mr. Browning, who is discoursing about tricycles in *Knowledge,* last week gave some hints to the photographer. In recommending tricycles with low wheels and a two-speed gearing, he says:—"A rider who carries a set of photographic apparatus of the largest size, to take pictures 12 × 10 inches, which will weigh from thirty to forty pounds, will use his power gearing only, and will ride with the same ease with a reduction in his speed."

The well-known chemist, M. Lecoq de Boisbandrau, has made known a very simple and ingenious method of filtering liquids containing very finely-divided precipitates, which, as most experimentalists desired, will often pass through the closest-grained filter-paper. For instance: in preparing a silver bath by saturating a strong solution of silver with iodide, and then diluting, the opalescent appearance produced by the fineness of the precipitate cannot be got rid of by one passage through a single filter; two filtrations through two folds of filter-paper usually being necessary to obtain absolute brightness in the filtrate. By the means designed by the chemist we have named this will be obviated. He boils a number of pieces of ordinary filter-paper in *aqua regia* till a thick fluid is formed. This is next poured into a large quantity of water, and the precipitate well washed by decantation or otherwise. A portion of the flocculent mass is mixed up with water and poured into a filter. After the latter has drained it will have become compact in texture, and its pores filled up by the precipitate to such an extent as to permit its thoroughly filtering out the finest precipitates. In place of preparing the filter in this manner some of the prepared paper may be stirred up into the fluid to be filtered, when it gradually fills up the interstices and pores as the filtration proceeds. We should imagine it would be necessary to pass the first portion of the filtrate through the filter again.

Dr. Paul Gassfeldt has been endeavouring to ascend the highest peak of the Chili Cordilleras, but, owing to the extreme cold, has not been able to complete his task. He has, however, we learn, succeeded in obtaining some excellent photographs of a remarkable region. We hope some of these may find a place on the walls of Pall Mall at another exhibition—difficult photographic feats on the mountains, as our readers may have noticed, being among the successful exhibits of the present collection.

THE OBSERVATORY AT STONYHURST COLLEGE.

The fact that strikes a visitor to Stonyhurst Observatory more strongly than any other is the completeness of its equipment as a physical observatory. The telescopes are not of such colossal dimensions as in some other English observatories, and an experienced observer will doubtless notice improvements that it might be well to introduce; but the three great branches of research—astronomy, meteorology, and terrestrial magnetism—so intimately connected in many ways, are all excellently provided for on the same spot, which is of great advantage in the comparison of results.

The meteorological equipment is the same as that at the six other principal observatories of the Board of Trade, consisting of a photographic self-recording barograph and thermograph, an anemometer and rain-gauge continuously registering by pencil, and a sunshine recorder, which chars a paper on which a time scale is marked. Some of the meteorological instruments, registered for many years at Stonyhurst previous to the establishment of the Board of Trade observatories, have continued, and still continue, in constant use in their original positions, in order that one series of observations may be checked, if necessary, by the other.

The magnetic department is also most complete, and consists of two sets of instruments. The one used for the absolute determination of the elements of the earth's magnetism is kept in a small wooden hut, from which all iron has been most carefully excluded. This hut is situated in a retired part of the garden, which is shaded by overhanging trees in summer, but to which the low sun of winter finds ready access, thus preventing, as far as possible, all extremes of temperature. The other set of magnetic instruments is photographic, and is placed in the underground chamber built expressly for the purpose. Adjoining the magnetic chamber is a second room devoted to photography, where the sensitised papers are prepared and developed. The magnetograph consists of three instruments, which record continuously by aid of gas all the changes in the direction of the compass, and also the variations of the two components of the magnetic intensity of the earth. The magnetic storms recorded in 1869 and in 1882 by these instruments afford ample proof of the extremely rapid movements that this photographic trace is capable of recording. The room in which the movements of the magnets are continuously registered has been built with the greatest care, and is eminently successful, as it is always perfectly dry and keeps the daily range of temperature as low as 0·2° Fahr. The inner wall has openings all round, one foot apart from each other, through which the air can pass to a chamber in communication with the outer atmosphere. Both sides of the air-chamber are enclosed by brick walls, and the whole is surrounded by two walls of stone—the outer one without cement. The floor is well drained and the roof arched, and the whole forms as compact and satisfactory a subterranean magnetic room as it seems possible to build.

The astronomical branch of the observatory is almost entirely separated from the meteorology and magnetism, the only astronomical instruments in the central building being a meridian circle

and a standard sidereal clock; but the two observatory buildings are connected by an underground telegraph for sending time signals. The astronomical observatory consists of a central dome, in which stands an eight-inch achromatic of Troughton and Simms, mounted equatorially by Napier and Carey, and of two small chambers on either side—one supplied with a transit instrument and a sidereal clock, and the other serving as a library and spectroscopic studio. The chief work in this department is spectroscopic, and the three instruments in constant use are—an automatic solar spectroscope, by Browning; a star spectroscope, by Hilger; and an instrument whose fittings are by Simms, with four compound prisms by Hoffmann. With the Browning spectroscope a complete survey of the chromosphere is made on every fine day, and spot spectra have been occasionally studied. The star spectroscope was only received from the maker this year, and as it is supplied with six sets of prisms, some of which are of very small dispersive power, it is proposed to devote it to the examination of the spectra of telescopic comets and other minute objects. It has a double set of objectives for the collimator and viewing telescope—one of quartz and the other of glass—and it possesses many excellent appliances for finding any minute object and for recording its spectrum; but the work proposed is very delicate, and will demand a considerable amount of time and patient labour before very satisfactory results can be expected. The Simms-Hoffmann spectroscope, which is not well adapted for original research, except within very narrow limits, has been placed in the hands of those students who wished to become practically familiar with spectrum analysis. Browning's automatic instrument is supplied with a photographic camera, but no photographs of the chromosphere or of spot spectra have as yet been attempted.

Besides serving for the daily examination of the chromosphere the large telescope is used for drawing sun pictures on every available day; and the long series of drawings, giving the successive changes of both spots and faculæ, will, it is hoped, afford a fruitful harvest when they have been submitted to a careful scrutiny. A useful set of solar photographs were also obtained during a partial eclipse, but the object-glass is not well adapted for delicate photographic work. At night the practice with the star-spectroscope has been supplemented by observations of occultations of stars by the moon, by a long series of observations of the phenomena of Jupiter's satellites, and by other work which is necessarily of an intermittent character. For the use of students two telescopes are mounted in the grounds—one a four-inch achromatic, by Jones, on an equatorial stand; and the other a nine-inch Cassegrain reflector, mounted as an altazimuth. These are occasionally used by the assistants when the large equatorial is already in use.

The photographic process employed at Stonyhurst for recording the continual changes of the barometer, thermometer, and magnets is that well known as the waxed-paper process; but some slight changes have been introduced which have tended to secure more satisfactory results. In sensitising and developing the papers are not floated but immersed, as this method is found to be more secure and simple, though somewhat more expensive. It may, perhaps, be of service to others if the whole process as at present actually in use, and giving excellent results, be briefly described.

Each sheet of the waxed paper is first examined by transmitted light, and, if there are any shining patches on the surface, the sheet is rejected. The satisfactory papers are then immersed in an iodising bath, the proportions of whose constituents are 582·5 grains of iodide of potassium to 417·5 grains of bromide of potassium, and forty ounces of distilled water and sufficient free iodine is added before each new batch of papers is immersed, so as to give the solution a decided red tinge. This bath contains 160 ounces. Each sheet is turned over and rubbed down with a glass triangle, in order to remove all possible air-bubbles before inserting another sheet. About twenty sheets can be conveniently iodised at the same time, and whilst they remain in the bath they are each turned over separately half-a-dozen times, so that they may become perfectly saturated, and any adhering of one to another may be effectually prevented. Spots not detected at first sometimes appear in the iodised papers, and these are also rejected. Iodised papers will keep perfectly for more than a year.

The sensitising bath consists of forty grains of nitrate of silver to each ounce of distilled water. The whole bath contains fifty ounces of solution, including three drachms of glacial acetic acid, and is strengthened, after each batch of six sheets has been immersed, from a stock solution of 100 grains of silver nitrate to the ounce of distilled water. The immersed sheet of iodised paper is turned over several times in the dish, and then transferred successively to two dishes of distilled water, in each of which it is turned again with the same care, so as to ensure a thorough removal of all superfluous nitrate of silver. The sensitised papers are dried by being left suspended in a large box.

The developing solution contains forty ounces of the water used in washing the sensitised papers, with four ounces of saturated aqueous solution of gallic acid, four drachms of silver nitrate, twenty grains to the ounce of water, and four drachms of acetic acid. The washing water is warmed before mixing by immersing the jug containing it in boiling water. The paper to be developed is immersed as before, and is constantly turned over as the photographic trace appears. Twenty minutes generally suffice for developing when the light has acted evenly upon the paper. A better-defined edge is secured for the curve, traced by the point of light, by aid of an intensifier consisting of four drachms of a saturated solution of gallic acid in methylated alcohol, two drachms of silver nitrate, two drachms of citric acid, and one drachm of acetic acid; but these quantities are varied with the nature of the curve.

The paper is then sponged with water on a flat glass, and fixed in a saturated solution of hyposulphite of soda. On leaving the fixing bath it is again washed, and then placed in the toning bath of forty ounces of saturated hyposulphite of soda to sixteen grains of gold chloride. Before removal from this last bath the curve should be of a bluish-black tint on a white ground. The paper is then once more washed with a sponge, and left to soak for twelve hours in a washing trough, in which the water is changed every minute by means of a self-acting arrangement kept in motion by a constant stream of water. The curves generally turn out very satisfactory when this process is strictly adhered to; and it may be doubted whether a more sensitive process would be preferable for this kind of work, as a little stray light, acting on paper exposed for two or three days on the cylinders of the instruments, might then mar the result in spite of the greatest care of the operator.

S. J. Perry, S.J., F.R.S.

PHOTOGRAPHY AND STILL LIFE.

I have been assured, by a gentleman to whose opinion all dabblers in science photography must bow, that the following method of photographing objects of still life was unknown to him, and that its publication might prove useful to others.

Having some years ago to photograph a series of implements to illustrate a paper on the Borness Cave, I was met at the outset by the difficulty of avoiding cast shadows and such accessories as were needful for posing the objects to be copied. It occurred to me that a pane of glass, a white cloth, and some bees'-wax would meet the difficulty—as objects fixed to the glass by bees'-wax with a white cloth behind them would "come out" on a white ground free from the shadows and accessories I wished to avoid.

Having been recently asked to photograph some important bones, teeth, and flint implements, "necessity, the mother of invention," has much improved on the original rough process, and I can confidently recommend the following cheap apparatus as extremely efficient, namely, a *square* pane of plate glass with a hole drilled in the centre (for fastening such objects as may be too heavy for the bees'-wax), the pane to slide between two grooves into any convenient movable stand. The advantage of this form and arrangement is obvious, as, after the object or objects are fixed to the glass, they can be inverted or placed sideways, as may best suit the light, without moving the camera. Moreover, the stand can be tilted or set obliquely at the operator's pleasure, the object being thus adjusted to the camera instead of the camera to the object. The backgrounds can, of course, be changed at will to any shade between black and white—a most important power, as a background that will set off one object will often be unsuitable to another.

—*Nature*. Arthur R. Hunt.

PHOTOGRAPHY ON WHEELS.

No doubt the readers of the Journal will think this article a little "behind the fair," as we are now beginning to think of packing up our traps for the winter, the short days and long nights warning us that photography must soon be a thing of the past so far as 1883 is concerned. But then we have 1884 to think of and provide for. Besides, in these days of gelatine plates, cold weather does not affect us much, and many a charming scene is to be secured in the winter.

Which of us living in the country, waking up some cold wintry morning, looking out of window and seeing the lovely tracery of hoar-frost on the trees, does not sigh for an opportunity of running a little way out into some sheltered lane or clump of trees, and trying to snatch a picture of the beautiful lacework hanging from the branches? But, then, oh bother! though my camera and slides are ready, they

are so heavy how am I to take them there? I have no trap. True, I might use the wheelbarrow or even the perambulator; but, then, oh, shades of mine uncle! what would neighbour So-and-so say if he saw me? So my readers will see that I am not quite out of season even now in suggesting a ready means of getting our apparatus to the spot, so that a picture may be secured of some of these charming bits of nature's handiwork.

Now to my text—that is, a practical way of carrying camera, &c., to "fresh fields and pastures new." I think our new friend the tricycle comes readily to our aid; so, presuming we have our camera-backs, lenses, and tripods ready (and these together weigh say twenty-five or thirty lbs.), our friend the tricycle will carry them, and, if we choose the right machine, carry them easily. But, then, which *is* the right machine? Ah! "there's the rub," and a problem I cannot say I have solved, but will give you my experience.

For a long time I had been looking out for a good luggage-carrying tricycle, and at last seeing two rather strong-minded young ladies in my neighbourhood (near Epping Forest) often pass my door on their way to London on what, to me, seemed a good, sound, useful tricycle, and frequently with a moderate-sized portmanteau strapped at their backs—on the tricycle, of course—now, thought I, Eureka! I have found it. So I was rude enough one day to stop these young ladies and ask them a few questions, which they readily answered, and a day or two afterwards called upon me and placed in my hands *The Tricyclists' Indispensable Annual.* This annual has a full description and illustrations of nearly every machine made (between two and three hundred). This I carefully perused, and came to the conclusion that these young ladies had found out the machine that would answer my purpose, namely, to carry myself and apparatus across country, and render me independent of railways and fly-masters.

So I purchased a Coventry convertible tricycle, and find it a most handy, safe, and useful machine. It will carry me and my apparatus, either as a single machine, or should I wish for a companion or assistant, I can, in one minute, convert it into a double machine. This is done by attaching what may really be called a second machine by means of a pin and two nuts. Thus I can have an assistant, or, should I prefer it, the companionship of "a sister, cousin, or aunt," so making my run one of pleasure as well as of business.

The machine is twenty-nine inches wide as a single, or "Coventry Rotary" as it is then called, and fifty-nine inches as a double, or "Sociable." The driving wheels are forty-eight inches high, and one of its best qualities, so far as we are concerned, is that it has two steering wheels—one back and one front—thus rendering it safe so far as "croppers" or "back throws" are concerned.

And now as to its luggage-carrying qualities. It has a long steel tube to which these two steering wheels are attached, and a "stay" runs from the axle to the hind wheel, thus giving a good platform to carry anything on. A light basket lined with a waterproof material, made to hold the apparatus, and strapped to the back of the seat and resting on this platform, is all that is necessary. I may add that it has very powerful brakes to both wheels, so that it is a safe hill-climber, and, when in proper going order, a fast machine, an average of eight miles an hour being easily got out of it. I have no doubt there are many machines as good, or better; but I have not been able to find one so well adapted to our purpose as this.

In recommending a tricycle, I do so as not only can it be used for business purposes but also for pleasure. It is easily learned, and after a little practice thirty or forty miles a-day can be easily run, and that with less fatigue than a walk of eight or ten miles would entail. I often run ten or fifteen miles of an evening, and our roads are anything but level; and, though expensive (about half the cost of a neat little horse and trap), it does not require a stable, being easily stowed away. If not used it does not cost anything to keep, while after a run there is no horse to groom, feed, and bed.

C. G. CUTCHEY.

PHOTOGRAPHIC MATTERS CONNECTED WITH AMERICA.

[A communication to the South London Photographic Society.

QUESTIONING the wisdom of my having complied with the persistent request, made on the occasion of the pleasant dinner of the Society at their recent outdoor meeting at Hampstead Heath, that I should open the sessional proceedings by discoursing concerning American photography, I yet do not shrink from the task, knowing, as I do, the widespread interest that exists in all things connected with the great western continent. For the more facile treatment of my subject it will be better that I assume myself to be an American citizen, although four months have yet to elapse ere this event can be completed.

Let me at once disarm you of any prejudices of an international nature which may exist, by stating that we in America freely, cordially, and unhesitatingly give you full credit for the skilful, scientific research you have brought to bear upon photography. Life there exists under too high a degree of pressure to permit of any professional photographer cultivating research, and amateurs are only now being created. In the course of a few years you will reap the benefits arising from what is now being sown; for it is a peculiarity of the American mind that if it be sometimes a little tardy in initiating novelties it is quite at home in rapidly effecting improvement when once the discovery or invention has been initiated.

Americans—and among them American photographers—are sometimes twitted with entertaining large ideas in connection with their country and its institutions; but when one realises the immensity of the country a little "tall talk," or "spread-eagleism," is scarcely to be wondered at. Everything there is on a large scale. It is a country divided into or composed of many states, and among these states are some as large as three or four European kingdoms. You will see the bearing of these remarks on photography before I conclude.

It is recorded that when Dr. Beckenridge, an American clergyman, was travelling in England some years ago, he was asked by a stage-coach companion—"Pray, sir, have you any river in America equal to the Thames?" He replied—"Why, sir, I reside, when at home, on the banks of a river formed by the confluence of two rivers which, coming from opposite directions, unite after flowing each of them *four hundred miles.* The united stream then rolls on *one thousand miles,* with mighty cities on its shores, when it meets a river which has come from another direction *three thousand miles* to meet it, and these, flowing on together, soon take in another which has come *two thousand miles* from another direction, and these five rivers make the Mississippi, which now rolls about *fifteen hundred miles* farther on and there disembogues itself by thirty mouths into the sea." Those who know the Alleghany, Monongahela, Ohio, and Missouri rivers can realise the accuracy of these figures.

This vastness, whether of territory, mountains, rivers, cities, and even wars, produce their effect upon the American mind, and cause them insensibly to entertain colossal ideas. Is it any wonder, therefore, that in photography mere dimension is an element prevailing to an extent altogether unknown in England? Those of you who have visited the International Fisheries Exhibition now open and have examined the American Courts can see the accuracy of this in the innumerable gigantic photographs by which the walls and screens of those courts are adorned. Five years ago, when I went to the United States, I was subjected to some quiet badinage by photographic friends in New York in consequence of 12 × 10 *enlargements* having been a term made use of in a certain business relationship, while at that time New York photographers—even those far removed from the highest ranks in the profession—were taking *direct* portraits 24 × 20 as a matter of daily routine. Owing to my now being placed in a position affording greater facilities for being apprised of the operations of the profession, I can say from personal knowledge that cameras for producing direct portraits and groups on plates 34 × 30 are in use in the States. I do not know whether there are at present any 12 × 10 enlargements made in America, but the head of a firm who does a large business on the club system in collodion transfers, and whose managing artist acquired a technical knowledge of transfer painting in England, told me last April that they had had to raise the standard of their sizes, and that a 12 × 10 transfer was now never made unless to special order. Any of you who think of going to America to work photography on the club system will do well to realise this—that this system is developed to a far higher pitch there than here, seeing it pervades every department of commerce, including watches, jewellery, household furniture, and even houses; that the collodion transfer system of producing enlargements first introduced by M. Moitessier, and afterwards systematised and perfected by Messrs. J. R. Johnson, Ernest Edwards, and others, is intimately known in its capabilities and manipulations by American photographers. The upper stratum of the photographic profession do not employ the collodion transfer process.

The enlarged work of New York photographers is, in a great degree, produced upon a solar camera basis, and is usually elaborately finished in crayons. I am quite aware of an objection you may here take by saying that solar camera work will fade, and I remark thereon that American artists are just as wide awake in a matter of this kind as you are. If the solar work be in silver the artist uses it as a base of operations only, and if in after years the photographic portion fade away altogether the crayon work remains unchanged. But when the work is executed in platinum the crayon artist modifies his operations accordingly, knowing full well that the base upon which he works is as endurable as the crayon itself. The highest class of crayon work issued by the chief photographers is not, however, done on a photographic basis at all, or, if so, only to an extremely limited extent, much of this higher work being done by *free hand.* It is quite surprising in how perfect a manner a freehand-crayon picture can be produced, having all the likeness and character of the photograph from which it is reproduced, yet free from such excrescences as are often unavoidable in camera work. Bear this in mind: that there is plenty of money in New York, and mediocre work will not go down with the middle and upper classes there. Those who imagine New York to be merely a commercial city of people who have no thought save that of acquiring wealth make a grand mistake. There is as much artistic and literary refinement and culture there as are to be met with in any city in the globe, and, in some senses, more so.

I may here observe that Germany and France, in a much greater degree than Great Britain, provide artists for America. I speak now

from the photographic point of view. This suggests the idea of the fact that many principals, as well as the *employés*, in the photographic business are Germans. A glance over the list of names of those who form large societies, such as the Photographers' Association of America, will show the prevalence of names which will immediately be recognised as German or Dutch. Other nationalities, too, are represented, but in my estimation Germany in a greater degree than others. I have almost invariably found these to be intelligent men of advanced ideas. In New York there has long been a German Photographic Association, at which the proceedings are conducted in the language of the Fatherland; and another society there—that of the Operative Photographers of New York, and of which I have the privilege of being an honorary member—is in a large measure composed of Germans, several of whom possess great talents as operators, retouchers, artists, and chemists.

I have spoken of solar enlargements. This branch is practised extensively in America; for, unlike England, the sun shines there. Any American who has resided for a short time in England, especially during the past season, can readily sympathise with the Persian who, when on the occasion of visiting London, was taunted by an English friend with being a worshipper of the sun, replied—"Ah! but you people in England can form no idea at all of what a glorious object the sun really is." Since I arrived here I have devised a simple and efficient heliostat capable of being employed, *inter alia*, in solar camera work, and I have been long waiting for a chance on which to have it tried. Far be it from me to aver that the sun never shines here in an unclouded state; but I stand on solid ground in saying that he does so in a singularly reluctant and diffident manner.

What I have said about enlargements applies only to portraiture. If I am asked as to the state of enlarged landscapes: when I view this branch under the light of the magnificent works of this class which for several years past have emanated from the Autotype Company's works, I unhesitatingly answer—"We are nowhere." It will be a good day for American photography when some one is enterprising enough to start a carbon enlarging business in the United States on the Autotype lines.

The climate in America is dry, even if the temperature be extreme, which may, in some degree, account for my having been enabled to hint, as I did in my recent annual *Report on Progress* to the Convention of American Photographers at Milwaukie, that in the permanence of silver prints America possessed some slight advantage over England; for here the moisture of the air is naturally conducive to fading—the fading of *silver* prints, be it well understood—for with an experience of carbon prints dating from 1864 I have not found one in my collection to have faded.

But if the climate in America conduce to the permanence of silver prints, it is terrible upon some of those colours that, five years ago, were employed in such works as collodion transfers. Several of the transparent oil pigments—even those of the finest English manufacture—with which these photographs were washed were found to succumb to a New York sun in a few hours comparatively, necessitating the recognition of body colours (for face work, at anyrate) to an extent not found to have been at all necessary for England. The American system of transfer painting consists, in contradistinction to the English system, in using body colours on the face, hair, and background, instead of the English transparent glazing with only a touch of body colour for subsequently strengthening the shadows or touching up the eyes. The former indubitably costs more and demands a higher degree of skill from the painter; but it is the only system by which satisfaction can be guaranteed. Much of the transfer work which I have seen in England during the past few weeks would be at once rejected by the New York citizen. An English transfer painter, who had arrived in New York made for me a series of strips, three inches long, on a sheet of mounting-board from each of the pigments employed by him in his vocation, and upon one half of this being covered up with an opaque card, and the whole then exposed to sunshine for fifty hours, several of the most important and beautiful of the face colours were found to have suffered greatly—their record including "half gone," "much faded," "nearly gone," and in a face colour composed of more than one material the artist reported "lake quite gone." I mention this to indicate points of difference between the English and American climate.

Very highly is it to the credit of English camera-makers that their work is found to resist successfully the terribly dry climate of America. I shall not here institute any comparison between either the construction or finish of the cameras of the Old and New Worlds, but may say that, granting the exquisite beauty and finish of a first-class English camera, there are still certain features about the (perhaps) more utilitarian, if less elegant, American cameras which are worthy of attention. Among these I may mention the cut-off or light trap in the dark shutter. This is not English, but essentially American. Among English inventions which have taken firm root in America is the Archimedian camera-stand of Mr. Jabez Hughes, and it would gratify that gentleman if he could see the innumerable changes that have been rung upon his invention with a view to cheapen and simplify its construction. On those of the best class, however, no departure appears to have been made.

Some of the studios in America are fitted up in a gorgeous manner. Of those in the leading cities that I have seen, and which do not include San Francisco, or Chicago, or St. Louis, the most sumptuous is that of Walzl, of Baltimore. [A very lengthy extract from the N. Y. *Photographic Times* was here read by Mr. Taylor.]

Carbon printing is but little practised in the States, for what reason I cannot well say. No work on the process has been published there except the *American Carbon Manual*, which is a reprint of Mr. G. Wharton Simpson's work *On the Production of Photographs in Pigments*, published here in 1867, but to which is attached the name of another as author—a proceeding which you will recollect occasioned much surprise here. As the system of carbon printing was revolutionised very soon afterwards, the work became *passé*. The process was then allowed to lie dormant (I refer to America) until the famous process vendor, Sarony-Lambert, in company with the clever French artist, Claude Leon Lambert, reinstated it, after subjecting it to certain improvements, under the name of "Lambertype." There are not many by whom the carbon Lambertype is practised throughout America, but I can assert that some of the work produced there—in Minnesota, California, Boston (Mass.), and even so far south as Atalanta (Georgia)—is not in the slightest degree inferior to the very finest work of the best class that has been produced in England, even in the palmiest days of this process. My information is short on the subject as to whether the non-popularity of the carbon process in America arises from its being in any way hampered with patents, or whether photographers are not greatly concerned whether their work is permanent or not.

Mechanical printing processes—especially those of the collotypic order—are worked in America in a state of great perfection. As Lambert and his *confrères* managed to secure all the patents that are in force for America and sold the licenses for territories the process is somewhat limited as regards extent of practice. I may say, however, that the work generally is of a high class. From such specimens as I now submit for exhibition it will be for you to say whether America or Europe excels in this class of work.

The Woodbury process has been somewhat unfortunate in America. Some good work was done by Mr. John Carbutt whilst it remained in his hands; but for some reason he parted with his interest in it, and nothing appears since to have been made of it. The experience—of both a business and technical experience—Mr. Woodbury has had in America will be useful to him in effecting the proper introduction of his new stannotype process there.

The name of Mr. John Carbutt suggests to me the subject of transparencies. I observed in one of the journals lately an allusion to certain transparencies of Egyptian scenes, recently taken by an American, not being quite up to the English standard of excellence. This prompted me to call and examine them. Admitting that they are not quite up to the mark, I have to say, in vindication of American abilities in this department, that there are in the United States many who, when the negatives are of a good and suitable quality, are able to produce transparencies of the greatest excellence. Practical knowledge and experience of a special nature are required for work of this kind, from the manipulating of the negative to the finishing of the transparency. In March last I was present in Carbutt's factory, when he produced in my presence some transparencies of singular beauty. I have in my possession high-class lantern transparencies by several other American photographers, so that I cannot allow an idea, if such really exist, of America being in the slightest degree behind, merely on account of a few American pictures of a slight remove from the best quality having found their way over here.

Gelatine is in some measure superseding collodion for gallery work. The question will naturally arise—"Of what quality are the plates of American manufacture?" I have tried many of them side by side with those of English make, and I fail to discover any special difference between the several nationalities, either as regards quality or rapidity. Owing to the higher price of glass in the States the plates are sold at a slightly-higher price there than here; but it will not pay to send them from here to America, owing to the duties and expenses. I say this from being conversant with trade prices in both countries.

This Society occupies a high position in all matters which concern the lantern, both in its construction and its application to the projection of photographs in lectures or other entertainments. This is one department, especially in its commercial application, in which you are far ahead of us; and I may inform the more enterprising among you that there are fortunes to be made in America by pushing this, as yet, scarcely-known branch of business there.

I conclude these discursive remarks by saying that I am conscious of having left many matters of interest not even alluded to; but I place myself at your disposal to answer, to the best of my ability, such questions concerning American photography as it may please you to propound. J. Traill Taylor.

OPINIONS OF THE LONDON DAILY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

The Photographic Society.—The annual exhibition of the Photographic Society opens this morning in the rooms of the Royal Water-Colour Society in Pall Mall. The walls which we are accustomed to see glowing with

colour and covered with the minute and delicate handiwork of some of our best English painters are now given up to a different class of art, in which colour has no place, and which depends for its success partly, indeed, upon individual skill, but mainly upon the perfection of a mechanical process. Yet this mechanical process has displayed and is displaying such immense improvement; its results are approximating so nearly to the delicacy of Nature herself that it is every year exercising a more powerful fascination for persons themselves endowed with artistic sensibility, so that the finest photographic work is more and more coming within the sphere of fine art, properly so called, and is steadily becoming more worthy of serious criticism. It is but some thirty years since photography began to be at all generally practised, and already its manner of action has been more than once revolutionised. There is little relation between the rapid and certain manipulation of a finished photographer of today and the rude and experimental methods of his predecessor less than a generation ago. Such work as that exhibited in these rooms is so far ahead of the work which we can all remember that it seems scarcely right to call it by the same name. It is hardly necessary to dwell on the influence that this improvement in photographic processes has already exercised, and will continue to exercise, on art in general. Already there are few departments of the art of book illustration which photography has not invaded. The exquisite woodcuts which the Americans have taught us all to admire are largely photographic in their method, and, as all collectors of ancient prints are aware, some of the processes—like that called "heliogravure," by MM. Amand-Durand—are capable of reproducing the original so exactly that it requires a first-rate judge to know the difference between the print and the copy. Nor are our painters at all too proud to avail themselves of the help which photography gives them. Some of the most famous portrait painters habitually spare their sitters trouble, and secure a model which will not suffer from fatigue, by having the hands and the drapery photographed, and working in the details from these faithful copies. Nor can the landscape painter be blamed if he occasionally seizes a fleeting moment of cloud effect, or of light upon his trees, and perpetuates it by photography, so that he may refresh his memory at his leisure, and finish in the studio what he began in the field.

The Exhibition, however, contains quite enough to satisfy the visitor who goes there to enjoy the pictures themselves without any thought of their subordinate uses. It is strong in landscape, and still more so, perhaps, in views of the sea, some of the latter being really astonishing for their fidelity and beauty. No. 15, a group of Norfolk coast and sea views, by Mr. Selwyn Edwards, is excellent; and still more so is the neighbouring group (No. 23) by Mr. W. Mayland, to whom the judges have very properly assigned a medal; while Mr. Matthew Whiting's Dover scenes (No. 92), a very brilliant group of yachts by Messrs. G. West and Sons (No. 223), and some of those exhibited by Messrs. Perkins and Son (No. 415) are charming. One of the most elaborate of these seapieces is *A Nor'-Easter* (No. 59), by Mr. H. P. Robinson, a member of the Council of the Society, and a highly-skilled photographer. This artist's work, however, of which there are numerous examples, all technically very brilliant, seems to reveal the limitations as well as the possibilities of the art of photography, pictorially considered. He is fond of scenes in which figures play a part as important as the landscape, especially scenes of haymaking and of other operations of country life; and we can imagine that such a picture as No. 62, *Carrying Hay*, will be highly appreciated by many visitors for the fidelity with which it produces a charming moment. But it must be owned that there is a stiffness about the figures which show that photography is, and must remain, far behind the art of the painter, who succeeds in rendering the infinite variety of human movement and expression in a manner which the photographer, tied as he is to the exact reproduction of details, can never approach. No criticism of this kind, however, need be passed upon the better examples of pure landscape in the Exhibition. These are of all sorts and sizes, and are rendered by many different processes. Among them we may select a few, though by no means all that we might wish to name, such as the Alpine views, generally large, of Mr. W. F. Donkin, an accomplished chemist, or as the large landscapes of Mr. Vernon Heath and of the Autotype Company, *e.g.*, the fine Derwentwater view (No. 126), and the extremely beautiful small views of Mr. H. B. Berkeley (Nos. 114 to 118), and especially (No. 132) *Noontide*. These last are mostly by the platinotype process, which in Mr. Berkeley's hands gives results that can hardly be distinguished from the very finest engraving.

Of ordinary portraits there is no lack, and the improvement which every year shows in this branch of the art still goes on. We have been especially struck by the *Studies* (No. 233) of Mr. W. N. Malby, and by some of Mr. Mayall's portraits taken by the electric light. Mr. Abel Lewis exhibits the last photograph that Dean Stanley ever sat for; Mr. Bullock has a medal for his unnamed portrait (No. 335). Our brethren of the animal world are fully represented in the portraits of lions and tigers, dogs and cats, exhibited by Mr. Henry Dixon and Mr. T. G. Dixon, whose achievements in this branch of art have already gained them celebrity. Nor ought we to omit to notice one or two fancy portraits, such as Mr. W. Gillard's charming picture *Day Dreams* (No. 308), and Mr. Adam Diston's *Industry* (No. 291), one of a set which display the finish and smoothness of an old Dutch picture.

We may conclude this notice by calling attention to the new "stannotype" (*i.e.*, tin-type) process invented by Mr. Woodbury, whose name is already well known in connection with another method of photographic reproduction. In No. 485 we have examples of all the stages of the process, from the carbon positive transparency to the finished print; while below hangs a case of prints produced in this manner, in which the negative relief has been covered with tinfoil before the printing takes place. This ingenious, cheap, and simple process, by which some four hundred prints can daily be produced from a single negative, seems destined to play a considerable part in the art of book illustration.—*The Times.*

Photographic Exhibition.—The Exhibition of the Photographic Society of Great Britain, which opens today at the Gallery of the Royal Society of Painters in Water Colours in Pall Mall, shows a good collection of upwards of six hundred works. Though there are, perhaps, fewer striking productions than on some previous occasions, owing to the absence of many names that usually figure in the list of contributors, progress is discernible in nearly every branch. To an inexperienced eye photography may have seemed, long ere this, to have reached the consummation of excellence; but to those initiated in its technicalities it has, like most other branches of science, a road to perfection of which the end is yet distant. The last few years have seen a complete revolution both in the methods employed and the results attained, the old process of using a plate of glass coated with collodion and afterwards immersed in salts of silver being now almost entirely thrown aside for the more rapid and facile method of a prepared gelatine plate, which takes its impressions while dry, and is thus invaluable for outdoor work. Two years ago the productions, by both methods, were about equally balanced in number; last year the gelatine plates were so widely used that the cases where wet collodion was employed were specified in the catalogue as exceptional, and in the present Exhibition there are not more than half-a-dozen such examples to be found. The novelty of the season is the stannotype process—an outcome of the Woodburytype. It consists in applying tinfoil to the gelatine relief, giving a printing surface equal to the type-metal formerly employed, and from which a thousand copies can be taken. Mr. W. B. Woodbury has been awarded a medal for his successful experiments in this direction. Another new process is the photo-engraving, for which Messrs. T. and R. Annan take a like honour. A large work occupying a prominent place in the gallery is Mr. W. Mayland's *There is Sorrow in the Sea: it Cannot be Quiet*, enlarged by the Autotype Company, for which a medal has been justly awarded; similar distinction being given to his beautiful series of sea studies, with breaking waves, gathering clouds, and morning effects, which are excellent both from a pictorial and technical point of view. Mr. H. P. Robinson, whose *Wayside Gossip* was one of the prettiest things in the last Exhibition, and who, together with Mr. Stevens, has lately received honours at the Brussels International Photographic Exhibition, is represented this year by a variety of pleasing pictures, and takes a medal for *A Nor'-Easter*, a girl leaning on a boat looking out to sea, in which the light on the water where the sun has burst through the heavy clouds is very effective. Other medals have been awarded to Messrs. G. West and Sons for studies of yachts, which are remarkably clear and bright, having, moreover, the merit of being taken from a vessel in motion; to Mr. Berkeley for land and river scenes; to Mr. W. Cobb for some clever views of London streets taken from the top of an omnibus; and to Mr. A. Lugardon for studies of horses in motion. Those latter clearly prove that it is possible to produce instantaneous photographs of animals in action which shall represent them as they appear to the naked eye without producing ludicrous effects, as was the case in the photograph of a galloping horse by Muybridge, of San Francisco. The remaining honours are taken by Mr. W. F. Donkin, for a *View of the Dent de Géant, near Chamouni;* and by Messrs. Adam Diston, J. Bullock, A. Common, and T. G. Whaite. Mr. George Renwick takes a medal for a beautiful snow scene. Mr. Henry Stevens has some of his excellent reproductions of flowers and plants; Mr. T. G. Dixon several fine studies of animals; and Mr. F. M. Sutcliffe a large number of coast scenes cleverly chosen. There are some charming little bits of continental scenery by Mr. England, who, being on the jurors' committee, sacrifices the honour of a medal which would presumably have again been his as one of the most successful of our landscape photographers. Other works demanding attention are Mr. Henry J. Godbold's very artistic views of Hastings; Mr. Fred. Barlow's *Atlantic Iceberg*, taken from the deck of the s.s. "Circassian;" portraits by electric light nearly, if not quite, equal to those taken by sunlight, by Mr. J. E. Mayall, F.C.S.; Mr. W. E. Debenham's excellent portraits, and Mr. R. Slingsby's series of figure studies. Mr. Arnold Spiller contributes the *Interior of a Dene Hole at Gray's Thurrock, Essex*—interesting from a geological point of view, and taken by oxy-magnesium light. The members of the Society gave a *soirée* on Saturday evening, when the President (Mr. James Glaisher, F.R.S.), the Vice-Presidents (Captain W. de W. Abney, R.E., F.R.S., Mr. H. B. Pritchard, F.C.S., and Mr. John Spiller, F.C.S.), besides most of the members of the Council were present.—*Daily News.*

The Photographic Society.—By the innocent lovers of beautiful things the admirable mechanical art of photography is often mistaken for a fine art, because it reproduces fine art, or deals directly with the objects with which fine art is accustomed to deal. But it is not only those who look at photographs with an erroneous and too exalted idea of the power that produced them who will find an interest in the Exhibition of the Photographic Society which is now open at the rooms of the Royal Society of Painters in Water Colours. For there can be gathered a very complete notion of the resources that photography at present possesses, and of the subjects with which it best may cope, and of the relative skill of many of the most successful practitioners of the craft. It is obvious that in the direct reproduction of natural scenes the craft has the greatest chance where the beauty of the scene is less dependent upon colour, and where the light and shade are at all events in large masses. Thus, though there are of course remarkable exceptions, as in the photographs by Mr. Vernon Heath, photography is generally least successful when it is engaged with the intricacy of foliage, and most successful when it records, in nature, the bolder features of cliff or sea, or, in art, the cold contours of sculpture. Mr. Whiting's Kentish views—views on the Kentish coast—and Mr. Sutcliffe's views of the seaboard of the North Riding, may perhaps be especially remarked; so may Mr. Debenham's portraits, and the fancy portrait subjects of Mr. Gillard, in which the art of "composition" plays an important part. The Woodbury reproductions and the works of the Autotype Company remind the visitor of some of the latest and most ingenious successes of the craft; and in more than one work the delicate manual labour of engraving allied to photography produces a result which is, in the real sense, artistic. About photography there are two mistaken views. One is the view of those ignorant of art, and of the mental processes by which art is created.

that view always overrates it. The other is the view of those who have studied artistic things in too old a school. That is the view of those who cheerfully deny to a quite first-rate photograph that merit of honest reproduction which they too willingly allow to a quite third-rate etching.—*Standard.*

Exhibition of the Photographic Society.—The Photographic Society of Great Britain opens its annual Exhibition today at the Gallery of the Royal Society of Painters in Water Colours, Pall Mall East. It consists of photographs, and of the paraphernalia—mechanical and scientific—of the photographer. There are some 200 more exhibits than there were last year. These are with very few exceptions printed from negatives taken on gelatine plates, which have now almost entirely superseded wet plates, as used in the collodion process. The introduction of dry plates a few years ago has completely revolutionised the practice of photography, and attracted to it a large number of amateurs, the result being very apparent in the present exhibition. Photography has always had its "distinguished amateurs," and its development is greatly due to them; but it has been so simplified of late years that it has come to be regarded as a mere scientific toy, with which anybody may play with a certain amount of success. Of course in this as in other things requiring tact and judgment, as well as refined taste, there are many failures. No doubt that which is positively bad or indifferently good is kept from the public eye; but this Society is enabled each year to display examples contributed by amateurs which equal the best productions of the professional practitioner. This year the Society has welcomed a large number of new exhibitors, members and non-members, amateur and professional; and the high character of the Society is well maintained, notwithstanding the absence of some of those who have previously figured as the most conspicuous contributors, notably Mr. Payne Jennings and the Paynes of Aylesbury. It is in the beauty and refinement of the landscapes and marine views that the present Exhibition particularly excels. Most of the medals have been awarded for this kind of outdoor work. In figure subjects no real advance is apparent. The photographer apparently thinks he has acquitted himself satisfactorily when he has obtained a faithful record in monochrome of some bit of natural scenery, defining the multitudinous details of the foreground, and the delicate gradations of the half-tones and distance. No doubt this is an achievement commendable in itself, but it has been accomplished so often that it has become a matter of course, and the observant on-looker begins to ask for something more, and this he is denied. Subjects of dramatic interest, for instance, or indeed, of simple *genre*, are conspicuous by their absence. There are no works involving imaginative effort. Poetry, history, and the drama offer themselves as handmaids to the photographer, and he abjures them all; whereas there seems to be no legitimate reason why the one should be a stranger to the other. Mr. Adam Diston, in his *Industry* (No. 291), which has been awarded a medal, shows, by the single figure of an old lady seated by her spinning-wheel, what can be done in this direction, and what a field lies open for photographic productions of a superior kind. For figures in combination with landscape Mr. H. P. Robinson, of Tunbridge Wells, has a special aptitude, and his *Nor'-Easter* (No. 59) is a poem in itself. *What Luck?* (No. 60) is another remarkably good example. A step further, and what is here hinted at would be an accomplished fact. The frame of *Sea Studies* (No. 23), by Mr. W. Mayland, though devoid of human interest, has in it life and motion, the one study, *There is a Sorrow on the Sea: it Cannot be Quiet*, being highly praiseworthy. This instantaneous view of waves tumbling on the shore has been enlarged with astonishing results by the Autotype Company. Both the original and the enlargement have been adjudged a medal. Mr. Valentine Blanchard is represented by some effective specimens of portraiture, in which department Mr. W. J. Byrne, of Richmond, holds his own against all competitors, his photographs of children, printed in red carbon, being remarkably delicate and beautiful. *Views in Switzerland* (No. 83), by Mr. Seymour Conway; *Noontide* (No. 132) (platinotype), by Mr. H. B. Berkeley; *View of the Dent de Géant, near Chamouni* (No. 140), by Mr. W. F. Donkin; *Yachts* (No. 223), by Messrs. G. West and Sons; *Views in Brittany* (No. 319), by Mr. T. G. Whaite; *A Portrait* (No. 335), by Mr. J. Bullock; *Streets of London* (No. 372), taken from the top of an omnibus, by Mr. W. Cobb, have each received a medal. Mr. Henry Stevens, of King-street, Covent-garden, exhibits three frames, one containing *Studies of Orchids* (No. 125), silver prints untouched, which are not merely artistically grouped, but exceedingly successful in the finish and delicacy of the printing. The markings of the maidenhair ferns are singularly beautiful. As a curious result of instantaneous photography a year or more ago the legs of horses galloping were made to appear twisted and crossed in a most grotesque fashion, and it was thought that artists had always been wrong in their delineations of animals in motion. Mr. Muybridge, of San Francisco, was the first to produce these crooked limbs, and he obtained his results by placing black horses against a white background, the animals being thus, as it were, *silhouetted* in order the more certainly to record their movements. The fidelity of the prints obtained in this way has been generally accepted; but it is singular that in this Exhibition a French photographer, M. A. Lugardon, contributes a frame of horses leaping over bars and racing, in which the limbs are not in the least distorted, while the shadows and half-tints are quite natural and perfect, and this result has been arrived at without the aid of artificial contrasts of black and white. So highly do the Society think of M. Lugardon's results that they have awarded him a medal. Amongst other specialities may be noticed a photograph (No. 472) of the great nebula in Orion, taken with a three-foot reflector at Ealing, 30th January last, by Mr. A. Common; also some specimens of photo-engraving on copper (No. 476) by Herr Klic's process, the photographs being printed by the ordinary copperplate press, and exhibited by Messrs. T. and R. Annan. Mr. W. B. Woodbury, the inventor of the well-known Woodburytype, exhibits a frame illustrative of his new process of printing, called "stannotype." The first stage shown is the carbon positive transparency, then the negative relief tissue, the negative relief, the negative relief covered with tinfoil, and finally the print. These prints, which are produced altogether independently of sunlight, present all the characteristics of the finest photographs, are altogether permanent, and can be produced in any required tint. The specimens shown are exceedingly delicate. Stannotype will be most useful for book illustrations, the number of impressions which can be worked off being dependent upon the preparation of the printing surface, which may be either of simple tinfoil or a coating of steel or nickel. This process is a distinct advance in the art of photo. printing, and Mr. Woodbury has been awarded a medal for his interesting and valuable invention. The exhibition will remain open to the 15th of November, and on Monday, Wednesday, and Saturday evenings. On Monday evenings the optical lantern—which is only the more scientific make of what is familiarly called "the magic lantern"—will be displayed, negatives being used as slides, and much instruction of a technical kind will be imparted. —*Morning Advertiser.*

Exhibition of Photographs.—The annual Exhibition of the Photographic Society of Great Britain opens today in the Gallery, No. 5a, Pall Mall East. The Exhibition is scarcely up to the standard of recent years. There is no falling off in quantity—indeed, the hanging committee have had to deal with two hundred more pictorial claimants than last year—but many of the best art photographers have not sent contributions, and altogether the display is strikingly destitute of "eye-catchers." There are few central points in the Exhibition to which the visitor is insensibly attracted, as a relief from the evenness of mechanical merit. Still, an exhibition that illustrates the progress of rapid photography cannot fail to be instructive, nor with Mr. H. P. Robinson, of Tunbridge Wells, and Mr. Mayland among the contributors, can it fail entirely in artistic value. The two photographic facts asserted by the Exhibition are: that a very short distance separates the amateur from the best professionals, and that the more laborious branch of portrait photography does not keep pace in excellence with landscapes. The first of these is illustrated by many foreign and continental views taken by travellers and naval officers on the Mediterranean, in Brazil, and in the peak-sentried Vale of Yosemite. The fact that only one medal is given for a portrait speaks for the second. Every visitor versed in photographic lore will naturally go first to the set of nine contributed by Mr. H. P. Robinson. The best of them is *A Nor'-Easter*, which looks like a square foot of nature in miniature taken bodily out of a beach. A wave is sinking back with frothy reluctance, the pebbles stand singly out with humid sheen, and against a boat, out of which the fisher's nets are sprawling, his daughter leans, shading her eyes and peering out into the storm. Mr. Robinson always endeavours to get something of fine art into his camera pictures; and in the *Nor'-Easter* he has risen above technicality, like an artist above systems of construction and tricks of colour. Like every originator of a school Mr. Robinson has his imitators. Mr. Lyddell Sawyer is a clever photographist, and deservedly takes high rank among the followers of the art; but no one can study his attractive series of rustic views—juvenile tyrants on country gates, or love-makers in a setting of hayfields and nutwoods—without feeling that he has been largely influenced by Mr. Robinson. The same may be said of Mr. Slingsby, whose subjects are autumnal, and bristle with ears of barley. Remarkable as these examples are, the Exhibition presents many more remarkable illustrations of the extraordinary enlargement of photographic possibilities by the adoption of gelatine plates. Mr. Mayland's views of *Henley Regatta* were taken amidst the rapid motion of a race-scene; but under an artist's hand they flashed upon the film of gelatine, and there they are—bright and vivid vistas of regatta life. Mr. W. Cobb took his scenes on the London streets from the top of an omnibus while the omnibus was moving, and yet there is not the slightest indistinctness, not the faintest trace of haste, about them. When such facts as these are possible, one is inclined to pay some attention to the theory of Professor Janssen, who says he takes pictures of the sun by submitting a sensitive plate to the solar rays for the brief space of one twenty-thousandth part of a second. We have not space to speak of Messrs. Marsh Brothers, or Mr. Bedford, or Mr. England, all of whom make a creditable show; nor of the enlarged photographs, the finest of which is Mr. Mayland's exquisite *Sorrow on the Sea: it Cannot be Quiet*, a wonderful suggestion of remorseful wave forms and melancholy murmuring. They all call for patient study from the man who believes in art. Although the Exhibition is disappointing as a whole, more especially as to portraits, the examples we have indicated will bear comparison with any former achievements in photography. Another year, perhaps, when the new devotees of gelatine have recognised the necessity of finish, and seize upon their success with less of greed and more of fastidiousness, a more even standard of merit may be displayed. As it is, the Exhibition holds out a rich promise of future service to artists.—*Echo.*

The Photographic Society of Great Britain.—If photography has made no great strides during the last year, it is evident from the Exhibition which was opened today that there has been at least no diminution in the keen interest evinced by both professionals and amateurs for the advance of their art. The room at 5a, Pall Mall East is well filled, both walls and screens, and the catalogue comprises no less than 623 exhibits. Among many very beautiful examples we notice Mr. Mayland's admirable group of sea studies—*The Return from the Wreck*, *Gathering Clouds*, *Homeward Bound*, *Early Morning*, and a large piece, *There is Sorrow on the Sea: it Cannot be Quiet*, which has been enlarged by the Autotype Company. Mr. H. P. Robinson exhibits some very delicate seascapes, in which he has been able, for the first time we believe, to introduce small figures into the large backgrounds. Mr. F. M. Sutcliffe's fisherfolk studies are also well worthy of notice, as are Mr. Thorn's two little pictures of *The Lifeboat*. Mr. Vernon Heath sends some very charming studies of woodland scenery, among them being a striking photograph of *Oxborough Castle*. Two of Colonel Stuart Wortley's exhibits—*St. Wanna praying for a Wreck* and *A Study of Niagara*—are highly effective. The Autotype Company is strong to the fore with a

large number of valuable exhibits, among them being an enlargement of Mr. Alfred Pettitt's *Friar's Crag, Derwentwater*. The Stereoscopic Company are also large contributors. There are, too, some very striking portraits of Lord Salisbury, Lord Selborne, Mrs. Kendall, and Miss Ellen Terry. The four grim views of the lines of Tel-el-Kebir are sure to be a great object of interest. Messrs. West and Sons have some beautifully-clear photographs of yachts, and Mr. W. F. Donkin's views of Alpine scenery are sure to be appreciated. Mr. Dixon's tiger's head, enlarged to seventeen inches diameter, is a fine piece of work. One of the novelties of the exhibition is Mr. Woodbury's stannotype process, for which he claims cheapness and great effect. The different stages of development are all shown. The exhibition opens its doors to the public on Monday, and remains open until the 15th of next month.—*Pall Mall Gazette.*

RECENT PATENTS.

AUSTRIA-HUNGARY PATENT GRANTED.

"Process of Obtaining Photographic Negatives for Making Tinted Vignettes of Gelatine, Collodion, &c." J. B. Feilner, of Bremen.—*Dated May* 11, 1883.

AMERICAN PATENT GRANTED, September 11, 1883.

"Photographic Camera Shutter." D. M. Little, Boston, Mass.—*Application filed May* 18, 1883.

PATENT SEALED.

No. 3,837.—"Improvements in Adjustable Chairs for Photographic Purposes." W. R. Lake; a communication by William S. Liscomb, of Providence, U.S.A.—*Dated August* 7, 1883.

PATENTS APPLIED FOR.

No. 4,705.—"Art of Obtaining by Photography Definite Photographs to be Used in the Production of Typographic Blocks and Art of Photo-lithography and like Arts." R. Brown, R. W. Barnes, and J. Bell.—*Dated October* 3, 1883.

No. 4,732.—"Apparatus for use in Transporting and Exposing Sensitised Photographic Plates or Films." J. E. Atkinson.—*Dated October* 4, 1883.

No. 4,735.—"Producing Printing Blocks by means of Photography." W. B. Woodbury.—*Dated October* 5, 1883.

No. 4,794.—"Rotary Stands for Exhibiting Photographs, Samples, and Articles for Sale." A. M. Clarke.—*Dated October* 9, 1883.

PRODUCING COLOURED CARD PICTURES.

We imagine that in the previous volumes of The British Journal of Photography are to be found, not one or two but *innumerable*, specifications of patents for applying colours to the back after the print has been rendered translucent by oil, varnish, wax, or other substances of like nature. This being the case, Mr. Alfred Horace Dawes, of Windermere, deserves credit for having been able to ring even such a small change upon this well-worn topic as to secure it by patent. We subjoin his specification. It is entitled "An Improved Process, System, or Method of Producing Permanent Coloured Photographic Card Pictures."

The object of this invention is the production of coloured photographic pictures which shall more nearly resemble the long-desired effects of natural colouring produced by the camera, and, being mounted upon paper, card, or other convenient substance (without the use of glass), they are suitable for "portrait albums," or such like places or purposes.

In carrying my invention into effect, I take an ordinary unmounted paper photograph, and, after reducing its thickness, if necessary, I immerse it in a bath of oil, varnish, and spirit, and allow it to remain therein until it assumes a horny and transparent state and appearance. I then take the picture from the bath and carefully remove any surplus quantity of the bath mixture, and, with oil paint by preference, I paint the desired colours and effects upon one side or face of this loose transparented photograph.

I now prepare the mounting paper, card, or base for the before-described picture, and this (the picture) being coloured with oil paint, I face or prepare the "mount," whatever it may be, with similar material, and, in so doing, I prefer to repeat (reversed) the outline and colours of the picture upon the mount, to produce purity, definition, and clearness, and to prevent confusion or alteration of the colours, according to the nature of the picture and other circumstances.

The paint upon both the foregoing having attained a certain consistency or spissitude, I then carefully lay the picture upon the so-prepared "mount"—paint to paint—and apply sufficient pressure to cause them to adhere to each other; and I afterwards continue and increase this pressure, between polished surfaces, until the whole—photo., paint, and mount—are thus thoroughly and permanently united. In some cases I afterwards enamel the surface, or apply thereto a clear, hard varnish, and thus, by the foregoing process, with the colours between the photograph and the "mount" upon or before which it is laid, I obtain without the use of glass what may be called a coloured, naturally shaded, card or other photographic picture for albums or other similar uses or purposes.

Having now described and particularly ascertained the nature of the said invention, and the manner in which the same is or may be used or carried into effect, I wish it to be understood that I do not confine or restrict myself to the precise details which I have described or referred to, as the same may be modified without deviating from the principles or main features of the said invention; but what I consider to be novel and original, and therefore claim as the invention, secured to me by the hereinbefore in part recited letters patent, is—

The production of oil paint or other coloured photographic pictures wherein, by the hereinbefore described process or system, or any mere modification thereof—embodying the placing of the colouring matter between the transparented photograph and the paper, card, or other substance upon or before which it is laid or mounted—the natural lights and shades produced by the camera are preserved, and full-toned and well-defined permanent coloured photographic pictures, without the use of glass, are obtained, virtually as or after the manner hereinbefore explained and set forth.

IMPROVED APPARATUS FOR TRANSFERRING DRY PLATES.

Among the apparatus to be seen on one of the tables at the present Exhibition of the Photographic Society of Great Britain is a camera having a peculiar arrangement for effecting the transference of sensitive plates from one plate-box to the camera, and thence to a second empty box of similar dimensions placed on the camera to receive them. It is the invention of Mr. Thomas Samuels, who has obtained a patent for it. We here append the specification, premising that it is the provisional one, which we select purposely in preference to the completed specification, which could not clearly be understood without a large number of drawings with which it is illustrated. The specification is designated "Apparatus for Holding Dry Plates or Films before, during, and after Exposure, and for Changing them in the Photographic Camera."

My invention relates to an improved apparatus in the nature of a combined dark back and holder for containing a number of dry plates or films superposed or placed in front of one another, and for automatically bringing the said plates or films successively up to the same plane or position for exposure, and for receiving and packing away the said plates or films after exposure. The said apparatus is applicable to any ordinary camera, and is serviceable also as a convenient and compact means of transporting the plates or films both before and after exposure.

By means of this apparatus a number of exposures in very rapid succession may be easily obtained without the possibility of accidentally exposing the same plate twice over, which is liable to happen with double backs and some existing changing-box cameras, there being with my apparatus no manipulation beyond the mere sliding out and in of the dark shutter, the operations of bringing up the plates or films to position for exposure and packing them away after exposure being entirely automatic, except in so far as they are dependent on the working of this slide.

My invention further comprises an envelope or sheath for the plate, by means whereof the contact of the plates or films with one another, when superposed in my holder, is avoided, and the light is prevented from passing through a plate when under exposure to those behind it.

The apparatus consists of a pair of plate-holding boxes corresponding in area to the dimensions of the plates and identically similar in construction, which are adapted to be fitted close together side by side (in a groove or otherwise, so as to be light-tight) upon a board or frame, hinged or otherwise, attached to the body of the camera in a position corresponding to that of the ordinary dark back, and secured thereto with a light-tight joint. One of these plate-holding boxes I denominate the "container," as it contains the supply of plates previous to exposure, and the other I denominate the "receiver," it being intended to receive the same plates after exposure. The container is placed behind an opening in the said board or frame, rather smaller in one direction than the size of the plate, so that the surface of the board may form a supporting plane against which the plate may be held for exposure, whilst the receiver is placed opposite a solid part of the said board or frame. The container and receiver are each grooved to fit a light-tight sliding lid working flush with the edges of the box, only one lid being used, however, when the boxes are mounted on the camera, this lid then sliding in the grooves of the container and covering the exposing aperture, the lid thus serving the purpose of the ordinary dark shutter and also as the means of propelling the exposed plate from the container into the receiver, the recess in the boxes in which the lid works affording also a passage for the plate from the one box to the other. Each box is provided with a spring-propelled false bottom, that in the container serving to propel the plates forward and bring them successively up to the exposing aperture, whilst that in the receiver serves to hold the plates steady in the box.

To enable each plate to be slid in front of its predecessors in the receiver springs are affixed to the board opposite the receiver which yield as the plate is pushed in, and which tend to cant the plate or make it stand obliquely after it has entered the receiver, to enable the next following plate to slide in front of it and force it backwards into the receiver against the pressure of the spring bottom. Instead of these springs forcing the near edge of the plate backwards there may be a shallow well in front of the far edge of the plate into which the spring bottom may force that edge forwards, thus canting the near edge backwards sufficiently to admit the next plate in front of it. Or, instead of an automatic device, I may employ a lever or other device operated by the hand at the required moment. To enable this forcible displacement of a plate to be effected without injury to the sensitive film each plate is encased in a sheet metal or other sheath covering the back of the plate and embracing three edges thereof, so as to form a sort of frame for the plate which, by its projection from the front surface of the plate, prevents the contact of one plate with another. This envelope or sheath fits the plate spring tight, so that it may be readily inserted and withdrawn. The inner surface of this sheath or envelope is preferably coated with a non-actinic varnish. These sheaths or envelopes and the boxes or holders may also be used by the makers of dry plates for packing the same for sale. Instead of two separate and detachable boxes they might be made in one together with the board upon which they are mounted.

For outside work a convenient number of boxes, each filled with dry plates encased in their sheaths, as above described, and closed by a sliding lid, and an empty box without any lid, are all that are needed for transport

esides the camera and the usual accessories. The empty box and a full one aving been fitted side by side in their proper relative positions upon ıeir supporting board or frame, the apparatus is ready for use.

The apparatus being hinged to one side of the camera, as above de- ɔribed, it can be readily swung back out of the way of the focussing-screen, hich may be hinged or otherwise attached to the top or bottom of the amera so as to be quickly placed in position for focussing immediately the late-holding apparatus is swung back out of the way. The focussing- creen is so constructed that, when in position, it shall coincide in position vith the plane of the surface against which the plates are held during xposure, as above described.

The operations of sliding out and in the dark shutter, thereby succes- ively exposing and pushing the plates into the receiving box (alternated or ıot with the operation of focussing, as may be necessary), having been ontinued until all the plates in the container are used, the dark shutter is ushed into the grooves of the now-filled receiver, for which it now serves s a cover. Both boxes are now removed, and the empty one which was reviously the container now takes the place of the other to serve as a eceiver, a full holder containing a fresh supply of plates being placed next o it as before described.

All these operations may be performed in the studio or field with only he precautions usually taken in exposing plates.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 18	London and Provincial	Masons' Hall, Basinghall-street.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The first ordinary monthly meeting of the session was held at the House of the Society of Arts, John-street, Adelphi, on Thursday, the 4th instant,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the last ordinary meeting in June were read and confirmed, and allusion was made to a successful outdoor meeting held at the "Bull and Bush," Hampstead, on Friday, 28th July, on which occasion several members sat down to tea. Two photographs were also taken of those present by Mr. P. Mawdsley.

The Chairman then presented the Society's diploma to Mr. E. Dunmore for his picture, *Cattle*, sent in for competition at the May meeting, and congratulated that gentleman on his repeated success. He was very glad to see that the members were beginning to take up the matter of competition with more enthusiasm, as was shown by the increased number of examples sent in for competition during the holiday months since they last met. Mr. P. Mawdsley was also awarded a diploma for his picture, *An Open View, with Clouds;* but as that gentleman had gone to America, it would have to be forwarded to him.

The names were announced of the members who had been successful in the artistic competitions for June, July, August, and September, as follows:—June: *A Country Road, with a Finger-Post*, Mr. John Nesbit.—July: *Fisher-Folk*, Mr. Matthew Whiting.—August: *A Good Place for a Rest*, Mr. E. Dunmore; *Moving Figures*, Messrs. Cobb and Son.—September: *A River View*, Mr. F. A. Bridge, and *The Milkmaid*, Mr. John Nesbit. The subjects for the October competition were then ballotted for, the result being—Landscape: *Gnarled Oaks;* and Figure: *Cat and Kittens.*

The Chairman announced that their next meeting (the 1st November) would be the annual technical meeting, and the committee were anxious to make it as great a success as possible, by getting promises of new apparatus, &c., to be displayed on that occasion; also demonstrations of new processes or formulæ, or anything which might prove interesting. He called upon the members individually to aid in making the meeting a success. The proceedings on this occasion would commence at 7-30 p.m. instead of 8.

Mr. J. Traill Taylor (of New York) then read a paper entitled *Photographic Matters Connected with America* [see page 606], and commenced by disclaiming, on the part of American photographers, any prejudices of an international character, and remarked that if Americans did, as a rule, entertain large ideas of their country, they might be pardoned from the fact of the immensity of the country causing them insensibly to form colossal ideas. He touched upon the methods and dimensions of enlarging in America as compared with the same in England, and spoke of the artistic and literary culture to be met with there. He referred to the fact of Germany and France providing artists for America to a much greater degree than Great Britain. With regard to landscape enlargements, Mr. Taylor readily admitted the supremacy of England. He spoke of the relative merits and demerits of climate in the two countries, and of the apparatus manufactured in each. Referring to the American studios, he described the gorgeous way in which some of those in the chief cities were fitted up, and read an extract from the *Photographic Times* descriptive of the magnificent studio of Mr. Richard Walzl, in Baltimore. In alluding to mechanical printing processes, Mr. Taylor passed round some American specimens for inspection. He remarked that the Woodbury process had been somewhat unfortunate in the United States; and, in connection with transparencies, referred to the beautiful work produced by Mr. John Carbutt. After a brief allusion to gelatine plates, Mr. Taylor concluded by expressing his willingness to reply to any questions referring to American photographic matters which might be put to him.

A paper containing the following questions was then handed up to Mr. Taylor:—What is the state of photographic journalism in America? Which journal is the best? Is there a prospect of a photographic weekly? What about the independence of journalism? How about Carey Lea? In replying,

Mr. Taylor said that when such a question as the *best* journal was propounded the querist either forgot that one of them was edited by an old member of their own South London Photographic Society, or else what he meant was—"Which journal next to the *Photographic Times* is best?" He would give a general reply to these questions. In addition to the *Photographic Times* there was a second journal, Anthony's *Bulletin*, published in New York. It was, in a large degree, the commercial organ of the well-known stock house whose property it was. Its technical literature consisted for the most part of selections from the English journals. It was edited by Mr. Henry Anthony—a gentleman getting on in years, but who enjoys the respect and esteem of all who know him. The *Philadelphia Photographer* at one time held a good position in America. It was still in existence, but he was unable to speak concerning its merits, and he did not know whether it had an editor at present, the former one (Mr. E. L. Wilson) having "gone in" for the more lucrative employment of lecturing in connection with the magic lantern. This gentleman, however, now belonged to the staff of the *Photographic Times.* A quarterly journal, *Photographic Rays of Light*, emanates from the establishment of Mr. Walzl, of Baltimore, himself a man of considerable literary ability and well up in photography. The *St. Louis Practical Photographer* was discontinued on the death of Mr. J. H. Fitzgibbon, but his widow had started another journal with a nearly similar name. Some of the English journalists whom he (Mr. Taylor) saw present had complained that their articles frequently appeared in this journal without acknowledgment of the source whence they emanated. The *Eye* is a weekly Chicago newspaper, one edition of which devotes special attention to photographic matters. Mr. Gentile, the photographic editor, is a man of culture and literary ability, and a practical, if not a professional, photographer. Concerning the *Photographic Times*, Mr. Taylor said that four years ago it was a very small periodical indeed, appearing as an appendage to the *Philadelphia Photographer*, and from the specimen copy he handed round they would be able to judge to what a stage it had now advanced, the last number issued (it was a monthly) containing one hundred and forty-seven pages, of which ninety-seven were text and the rest advertisements. With respect to Mr. M. Carey Lea, he (Mr. Taylor) regretted his inability to reply to the question put. Mr. Lea had kept aloof for some years from all public utterances in photography, but Mr. Taylor expressed a hope that he would soon startle the world with some new outcome of his great talents and capacity for original research.

The Chairman was quite sure they would all agree with him in feeling much indebted to Mr. Taylor for his communication and for so modestly answering the queries put to him. He thought Mr. Taylor must have created feelings of envy amongst some of those present by his description of Mr. Walzl's studio. With regard to the sizes of enlargements in America, he remembered it had once been stated, during a discussion in that very room, that it would be impossible to produce pictures of the dimensions described by Mr. Taylor, and he thought they might take a lesson from what had been achieved on the other side of the water in this respect. They might at least take comfort from what Mr. Taylor had said regarding the advantages of the American climate over that of Great Britain. He begged to thank Mr. Taylor very heartily, in the name of the members, for giving them the benefit of his observations.

Mr. Taylor, replying to an observation with regard to the prevalency of sunstroke in New York, said that the temperature was very extreme in America, especially in the central states. In the height of summer the thermometer averaged, perhaps, from 97° to 102°, which, though not an extraordinary high temperature, was quite enough to be distressing; and in winter, he said, it was nothing out of the way for the thermometer to register in some places (Chicago, for instance) 30° below zero. In New York, in summer time, cases of sunstroke were very common, whilst in the Southern states such a thing was almost unknown, though the temperature was equally high. With regard to amateur photography, he (Mr. Taylor) said that they were a little behind in America, although in New York amateurs were being created very rapidly in connection with the advent of gelatine, and were of a somewhat superior class as regards intelligence. There had been a purely amateur photographic society recently established in Chicago and another in Brooklyn, in the latter of which he had the pleasure of knowing some of the members—men who could produce beautiful work, and from whom he hoped for great results.

Mr. W. Brooks said he had had letters from several gentlemen in America who informed him they succeeded very well with the collodio-bromide process.

Mr. Taylor remarked that Mr. Newton, President of the American Institute, had bestowed considerable attention upon the collodio-bromide process, but he had discarded it in favour of gelatine, though he was ashamed to say that gentleman purchased his plates instead of making them.

Mr. Brooks replied that collodion could be made to rival what might be termed a "slow gelatine plate."

Mr. A. L. Henderson wished to ask Mr. Taylor what position club photography held in America, and whether it was true that some of the club photographers practised the art on Sunday; also, whether it was the humidity of the atmosphere which prevented the carbon process being practised there. He had been told that the reason the Woodburytype was not practised in America was on account of the humidity of the atmosphere.

Mr. Taylor said he had conversed with Mr. Woodbury on this subject only the day before, and that gentlemen had said that he was now prepared with a gelatine which would obviate all the difficulties experienced in America in connection with his process. He had grappled with the matter successfully, and when the stannotype process was ushered in it would be a success. About the club business: when he (Mr. Taylor) first went to America five years ago it was in full swing everywhere on Sundays as well as week days—rather more so, perhaps, on the former. He thought, with regard to the Sunday trade generally, that though there were some photographers who did not practise it, still there were a great many who did.

In reply to a question from the Chairman,

Mr. Taylor said that enamelling was not much practised in America. People, as a rule, preferred enlargements.

The question-box being handed up, it was found there was a query in it—"What is the best method of reducing over-dense negatives?"

Mr. Henderson, being called upon by the Chairman, said that from experiments he had made lately he had discovered a peculiar property in hydrocyanic acid, or the fumes given off from cyanide of potassium, on a very intense negative. He found that a gelatine negative when wet and surface dried, and placed over the fumes of hydrocyanic acid or cyanide of potassium, will very rapidly decrease in intensity, completely clearing the shadows of the negative and removing any trace of green or other fog that may be present. He would like to ask Mr. Spiller if he could explain the state in which the silver was left—whether volatilised, or if it still remained there in a different form, and, if so, in what form? On looking along the portion of the picture that had been reduced it presented a more glazed appearance, showing that there was really a removal of the silver.

Mr. John Spiller, in reply, suggested that the reduction of the image might possibly be accounted for by the escape of hydrocyanic acid by the action of the carbon of the air; but that, inasmuch as the cyanide of silver was insoluble in water, it appeared likely that ammonia—also present in commercial cyanide—might take part in the reaction.

In reply to a remark from Mr. Brooks to the effect that he had always had an idea that green fog was sulphite of silver,

Mr. Henderson said that, as a matter of fact, he thought sulphite of silver prevented green fog.

The proceedings terminated with a vote of thanks to the Chairman, Messrs. J. T. Taylor, A. L. Henderson, and John Spiller.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 4th instant, Mr. F. W. Hart occupied the chair.

Mr. W. E. Debenham said that if a gelatine negative were warmed, before being quite dry, sufficiently to produce any noticeable effect upon the gelatine itself, it was generally spoiled—either by distortion, caused by slipping of the film, or by a very disagreeable chalky effect upon the lights, which appeared to increase in density from the agglomeration of the film where the reduced silver was. He showed a negative which was originally not sufficiently dense, as was seen by a print taken from it in that condition. The varnish had afterwards been removed by alcohol and the plate intensified. In drying again gentle warmth had been used before the moisture had entirely evaporated, and there had been some action upon the gelatine. The negative, as always happened in such cases, showed the image in high relief; but the only noticeable effect in the print was that the eyes were actually larger in the print made after the second drying than in the first print. It was not merely the effect of stronger contrast, but the light surrounding the dark iris appeared to have shrunk away from the latter. There was no appearance of chalkiness in the lights, and the photograph had been accepted as highly satisfactory.

Mr. W. M. Ashman only that day had a very similar experience. The blacks of a negative had apparently been cleared by the action of the slight heat upon the damp gelatine.

Mr. W. Coles brought a negative, half of which had been intensified by the method recently recommended by Mr. W. Brooks, which consisted essentially of intensification by pyro. and silver in the presence of alum. The result appeared to be perfectly satisfactory.

The Chairman said that he had during the last two or three days been experimenting with some negatives that had been intensified with mercury until they were perfectly opaque. He had succeeded in reducing them to proper printing density by immersion in chlorine water. The strength was immaterial. The action was to convert the deposited mercury into corrosive sublimate, which was soluble. Chlorine hardened the gelatine, whilst the action of hypo. on these plates was to cause frilling.

Mr. A. Haddon remarked that chlorine would precipitate gelatine from aqueous solutions.

A question from the box was read:—"The writer has a 12 × 10 camera and a wide-angle doublet of twelve inches equivalent focus. What two lenses selected from those having the following foci—19½ inches, 16 inches, 8½ inches, and 7 inches—would it be best for him to obtain?"

Mr. Debenham would prefer adding the longest and the shortest focus lenses on the list; that is, provided the seven-inch focus lens were of wide enough angle. Such lenses had been made to cover a plate of the dimensions given and allow of some use of the rising-front.

Mr. W. K. Burton did not photograph buildings. He would prefer the longest-focus lens and one of eight and a-half inch focus. He worked with a 12 × 10 camera, and not unfrequently used one of the components of his sixteen-inch doublet, giving him a lens of thirty-two inch focus.

Mr. William Ackland was elected a member of the Association.

Gentlemen interested in photography coming to London during the Exhibition will be welcomed at any of the meetings of the Association.

EDINBURGH PHOTOGRAPHIC SOCIETY.

The ninth meeting of the current session was held in 5, St. Andrew-square, on the evening of Wednesday, the 3rd inst. The President being still too ill to attend, the chair was occupied by Mr. Norman Macbeth, R.S.A.

The minutes of the last meeting having been approved, the following gentlemen were unanimously elected ordinary members:—Messrs. D. Petrie, F.S.A. Scot., John Duncan, William Bertram Millar, Hume Nisbet, Robert Frier, William Dixon, and T. D. Pope.

The Chairman, calling on Mr. G. J. Tunny to read an account of his recent American tour, in graceful terms congratulated him on his safe return, and welcomed him back in the name of the Society. The very large attendance indicated the widespread desire to see and hear wh[at] Mr. Tunny had to bring before them.

Mr. Tunny by means of a map indicated the extent of his tour, an[d] pointing out the magnificent views with which he had adorned the wall[s] paid a high tribute to the untiring industry and artistic ability of M[r.] Watkins, who, with nearly two tons of *impedimenta*, mounted on sixte[en] mules, secured under the most trying circumstances those first photograp[hs] of the wonderful Yosemite Valley.

The Chairman, in proposing a vote of thanks to Mr. Tunny for h[is] interesting communication, said he hoped that on a future occasion h[e] would favour the Society with matter more directly affecting the phot[o]graphic profession, as the many men with whom he had been broug[ht] in contact and the number of studios he had visited must have enabled hi[m] to pick up many items of utility which would well occupy another evenin[g] in discussing.

Dr. Thompson hoped that Mr. Tunny would entertain the suggestion o[f] the Chairman, as one of his experience must have met with many thing[s] specially valuable to photographic practice—many things both chemica[l] and manipulative which he was not able to introduce into a descriptiv[e] paper.

Mr. Wm. Dougall hoped that transparencies could be made from th[e] wonderful views, to be available for a "popular evening."

The Chairman read an account of a sky-shade that Mr. John Parker, President of the Glasgow Photographic Society, had devised.

Mr. Howie thanked the Chairman for his courtesy in bringing such a useful apparatus before the Society, and for his lucid explanation of th[e] details of its construction.

Mr. Alex. Mathison suggested that a rubber band might be substitute[d] for the brass ring, and so allow the same apparatus to be used for lenses o[f] differing diameters.

Mr. Watson was grateful to Mr. Parker for allowing such an ingeniou[s] invention to be made public. The pictures produced by its aid indicate[d] its practical value, and he greatly regretted that he had not met with i[t] before.

Mr. Marshall Wane exhibited a contrivance to prevent the sliding o[f] the tripod on a slippery floor, for securely holding the tripod in a rigi[d] position, and preventing accidental shocks from overturning the camera. He (Mr. Wane) had seen the device at the Brussels exhibition, an[d] thought it well worth bringing before the Society. The contrivance con[]sisted of three strips of wood united at one end by a screw. The length o[f] the strips was governed by the maximum stretch of the legs of the tripod, and a series of holes in each strip allowed the points of the legs of th[e] tripod to be held firmly in any desired place.

The Secretary intimated that he had received from the Secretary of th[e] Photographic Society of Great Britain a number of complimentary ticket[s] for their exhibition, and would be glad to distribute them among member[s] who might be able to use them.

Intimation was also given that, through a mistake on the part of th[e] printer, it was feared that the presentation print for the current year woul[d] not be ready for next month, as promised.

Cordial votes of thanks to the gentlemen who had contributed to the pro[]ceedings of the evening, and to the Chairman, terminated the proceedings.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

The August excursion meeting of this Association took place on the 25th of the month, and an old haunt of the Association's was revisited, Tyntern being made the destination for the day's outing.

The members assembled at Clifton Down and Montpellier Stations and left by an early morning train, the day promising fairly well, although one or two of the older stagers who knew the little "freaks" of the atmosphere in the neighbourhood of Tyntern predicted "blue mist." However, all were bent upon a day's pleasure so far as it could be realised, and the run by rail to the New Passage was accomplished, the time soon slipping by, aided by the usual chat which commences such excursion days as that in question. Unfortunately, however, the genial face and entertaining anecdotes of the Vice-President, who in so constant a manner presides at nearly all meetings—both excursion and evening—were absent. It is not too much to say that everyone present regretted such an unusual occurrence, and felt as if there was "something amiss;" but we all know that now and then the exigencies of business prove insurmountable, and so it was in the present case.

New Passage being reached, the pretty run by the Great Western Railway Steam Ferry across the Severn (in the future, the *near* future, to be abandoned in favour of the new Severn Tunnel route) was much enjoyed, the fresh, salt breeze blowing the city cobwebs clear away from the members' eyes, and at the same time making each feel (although breakfast had been but a short time before "sent below") that, prior to setting-up cameras, lunch would be a most desirable institution.

The journey being continued through Chepstow (the railway station of which place, by-the-bye, was, by an enterprising local contractor, raised some feet "in toto" not long since, the foundation walls being built up to it from below in a most successful manner), Tidenham, &c., lovely scenery abounding on all sides, Tyntern (or Tyntern *Station* rather, the Great Western Railway, in their usual how-not-to-do-it style, having placed the station a mile further on than the village and the abbey) was reached. A pretty drive brought the party to the "Beaufort Arms" Hotel, Tyntern—a house greatly improved of late, and at which the Association has always been well catered for, and certainly not less by the pleasant manageress, Miss Jones, on the present occasion.

But time was passing, and after a welcome little lunch cameras were set up and work commenced. Some of those present repaired to the hill to the east of the hotel, from whence a charming composition, with the

abbey as a leading object, may be obtained; others at once entered the abbey and "shot off" some plates upon the interior, the light just then being particularly good, and the beautiful pillars, arches, and tracery standing out in delightful relief.

To those well acquainted with this most glorious old ruin (and yet in such splendid preservation as to almost belie such a term) there is a grandeur which is always new; but to a person who sees it in such a light, with the rich verdure and lovely hills around, and meandering and picturesque river Wye at its feet, the whole scene is most impressive and the effect one not easily forgotten. The lofty pillars and arches; the great windows so richly carried out in design, with the greatest of them in marvellously-perfect condition; the massiveness of the walls, on the bare tops of which quite broad paths exist so that the visitor can walk upon them, getting a full idea of the vastness of the original structure; the peacefulness of the quiet little village with its aged, time-honoured, and lofty pile, head and shoulders above everything, as if quietly watching the coming and going of generation after generation—all these carry the mind back ages and ages, till a voice from one of the party wakes us from our reverie, and we remember that photography, not fancy, is the order of the day. Wide-angle, rectilinear lenses in such a building are indispensable; and, although the fine gables and windows at the furthest distance get somewhat dwarfed, still with an ordinary angle lens so much of the idea of the great length of the Abbey is lost that the former are chiefly used. The Abbey, which is the property of the Duke of Beaufort, is most carefully kept, and a source of not an insignificant amount of pocket money to those friends of the Duke to whom he may generously "let" it.

The afternoon wearing on, it got time for the pictures which may be got from the opposite side of the river. They are not many in number, but most charming in composition. The "Job's comforters" of the morning were now, however, having their words verified; for, on reaching the opposite bank of the river, the blue mist which had arisen was very noticeable, and but few plates were exposed. The time for "high tea" had arrived; and on adjourning to the "Beaufort Arms" all did full justice to the Wye salmon and other good things provided.

Traps were "limbered up" and the return journey commenced, and, the members and their baggage being safely "aboard," the break swung round the corner into the main road, a cheery "Good day" from the aforesaid ever-attentive manageress sending the cameraites on their road rejoicing—on good terms with themselves, the result of her successful efforts as regards "*interior* surroundings," and of fine weather and lovely scenery as regards "*exterior* surroundings."

The train being once more boarded, the usual programme of tobacco, puns, and yarns made the journey seem no sooner began than finished; and, from all we can learn, the results are generally far from unsatisfactory, the blue mist having "more bark than bite."

HALIFAX PHOTOGRAPHIC CLUB.

THE annual meeting was held on Tuesday evening last, the 9th instant. In the absence of the President, Mr. J. E. Jones took the chair.

The Secretary read the minutes of the last meeting, which were confirmed. He then read the report for the past year and balance sheet, which showed, after paying all expenses, that there was a balance of £2 17s. 10d. in the Treasurer's hands. This report was also passed.

Mr. W. H. Boocock was elected a member of the Club.

Mr. F. SMITH proposed that the best thanks of the members be given to all the retiring officers. The motion was seconded by Mr. J. WHITEHEAD, and passed.

Mr. W. C. WILLIAMS replied in suitable terms, and said he wished other members to take part in the offices of the Club.

A ballot was then taken for the various officers, with the following results:—*President:* Mr. T. Birtwhistle.—*Vice-Presidents:* Rev. W. E. Hancock and Councillor J. Smith.—*Treasurer:* Mr. J. E. Jones.—*Secretary:* Mr. W. C. Williams.

The diploma certificates were then distributed as follows:—To Mr. W. C. Williams, the first prize for technical excellence and first prize for artistic merit. To Mr. Councillor John Smith, the second prize for technical excellence. To Mr. Edward Huntriss, the second prize for artistic merit.

Mr. Whiteley exhibited a shutter for instantaneous pictures, the exposure being made by the shutter sliding behind the lens, and could be used for slow as well as for quick exposures.

The meeting was then adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

THE first regular meeting of this Society for the winter session was held at Lamb's Hotel, on Thursday, the 4th inst.,—Mr. J. C. Cox, President, in the chair.

The CHAIRMAN congratulated the members on meeting again for the winter session, and made reference to the prominent place chemistry was to occupy in the new college. He said the members would find the chemistry classes exceedingly useful. The membership of the Association was rapidly increasing, and he was glad to see so many amateurs coming forward. He (the Chairman) also mentioned that he was in communication with several gentlemen of high scientific standing, with a view to getting them to lecture; and it was almost definitely arranged that Captain W. de W. Abney would lecture to the Association this winter.

Two new members were admitted, and six new applications for admission were handed in.

It was arranged to hold a series of competitions on set subjects. The one appointed for October was *Sky*, and that for November *Reflections.*

Correspondence.

RENDERING PAPER NEGATIVES TRANSLUCENT.

To the EDITORS.

GENTLEMEN,—Having tried the plan of using Canada balsam for rendering paper prints translucent, I find that it produces more or less of a mottled appearance in the paper by transmitted light.

Can you kindly suggest a remedy? I used of balsam two drachms, spirits of turpentine one ounce, and applied it with a flat brush. Three applications were required. It was applied on the non-albumenised side of the paper.—I am, yours, &c., G. T. THOMSON, M.D.

October 8, 1883.

[Where this difficulty is experienced it may generally be mitigated or altogether removed by treating the paper with hot water in order to remove the size; or, if this do not prove effective, the negative should be immersed in *very* dilute hydrochloric acid, then washed thoroughly, and dried.—EDS.]

PHOTOGRAPHY AND ART.

To the EDITORS.

GENTLEMEN,—In an article in last week's issue, Mr. W. J. Stillman discusses the question of Art and Photographers, and seems to say that because the photographer is at the last moment compelled to uncap a lens he must not be considered an artist or his work be called art.

Now it is impossible to feel the slightest interest in the self-styled *art*-photographer. Any man inclined to dub himself by this title falls at once into the category of "artistic" tailors, hairdressers, *danseuses*, &c., &c., and may extricate himself as he best can; but it is necessary to demur utterly to the sweeping implication that photography is not art. I notice that Mr. Stillman himself has not quite "the courage of his convictions," as, in concluding, he allows that "the man who waits for his reputation to precede him may win and wear proudly the epithet 'artistic.'" Of course he may.

In order that this happy consummation may be arrived at there are certain matters to be borne in mind. The photographer must have the artistic temperament and must cultivate the art of seeing. These two things granted, nearly all the rest follow. But there are other things he must bear in mind. He cannot ignore the laws of art, and he must aim at the same goal as the artist. The laws of art guide the beginner as to arrangement of lines, proportion of light and shade, and generally show him what to avoid and what to choose. They suggest how to mass his materials as regards lights, shadows, &c. As a photographer he is liable to certain temptations which he must carefully avoid. For instance: he must remember that nature and the artist's eye equally abhor microscopic definition all over the picture, and he must so arrange his subjects, if they can be arranged, as to give prominence to the *motif* of the picture; or, if they cannot be arranged, he must choose his standpoint with this object in view. Above all, he must strive to render apparent in the photograph some "feeling"—the characteristics of contrast, stillness, loneliness, motion, calm or storm—and so arouse in the minds of his audience the same idea which he felt when uncapping his lens.

The beginner in art is sometimes sorely puzzled as to what art is. He draws and then colours his subject with lifelike accuracy, and he stands by and sees it passed over without comment or set aside as feeble, while he finds other pictures commended, admired, purchased, in which there is apparently far less conscientious work. The reason is hidden for a while, but, by-and-by, when he has learned the rules and also learned when to break through them, he comes to that passionate love of nature and of his work that compels him to try and place his thoughts on canvas, and at last he is an artist, however successful.

Rules, brushes, colours, scumbling, and glazing are to the artist what formulæ, lenses, and cameras are to the photographer; and, no matter how perfectly mastered these things may be, this will make no man an artist.

It is easy, in one sense, to imagine that artists of a certain class will always run down photography, just as allopaths *will* run down homœopathy. This is, simply, human nature, of which there is a great deal in the world; but one must sympathise strongly with the artist who has set before him a photograph of a house broadside on, with distance and foreground equally sharp, and a white sky, or, worse, one painted-in from a cloud negative wrongly lighted.

Let photographers look upon their formulæ for emulsions, developers, &c., as tools, by the skilful use of which they may bring before the public Nature in her many moods; and, when they have reached their ideal as nearly as any man may, they will find themselves admitted to be artists, and their works to be art. An ideal is never reached, but should always be striven after. No man who does not believe in the ideal and strive after it will ever be more than Mr. Stillman tries to prove he is.

There is one point more: the artist, in comparing his work with photography, has always the advantage of colour; but this need not dis-

courage the photographer. I cannot help thinking that the love for black and white in art is a higher and more intellectual appreciation than the love of colour. Colour appeals to the senses, and will always attract the crowd; but the photographer, while his "audience" is more limited, has the pleasure of appealing to the intellectual lovers of etching and sculpture, and in winning their appreciation he wins the highest applause. H. NORWOOD ATKINS.

Liverpool, October 10, 1883.

THE RECENT COPYRIGHT DECISIONS.

To the EDITORS.

GENTLEMEN,—No one doubts, I suppose, that the *copyright* in the photograph of *The Cricketers* does of right belong to the party claiming it; and it seems to me equally plain, in spite of "Audi Alteram Partem's" tone of authority, that the only man who could be called "author" of that picture is the operator who took it.

"Audi Alteram Partem's" definition of the author of a work of art seems to be the man who originates the idea embodied in it. Who in this case had any chance of originating or embodying any idea except the operator? The idea of the man who sent him could scarcely have been more than a general jumble of all the cricket groups he had ever seen—the only definite item the number of figures. There seems no reason to suppose he did anything more than any sharp man of business might have done, and yet have been utterly incapable of originating a work of art, or caring for one when he saw it.

Besides, the case might very well be turned about. A clever photographer might be a bad man of business, and employ some one else to deal with the public while he devoted himself to operating. How many times more insanely unjust the matter would appear then if, on appealing to a court of law, he found the copyright of his works belonged to his business man!

Is it not, too, a question whether that photograph has, in "Audi Alteram Partem's" superlative sense of the term, any "idea" for any-one to be the author of? It must be a remarkable cricket group if it have.—I am, yours, &c., W. PAGE.

October 8, 1883.

EXCHANGE COLUMN.

Wanted, a half-plate landscape lens, or *carte* ditto, in exchange for a miniature anglo-concertina in mahogany case.—Address, H. C. PARLOW, The Elms, Eckington, Chesterfield.

I will exchange a nine and a-half-inch square bellows-body camera and lens, in perfect order, for a magic lantern of good make.—Address, R. J. SHEERMAN, 147, Clarence-road, Lower Clapton, E.

I will exchange a Haddon Hall steps, pillar, and wall, also a cabinet with five changes, pine folio bookcase, &c., for anything useful in photography.—Address, GEO. READ, photographer, Market-place, Preston.

Wanted, a 6 × 5 ordinary-angle Ross's doublet in exchange for twelve oak printing-frames, various sizes, in good condition, all with plate glass.—Address, C. COLEBURN, The Pottery, Green Lanes, Finsbury-park, N.

I will exchange a cabinet rolling-machine, lime light jet, half-plate view lens, whole-plate watertight bath and dipper, eight-feet gas bag and posing-chair, for anything useful.—Address, HOUGHTON, New Wortley, Leeds.

I will exchange a photographic rolling-press, with massive steel plate, nickel-plated, for a half-plate square studio camera without lens.—Address, G. H. PYNE JONES, 33, Devonshire-street, Monckwearmouth, Sunderland.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Frederick William Livsey, The Rowlands, Summerseat, near Manchester.—*Two Photographs of John Holding.*

X. X. X.—It is not the fault of the paper, but of the negative. From such a very inferior negative (excuse our saying so) it is impossible, with any paper, to get even moderately good prints.

S. STEPHENS.—Your letter contains nothing fresh on the subject; indeed, it is but a repetition of others which have already appeared. We can only hope that the law will be speedily amended.

HY. WASSELL.—The copies of coins you so much admire were (so we are told) not made from the coins themselves, but from copies in plaster of Paris. These casts copy much better than the originals would do.

G. MARTIN.—Vessels of sheet tin will do quite well for developing gelatino-bromide paper, but not for the fixing. For this you will have to employ porcelain vessels. If the latter be employed they should be coated with shellac or paraffine.

W. H. M.—There is practically nothing better than pumice stone for removing the stains. But why get the fingers stained at all when it is so easily avoided? Stained fingers are now looked upon as evidences of clumsy manipulation.

FOGGED ONE.—A little fresh acetate of soda should be added with the gold occasionally. If you have had the bath in constant use for three weeks we think you would do well to make up a new one rather than try to renovate a bath that has done so much service.

E. W. B.—Probably the reason you have got a negative from a negative, instead of a positive, is that you have very much over-exposed, and so brought about a reversed action of light. You say you exposed for six seconds, but do not mention to what light. If you exposed that time to daylight there is little wonder that you got a reversed action.

A. M. H.—If you employ indian-ink for spotting the prints you must a[dd] other colours to make it match the tone of the photograph. Indigo a[nd] crimson lake will assist you. Employ plenty of gum with the colo[ur] and that will remedy the dullness of which you complain.

H. B. WILSON.—The picture is decidedly a silver print, and not, as y[ou] have been led to suppose, a collotype or Woodburytype. Evident[ly] silver prints at the price you paid for this must carry some profit to t[he] producer, otherwise they would not be published at so small an amoun[t].

CALCO.—During the time the Photographic Exhibition remains open, eac[h] Monday evening there will be an exhibition of transparencies with th[e] Society's lantern. If you take your slides there you will have an oppo[r]tunity of passing them through the lantern, supposing them to be [of] sufficient merit. They have to pass a committee of inspection.

A NEW HAND.—There is no universal rule with regard to re-sittings. Eac[h] photographer has rules of his own, and is not governed by those of any one else. If, as you say, you are a "fresh one in photography," yo[u] will perhaps do well, in a business point of view, not to refuse re-sitting. It may not always be the fault of your sitter, you mus[t] remember.

C. S. H.—The spots on the negative are the ordinary silver stains, which are produced by the paper when negatives are insufficiently washed. W[e] fail to see that the spots are more prevalent where the varnish is thickest; they certainly are not on the negative forwarded. Any maker's plate will stain in a similar manner, if the hyposulphite of soda be not thoroughly removed.

ALFRED WATKINS.—Photographs on wood blocks may be produced in various ways. The powder process and the carbon process are those generally practised commercially. When the latter process is used a tissue must be selected which contains a large amount of colouring matter in proportion to the gelatine. If you wish to produce a small print from a large negative you will have to make a reduced negative first.

S. S. J. (Herts.).—We certainly do not agree with you that the standard of photography has been lowered since the introduction of gelatine plates; on the contrary, we consider it has been raised. We think you will be of the same opinion when you have paid your promised visit to the Exhibition. You will see a marked difference in the work now done with gelatine from that which was thought good before you left England four years ago.

E. E. writes, asking a series of questions which a careful perusal of recent numbers of the Journal would have answered for him. He also sends a number of sensitive plates, the sensitometer numbers of which he wishes to know. He explains that he is "but an amateur" (why the "but?"), and that the necessary appliances are beyond his means. His letter reached us the day before we go to press, and we regret very much we were unable to stop the publication in order to test his plates; unfortunately, at anyrate, we were unable to reply in the same week's number, as we always prefer to do when it is at all possible. As we have since learnt from the same correspondent (his first letter is dated October 2nd) that he does not "appreciate having the go-bye," we beg to say that his plates will be tested and duly reported upon when time permits.

RECEIVED.—F. E. Ives; John Carbutt; "Audi Alteram Partem;" S. Hyams. In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday next, the 17th inst., the subject for discussion will be the adjourned discussion—*On the Toning of Ready-Sensitised Paper.*

PHOTOGRAPHY AND THE THEATRICAL PROFESSION IN AMERICA.—The New York *Morning Journal* gives some curious details of what may be called "the theatrical department of the photographic business." Foreign theatrical celebrities, we learn, will not sit for their photographs now in New York unless they are paid for it. Sarah Bernhardt was the first among them to make payment a *sine quâ non.* She was besieged at her hotel by representatives of the various photographic firms, but she positively refused to be taken unless she were paid fifteen hundred dollars for the day the operation would cost her. Sarony, the leading New York photographer, gave the price demanded, and made a large profit by the transaction. He was so much encouraged by this success that he offered Madame Patti a thousand dollars for a sitting when she arrived in New York, and the *prima donna* accepted it. The result was not, however, so satisfactory as in the other case. There was a clause in the agreement that the sitter should have the privilege of rejecting any of the negatives that did not please her, and she broke them all but one. Mrs. Langtry received nothing from the photographers, and was always willing to sit when requested. Pictures of her were, in fact, already so numerous that any considerable addition to the numbers would have made a glut in the market. Sarony has already offered Mr. Irving a thousand dollars for his picture; and it is said that the offer has been accepted. A Broadway retailer told the writer of the notice that Madame Nilsson's portrait was the one most in demand at present. "Oscar Wilde," he added, "sold first-class when first he came over; but there is nothing doing in him now. Irving will sell big; and I guess Ellen Terry will be a big go. We're badly in want of something new."

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1224. Vol. XXX.—OCTOBER 19, 1883.

PHOTOMICROGRAPHY.

Mr. G. E. Davis, in his book on *Microscopy*, gives two diagrams of the plan he adopts, and for the large form prefers the sliding-box camera of several pieces. As regards the method of focussing different plans have been stated, and as some may like to try them they may appropriately be named here. Mr. Davis, at page 211, writes:—"The author now uses a much-improved method for focussing. Removing the ground-glass slide another is substituted of mahogany, but pierced with a series of seven holes, into each of which the ordinary A eyepiece may be fixed. The thickness of the slide is such that, when the eyepiece is pushed in as far as it will go, the diaphragm lies in the same plane as the ground surface of the glass slide. To any one accustomed to focus by the old method the present system will be found a considerable improvement, it being *easy* under these conditions to obtain a sharp focus with an ordinary paraffine lamp when using the $\frac{1}{16}$th objective." Mr. G. Smith, in his paper on *Lanterns and Slides* in this Journal, advises:—"Take an ordinary focussing eyepiece and adjust it carefully for the ground glass. If the eyepiece be now reversed and fitted in a little frame in such a way that, when put in the place of the focussing-screen, the outer surface of the lens is in the same plane as the ground surface of the screen would be, and the eye held at the open end of the tube, focussing can be done with the greatest nicety, details being distinctly seen which the finest ground glass would obscure."

In *La Nature*, No. 452, January 28, 1882, is described the method of photomicroscopy pursued at the Municipal Laboratory of Chemistry in Paris, under M. Girard, for not only biological study, but the examination also of adulterated and unfit articles of food. Three plans are described by M. Tissandier as regards obtaining the image. In the first the virtual image is transformed into a real one by displacement of the eyepiece, so that the image formed by the objective is between the focus of the ocular glass and its centre of curvature; the image then being formed on the other side of the eyeglass is real, and may be received upon the focussing-screen. The second plan, suggested by Dr. Vogel, is by seeking the virtual image that is formed in the microscope by means of a camera with a short-focus lens, the position of the image depending upon the magnifying power of the ocular, and is usually in advance of the eyepiece about 0·12 m. to 0·18 m.; hence the lens of the camera is nearly touching the eyepiece. The other plan, which is figured in *La Nature*, may be briefly described. There is a special dark room. The microscope is placed horizontally in the middle, the camera to the right, and a connection made between its lens and the eye end of the microscope by the use of a long tube. To the left is placed the lamp—the oxy-hydrogen light answering for the magnification to 300 diameters, and the electric light for enlargement up to 800 diameters. The principle is that luminous pencils having a great distance of conjugate focus become nearly parallel, and that the points situated in planes near to the true focal plane are reproduced by points scarcely larger than those in the focal plane. Thus it is stated to be especially adapted to photographing histological sections, crystals, &c. A translation of the article is given in the *English Mechanic*, February 17, 1882.

Dr. Carl Seiler, in a communication to the Photographic Society of Philadelphia, noticed in the pages of this Journal for 1876, page 55, describes the way by which he overcame a difficulty in photographing the blood discs on account of the depressed centre. When this part was in focus the definition of the edge of the disc was unsatisfactory. He endeavoured to meet this want of coincidence in the focus by using an eyepiece composed of a bi-convex and a plano-convex lens separated the necessary distance from each other. This plan considerably increased the time of exposure, the distance of the object from the screen being ten feet; but, remarking that a small brilliant aërial image was formed at a short distance from the eyepiece, he placed a Dallmeyer's rectilinear lens 4-4 in the proper position to receive the image, and transmit it to the screen, thus obtaining excellent definition and great reduction in the time of exposure—five seconds in sunlight. This is similar to the plan adopted by Dr. Vogel.

Visual and Actinic Focus.—In the work, already referred to, by Dr. Moitessier is described the method he advises for securing the correct visual focus of the image upon the screen when this is placed at a short distance from the object. He places in the slide-holder of the sensitive plate a plate of glass ruled on the surface next to the object with very fine micrometric lines. Then these are brought into focus by a strong focussing eyeglass or, better, a small microscope furnishing a magnifying power of about twenty diameters. The objective to be used being screwed into its position, an object with very delicate details is now placed on the stage of the microscope and brought into focus by using the small microscope as an eyepiece, so that when the lines and the details of the object are both in focus the image corresponds with the micrometric lines. The small microscope is removed, and the slide, with its ruled glass, is now replaced by an ordinary ocular. The focus will be found not to correspond with the former when the eyepiece occupies its usual position; but on withdrawing it gradually, without touching the focussing-screws, a position will be found when the object is in correct focus. If the same ocular be fixed in this new position (which should be carefully determined) then, with the same objective and other conditions remaining the same, the visual focus is constant, and the object will be in focus when the screen is inserted, or, what comes to the same thing, the image will be in correct focus on the sensitised plate.

To facilitate the use of this method an additional tube about two centimetres long, with a shoulder or ledge, is placed in the eye end of the microscope tube, the eyepiece fitting smoothly yet somewhat stiffly at the opposite end. Part of the side of this additional tube is cut away to form a kind of open window in the direction of the length of the tube, one of the long sides of the cut being graduated. A line is cut round the brass tube of the ocular, and by its means the corresponding point on the graduations can be read off that marks the exact focal position already determined. The position of the eyepiece in the tube can be always repeated, and by focussing the object at that graduation the focus is found for the position of the sensitised plate.

Any alterations in the distance between the object and the screen alters the conditions, and the graduations must be reset.

The same object can be gained by keeping the eye to the small microscope with the lines in focus, and finding by the movement of the screen the coincidence of the image. It is necessary to adopt some means by which the small microscope can be held steadily in its proper position whilst in use, yet free to move over any part of the focussing-screen. A well-made Ramsden eyepiece is generally made to take the place of the small microscope. When the image is projected, at some distance from the object, upon the screen there is often difficulty in focussing very minute details, owing to the luminous impression being feeble, and this becomes greater the further the screen is removed. This inconvenience is largely obviated by receiving the image (as was long since adopted by Mr. Wenhom) puon a fine, white cardboard placed exactly in the same plane as the ground glass or the sensitised plate will occupy. This is most convenient when operating in the dark room as a camera, or by the plan proposed by Mr. Charters White. The same plan can be utilised by having a door in the side of the camera through which the image can be viewed by the naked eye, or by the help of a lens, and which can be closed light-tight. We found this plan, though somewhat tiresome, effectual. In case of the risk of vibrations in closing the door, a light-tight flap suffices. Dr. Moitessier gives a figure of the same as applied to the microscope camera, in both its horizontal and upright position.

These plans relate only to the *visual* and not to the *actinic* image or focus, which, in objectives, when the difference of these foci is apparent, must yet be determined. Seeing, then, that the correct visual focus does not always suffice to obtain a perfect negative through want of the coincidence of these foci, it may be well here to name the various methods that have been adopted to meet the necessity. That which was advised by Mr. Wenham (before alluded to), and which we and others have found satisfactory, is the adaptation of a highly-polished, thin, plano-convex or spectacle lens of the requisite focus, fixed in a cell that screws into the back of the objective, and produces the necessary positive correction in the negatively-corrected objective. The proper lens is best selected by the optician, or, as adopted by Mr. Hislop, a selection made from a series kept on hand. A different plan can be used, which entails some little trouble, but which will repay the operator when once carefully done:—Obtain a well-defined visual image on the screen of some object presenting two or three distinct planes, as delicate hairs or markings upon the upper and under surface of the object; correctly focus the upper and take a negative of the object. Should the part as seen in perfect focus on the screen correspond in definition in the negative, no alteration may be required; but, if the upper details be obscure and the under in focus, withdraw the objective by the fine focussing-screw until that part of the object has become indistinct upon the screen, and proceed to take a second negative. The correction may now, by a comparison of the two negatives, show that either the fine focussing-screw has been turned too much, too little, or to the exact position, the upper markings coming into perfect focus. Note how many parts of a revolution, or how many divisions on the head of the screw of the fine adjustment, have been turned through to effect the correction, so that, a perfect visual focus of an object by that objective having been obtained, at a like distance the requisite adjustment for the actinic focus can be readily made.

Drs. Wilson and Abercrombie obtained the fine focussing by a rod and lever made to clamp the milled head of the coarse adjustment, thus securing a very delicate motion, whilst the fine focussing-screw was used to effect the correction of the actinic focus. A cardboard dial plate fastened on the body of the microscope, and a bent wire made to clip the head of the focussing-screw to be used as an index, furnish a method for reading the corrections. See *Popular Science Review*, 1867.

Mr. G. J. Johnson, in a paper communicated to the Manchester Photographic Society, published in The British Journal of Photography for February 23rd and March 2nd, 1883, obtains the same object in a somewhat different manner. A short split tube, with a pointer, is made to slide stiffly on the shaft of the fine adjustment; a semicircle of cardboard graduated in degrees up to 90°, having its centre coincident with the axis of the fine adjustment, is placed behind the pointer. The split tube allows the entire revolution of the adjustment-screw, whilst the pointer acts as an index through 90°. An ingenious plan, to represent an object with different planes, is adopted by using in its place on the stage an ordinary micrometer ruled to $\frac{1}{100}$ and $\frac{1}{1000}$, fixed at an angle of 15° or 18°, so that each line has a varying focal point, and thus a relation is established between the line in focus photographically with the line visually focussed, and the number of degrees the index was moved to again bring this line into focus. M. Bertsch found, in an ordinary objective of half-a-millimetre focal distance, a difference in the two foci of the one hundredth and eightieth of a millimetre in an object magnified 500 diameters. See *Comptes Rendus*, tom. xlv., 1857, p. 213.

Theoretically, if the distance of the screen be much altered either way, as there would be a different focus, the actinic focus would vary slightly, but in practice this is neglected. Some—as Mr. Shadbolt and Mr. Davis—have given the alterations required in the focussing with different objectives. The former, when using artificial light, found the one and a-half inch objective had to be withdrawn $\frac{1}{50}$th of an inch, the $\frac{2}{3}$rd $\frac{1}{200}$, and the $\frac{4}{10}$th $\frac{1}{1000}$ of an inch in Mr. Beck's objectives. Mr. Davis gives his results with various objectives at page 212 of his *Practical Microscopy*. In the higher powers, ranging from the $\frac{1}{4}$th upwards, the actinic and visual foci so closely correspond that the correction is usually neglected.

THE ELECTRIC LIGHT IN PHOTOGRAPHY.

In concluding the article on *Electricity and Photography* last week we intimated we should resume the subject of the electric light as applied to photography. As the season is rapidly approaching when artificial lighting in the studio would be of immense commercial value to a large proportion of photographers (if they could only make it available), we therefore take the earliest opportunity of redeeming our promise. For several years past, as the dark days approach, we have received numerous letters from correspondents asking advice with regard to the cheapest means of making the electric light available during the winter months, and whether a Grove or a Bunsen battery would not answer the purpose as well as the more expensive dynamo machine. It is with a view to the enlightenment of such correspondents the present article is written.

Now, it matters not from which source the electricity is obtained—whether from the now old-fashioned battery or the modern dynamo—provided that it be sufficient in quantity and of the necessary electro-motive force for the purpose intended. There is no question that the first cost of a battery is but a fraction of that of a dynamo even of the cheapest form; and in addition to the cost of the machine itself a motor of some kind is required to work it—either a steam or, what is more convenient, a gas engine—which, as a matter of course, very materially adds to the outlay.

In our volume for 1879, Mr. G. F. Williams, in a very comprehensive series of articles, gave practical details as to how batteries suitable for electric lighting may be constructed—or, perhaps, to speak more correctly, where the separate parts, which only require putting together, may be purchased at the smallest possible cost—also how they may be worked in the most economical manner. Such of our readers as may desire really practical information on this point cannot do better than refer to those articles. In his estimate of the cost, Mr. Williams gives that of a Bunsen battery of forty cells of the largest size at about ten guineas, and the expense of charging it at twenty-eight shillings. A battery of forty cells, of the size given, will, we know, yield an excellent light; yet, on the whole, we would prefer to use one of fifty cells when the light has to be employed for portraiture.

In a second estimate, for fifty cells of the square form, and still a very useful size for photographers though smaller than the above, Mr. Williams gives the cost as something under nine pounds, and the expense of charging it a little under ten shillings. A Grove's battery of the same size as the above will cost somewhere about twenty pounds, depending upon the thickness of the platinum employed. The expense of charging such a battery will be about twelve shillings.

The difference between the Bunsen and Grove batteries, we may ɜxplain to our non-electrical readers, is that in the latter the carbon ɛlement of the Bunsen is replaced by one of a thin plate of platiıum; hence the increased cost. The extra expense of charging he Grove form is due to the platinum foil taking up less room in he porous cell than the carbon, consequently more nitric acid is equired to fill it. As the battery, when charged, will work only or a very few hours, it will be seen that, although the first cost of he apparatus, when procured as Mr. Williams directs, is comparaively small, the expense of working it is very large for material lone. Added to this the charging and discharging of the battery ccupies considerable time, and although no great skill is requisite t is not an operation that can be entrusted to everyone. Furthernore, there is the serious inconvenience that the battery must be laced in the open air, as the acid fumes evolved from it while in peration are most pernicious—indeed, very dangerous—if inhaled. Hence, as everyone knows who has had any practical experience vith electric lighting with battery power, it is most troublesome, nd at the same time very expensive. Nevertheless, it may be nentioned that, up to the last few years, all the electric lighting hat was done was accomplished with the aid of the battery.

At the technical meeting of the South London Photographic Society, ıeld in 1881, Mr. A. J. Jarman exhibited what is known as the bichroıate battery, which he had specially modified for the use of photoraphers in portraiture. It consisted of some fifty cells, each ontaining an element of carbon and one of zinc, no porous cell being equired. For exciting this form of battery a solution of bichromate f potash mixed with sulphuric acid is employed, the estimated cost of harging it being five shillings. One great advantage of the bichromate attery is that it evolves no deleterious fumes like either of those to vhich we have previously alluded. For this reason it may be placed n the studio if required or in a room adjacent. It also possesses high electro-motive force which for electric lighting is a great dvantage. Unfortunately this form of battery will only work ontinuously for a few minutes, but when its action ceases it may be estored by stirring or agitating the solution, when it will work again or a few minutes longer; after this it will once more require fresh gitation. In portraiture a continuous action for a lengthened period s not necessary; for, so long as the battery is sufficiently steady to ermit of an exposure of a few seconds to be given, that is all that is eally required. In order to overcome the inconvenience of having o stir the solution in each cell, when the battery becomes sluggish Mr. Jarman devised a mechanical arrangement by which all the lements can be raised and lowered at once. By this means the olution is sufficiently agitated to restore the battery to an active ondition. The cost of the battery with Mr. Jarman's modification vas, if we remember rightly, a little more than that quoted above or the Grove form. From the foregoing it may be judged how far he electric light with battery power will answer the reader's requireıents. We shall now dismiss the question of batteries, and consider he other available sources of electricity.

During the past two or three years we have been promised great ıings from "stored-up electricity," accumulators, or secondary atteries, by which electricity may be kept in reserve, to be "drawn ff as required;" but, up to the present time, nothing has been roduced in this direction that would be of any practical value to ıe photographer for studio work.

The time may possibly come when electricity will be laid on, as ıs now is, in which case the photographer will be enabled to obtain supply without having to incur the trouble and expense necessary r its generation. In some few neighbourhoods this is now the ıse to a limited extent, and the photographer who happens to be nveniently situated can have it laid to his studio to be used as quired. But unfortunately for him, in most instances, the ıachines are not kept running during daytime, when there is the ıost demand for the light in the studio during the winter months. Ience, for the present, the photographer who wishes to utilise the ght must, perforce, have his own dynamo, or be content with that hich is more troublesome and expensive in use—a battery.

In addition to the cost of the means of generating electricity, an c lamp of some form must be employed for regulating the distance between the carbon points, in order to keep the light uniform while in action—that is, supposing a continuous light to be essential, as it is in the case of printing, copying, or enlarging. But when the light is only required for a few seconds, as in taking a portrait, the lamp may be dispensed with, and the carbons regulated by a simple lever arrangement governed by hand. This is the plan usually adopted by those who are now utilising the light for portraiture.

The cost of an ordinary automatic lamp, either for a dynamo or battery, as a source of electricity is the same, and is ab ut twelve pounds. But if it be essential that the light should be kept at the same point while burning—as it will be if it is employed in an enlarging apparatus, where the light must be maintained in the axis of the condensers—the cost of a lamp fulfilling these eonditions will be about half as much more.

Considering the interest now taken by photographers in electric lighting, and wishing to afford all possible information on the subject, we are reluctantly compelled for want of space to defer the consideration of the cost of the installation of a dynamo machine until next week.

THE PHOTOGRAPHIC EXHIBITION.

[Second Notice.]

Since the publication of the second edition of the catalogue, accompanied by the usual index of exhibitors, we have been able to find several works belonging to the medallists noticed last week which we had not previously seen or, at least, identified. As, however, the judges' awards have been in the majority of cases given to what we consider the best pictures, we need scarcely add anything to our remarks of last week. We give in the present issue the first instalment of our exhibition sketches; but the crowded state of our columns prevents our even completing our selection of the prize pictures. We hope, however, next week to be able to run abreast with the current notice; meanwhile, we are compelled to depart a little from the strict order of the catalogue.

No. 335—*Portrait*. By J. Bullock.

The School of Military Engineering, in frame No. 8, exhibit some of the very few wet collodion pictures in the present collection. These are, as usual, of good quality, the best, perhaps, being *Warwick* (No. 1 in the frame). Two views of *Guy's Cliff*, on gelatine plates, are scarcely distinguishable from the wet collodion work.

Mr. E. H. Griffiths exhibits a number of excellent landscapes, chiefly Thames views, one of the finest of which is *Wargrave* (No. 103). Views near Cookham and Henley are also good.

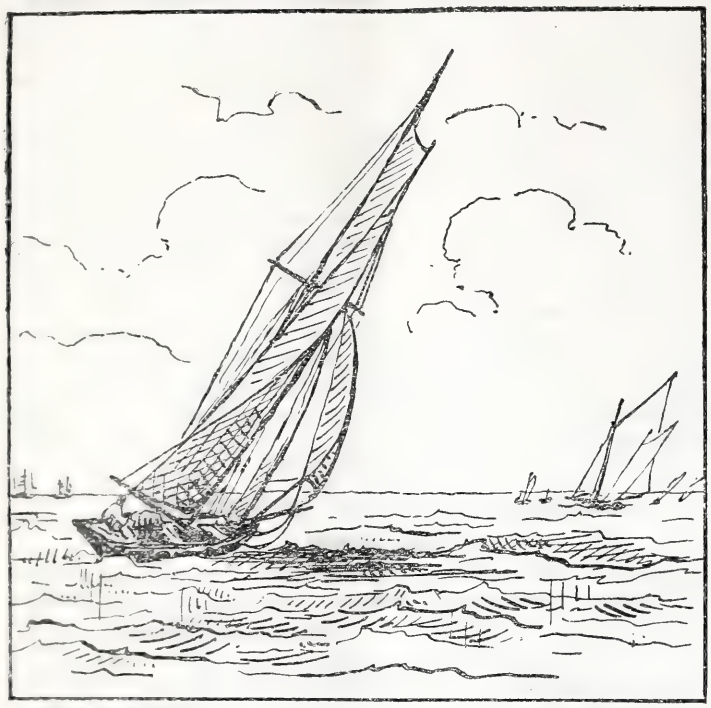
Mr. Charles Andreæ exhibits a frame (No. 11) of views upon gelatine plates of his own manufacture. The views of *Cowes* are particularly good, as is also *Cowdray Castle*.

Mr. William Muller has three frames of Swiss views, which are above the ordinary standard of such work; indeed, it is somewhat surprising that he should have been passed over by the judges. *View from Chamounix* and *The Tête Noire*, in No. 13, are specially worthy of notice.

Mr. G. Selwyn Edwards has a frame of meritorious *Sea Views* (No. 15), taken upon plates of his own manufacture.

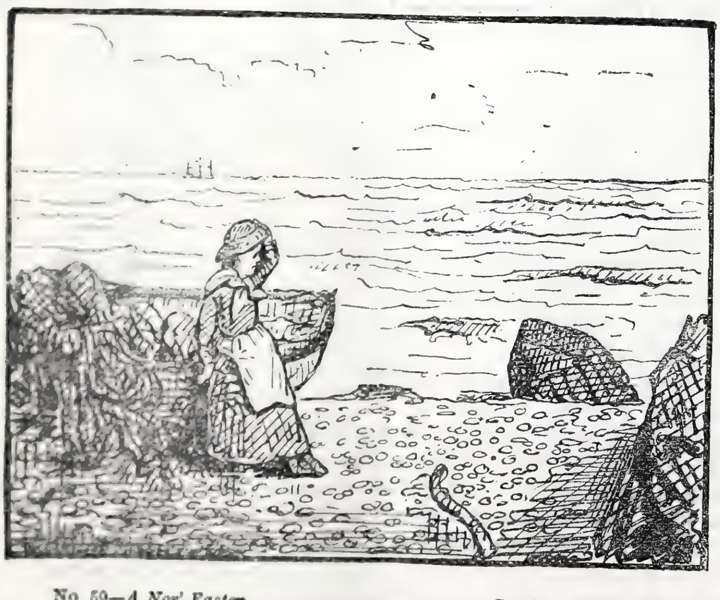
Mr. William Bedford is this year represented by only two frames containing four *Landscapes* (Nos. 19 and 20). If the quantity be

small the quality is all that could be desired; indeed, we have seldom seen more pleasing renderings of tree subjects, the composition and execution being alike perfect.



No. 223—*Yachts.* By G. West and Sons.

Mr. Henry Stevens's work in flower subjects is now so well known as to scarcely require any description. He has this year, however, entered upon a larger size, exhibiting a fine collection of direct 15 × 12 studies, whereas his last year's pictures consisted only of 10 × 8 and enlargements. With the increase in size there is, at least, no falling off in quality; indeed, some of his work this year seems to surpass any we have previously seen. Perhaps his best frame is No. 250, which is, however, so effectually "skied" that it is scarcely possible to examine it with satisfaction. The figure studies of the same artist are also noticeable.



No. 59—*A Nor' Easter.* By H. P. Robinson.

Mr. H. Manfield exhibits several frames of views in Switzerland and Italy, which do credit to an artist who has already carried off several medals for his productions in different classes. His views of Lugano and Maggiore are specially fine.

Mr. P. H. Buxton exhibits views in British Columbia and the States which, if not of the highest order of photographic merit, are worthy of praise if only for the difficulties which must have been overcome in their production.

Mr. T. M. Brownrigg has this year departed from his usual size (12 × 10), and exhibits a number of charming little studies in Italy (Nos. 31-4), also *Cottages at Lynmouth* (No. 37), which is a fine composition.

No. 132—*Noontide.* By Herbert B. Berkeley.

Mr. Edward Brightman is, as usual, good, some of his pictures rivalling any of the landscapes in the Exhibition. The selection and treatment of the subjects are invariably excellent, while no little of the ultimate success is due to the admirable and careful manner in which the printing has been done. *Early Morn* (No. 43) and *Tintern Abbey* (No. 44) are among the best.

Mr. H. J. Godbold has several capital little studies of breaking waves, amongst which may be noticed specially *A Storm at Hastings* (No. 46) and *A Boisterous Sea* (No. 77).

Of Mr. George Renwick's pictures (Nos. 53-6) we must speak with caution; for, though catalogued as *Snow Scenes*, he objects to their being described as such. Whether they be frost or snow scenes they are very effective; and, though they may be the same works he exhibited at Brussels, we must still assert that they are in his "well-known" style.

We shall continue our notice next week, our space on this occasion being limited by pressure of other matters.

THE PHOTOGRAPHERS OF THE FUTURE.

It is a gratifying fact that, concurrently with the advance in the status of photography, which everyone will admit is both marked and continuous, the professional photographer himself is also on a higher level, intellectually and socially, than many of those pioneers of portraiture who, a few decades ago, formed the bulk of the body photographic. Time was when, after the fashion of the schoolmaster of a more distant period, who was so often appointed from his failure in, or incapacity to fill, other positions, so a man chose "portrait-taking" as a last resource after numerous failures in other walks; and excellently well did some of these pioneers profit by their new calling.

For success nowadays, however, a photographer must possess, besides business tact, knowledge, artistic skill, and that manipulative dexterity which practice alone can give. These requirements are now possessed by many, and the knowledge that they are necessary has a tendency to keep, if not to bring, good men into the ranks of the profession. But on this very account—the training necessary to success—we must for the future rather look to the beginners and learners of the present for the best men, as the many directions into which the art-science has ramified make still increased calls upon the skilfulness of the photographic worker.

We are thus brought face to face with the question which forms the subject of our article—the training of those younger members of the fraternity from whom the operators and the principals of the future will mainly be derived; for the requirements of photography are increasing so rapidly that we do not apprehend that after a few years time many amateurs will take up the art as a profession.

There are at the present time, and we do not doubt the number will continue to increase, many youths who are under indentures to photographers to learn the art in its various branches, or, possibly, a single branch only; and the question naturally arises—What is

being done to train them so as to specially fit them for their work? The answer would usually be, we expect, "nothing beyond letting them watch others and work themselves." More than this should be done. Every apprentice or young learner of the art should further increase his knowledge by obtaining instruction in certain walks of science, and, in addition, as much training in the principles and practice of art as he can. The burden of seeing to this should fall upon the principal, and he, if he have a just regard for the dignity and the future of his calling, will not neglect the obligation—at the very least to the extent of recommending his pupils or apprentices to study both in art and science. There are classes in almost every town where, under the direction of the South Kensington authorities, or, perhaps, those of the City of London Guilds, most efficient education may be had at a very small cost in these departments of learning.

In a conversation we recently had with the head of one of the great engineering firms of the north, at whose works a very large number of hands are employed, we were much struck by one of the rules which he informed us were rigidly enforced at his establishment. It was that they would take no apprentice who was not willing to enter and make the proper number of attendances at one of the evening science classes in connection with South Kensington established in the city. Our readers may be aware that lads under indentures to engineers—working apprentices let it be understood, not premium apprentices—are by no means taken from the "educated classes;" they are just average workmen; and if a master can get such youths to surrender from their "play time" the hours necessary to undertake evening lessons to improve them in their acquaintance with, and the exercise of, their craft, it cannot be unreasonable to look for at least a similar expectation on the part of employers who have under their charge, in a sense, learners in a more delicate and more artistic craft, such as is photography.

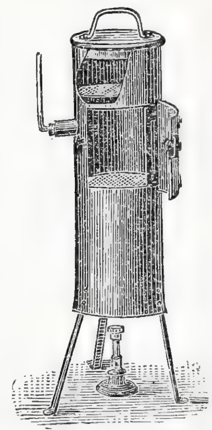
We may probably be told, as, indeed, has occurred to us, that the budding photographers are the porters and errand-boys and helps about an establishment who have picked up by degrees sufficient knowledge of the art to become operators and printers themselves. Very likely such may be the case in some instances, and all honour we say to those who have so worked their way up; but the same thing occurs in many other professions. Take the difficult one of law, for instance. How many skilful solicitors are there not now who have started life in no better position than the stool of a clerk, remunerated by a few shillings a week; but who, by diligence and attention, attracted their employers' attention, who have found it worth while to bestow on them their articles! Yet this does not militate against the fact that the larger number enter the profession in the usual way, by becoming what is neither more nor less than apprentices.

There is a future for photography. It has grown in importance with greater rapidity than any art or science of the day (unless we may except electric lighting), and it continues to grow. It has become a necessity in many walks of science and art; and with the various departments of the more artistic portraiture and landscape, or the scientific astronomical work, the modes of mechanical printing from wood, stone, metal, or gelatine surfaces—all requiring skilled workmen—a very large number of photographers must be employed throughout the country.

We urge upon all employers the desirability of increasing the usefulness of all apprentices and others under their charge—for the sake of their art and the future of these young photographers—by giving them the opportunity, and pointing out the advantages, of obtaining a knowledge of chemistry, and of training their fingers in at least learning to draw with some amount of readiness and skill. There are evening classes in all towns of any size where such knowledge can be easily and cheaply obtained; and by thus seeing to the training of young photographers they will both confer a benefit on the youths themselves and contribute to raising the status of an art which is already as important as it is interesting.

We have before us a number of very fine specimens of phototype prints by Ives's process, which the inventor has sent us in order to prove that he, and not Messrs. Brown, Barnes, and Bell, was the first to adapt photo-etched blocks to ordinary newspaper printing. There appears to be some slight misunderstanding with regard to what has been claimed by Messrs. Brown, Barnes, and Bell, namely, that they are the first who have succeeded in printing an untouched photo-etched block with type on a fast printing machine, and under the conditions which prevail in the printing of a newspaper of large circulation. Of the beauty of Mr. Ives's specimens there cannot be a doubt—some of them are among the best we have yet seen—but they are not produced under the conditions we mention. Even the examples of illustrations that have actually appeared in different American publications have enjoyed an amount of careful treatment they would have little chance of receiving in this country—certainly not on a newspaper; and they are, moreover, all printed on a more or less highly-surfaced paper. Messrs. Brown, Barnes, and Bell have made no claim in connection with high-class work, but merely that they have succeeded in arriving at a cheap process.

A very interesting description of a simple drying-stove, the invention of M. de Thierry, is given in a foreign contemporary, whose ingenious forms of apparatus are, it states, well known to students.



The sketch we give will, with very little explanation, enable our readers to fully comprehend the stove and its workings. A piece of stove pipe, closed at its upper end by a lid or stopper, provided with a handle [which, by the way, would be improved by being partially of wood.—Eds.] forms the body of the stove. Two pieces of copper wire gauze—one on a level with the bottom of the side door and the other about half-an-inch below the lid—support the articles to be dried. A thermometer (if necessary, a thermometric gas governor) allows the temperature to be taken. The heat required to produce the current of air is supplied by a Bunsen burner. Should a filter or a precipitate require drying without burning, it suffices to raise the lid and a brisk current of air rapidly dries it, and at a low temperature. If heat be required in the drying, the lid can be adjusted to a nicety to regulate the egress of hot air.

Though we are apparently not to have any comet of importance this year, there yet have been several minor ones visible, and Mr. Brooks discovered, some time ago, one which the experts say is comet Pons, and which it is anticipated will be visible to the naked eye as the year approaches its close. That will not be a favourable time for photography.

Some time ago we gave an illustration of a machine which was at work in Paris, actuated solely by the action of the sun's rays. We understand that three such machines have been set up in Algeria for the use of the French Government, and the inventor is now carrying on experiments at the Island of Porquerolles, near Hyères, in France, where his machines are at work thrashing Indian corn and raising water with no help but that provided by the sun's rays.

The Rev. A. Irving, B.Sc., brought before the British Association some account of a remarkable body which will be of considerable interest to photographers. He stated that he was aware of only one foreign book where it was alluded to, and of no English work, so that the matter will, probably, be as new to our readers as it was to his audience. When thoroughly dried air is passed over molten phosphorous contained in the bend of a tube furnished with bulbs or contractions at the opposite or egress end, phosphorous anhydride is produced and carried forward in snowlike drifts to the bulbs. If these are then sealed off from contact with air they can be kept unchanged in the dark for any length of time. Here comes the

remarkable part. The affinity of the preparation for oxygen and water is so great that if one of the bulbs containing it be broken and the contents shaken out it will spontaneously take fire from absorption of oxygen and water. Yet if, instead of breaking a bulb, it be exposed to direct sunlight for a few days, in place of combining it parts with oxygen. The white colour of the flakes gives way to the red-brown of amorphous phosphorous; the contents of the tube, when thrown into the air, are no longer spontaneously inflammable, and pure distilled water dissolves out of the tube matter which gives a copious yellow precipitate with molybdate of ammonium, even without warming, showing the production of an entirely different phosphorus acid.

According to the *Athenæum*, Mr. St. George has invented a photographic method for recording telephonic communications. A plate of glass is coated with sensitive collodion as a photographic plate. This is placed in a dark chamber and made to revolve by clockwork before a small slit fitted with a shutter. The vibrations of a telephone plate are communicated to the shutter, and thus it opens and shuts in obedience to the telephonic vibrations. The pencil of light thus admitted prints a dark line on the photographic plate, which varies in thickness with the variations in the sound vibrations thus recorded.

The connection between photography and electricity need not now be expatiated upon, though, perhaps, we may remind our readers that the term "volt" is used in describing the strength of the electric current. The following incident is rather too good to lose:—A well-known and eminent firm lately fulfilled an order for a certain number of lamps of twenty-candle power, at forty-five volts. Shortly after receiving the goods the following note was received:—"We have received your lamps, as per invoice, together with the supports; but we were unable to find amongst the goods consigned the forty-five volts invoiced with the lamps!"

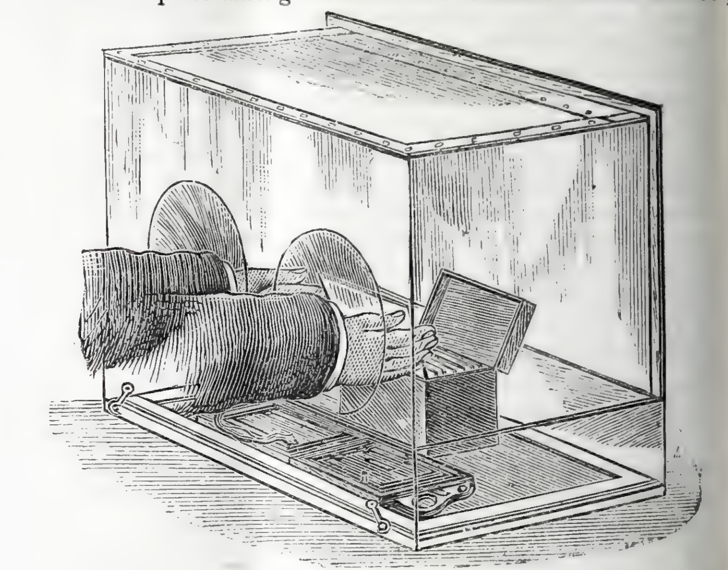
When some large and valuable collection of works of art comes "under the hammer" the auctioneers find it worth their while to issue catalogues with a very complete set of illustrations of the objects on sale, and no doubt they find it worth their while. A large quantity of them are sold, and, doubtless, a goodly number given away. But when a collection of pictures the property of the nation or of a public body comes to be catalogued—such valuable pictorial treasures being collected and exhibited for their educational influence—it is usually done in the most meagre fashion, and in a way to convey the least amount of instruction. A striking exception to this rule is offered in connection with the Liverpool Art Gallery. Already it possesses a catalogue calculated to interest and instruct; but now we learn that the Corporation are about to make an advance upon this, and have made arrangements to have the whole of the works in their collection—which, although small, embraces some magnificent examples of living and deceased British painters—reproduced by photography. It would be premature to make any observations as to the manner in which the public will be able to obtain these reproductions; but we may be sure that the liberal and broad spirit the Corporation have already shown in regard to the Gallery will be equally visible in these arrangements. When we say that the task of photographing the pictures—no light one, as all accustomed to the class of work well know—has been entrusted to Messrs. Brown, Barnes, and Bell, our readers may be certain that it will be executed with skill, and carried out in an artistic manner.

THE APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

Up to the time of writing this notice the amended edition of the catalogue containing the apparatus has not been issued; hence it is not impossible that we may unknowingly fail in according a correct paternity in every case to some of the exhibits. In the course of another week the new catalogue will have been published, after which no difficulty will be experienced. Speaking broadly, the exhibits are numerous, displaying many recent advances in design and construction, with excellent finish and fitting in most of them.

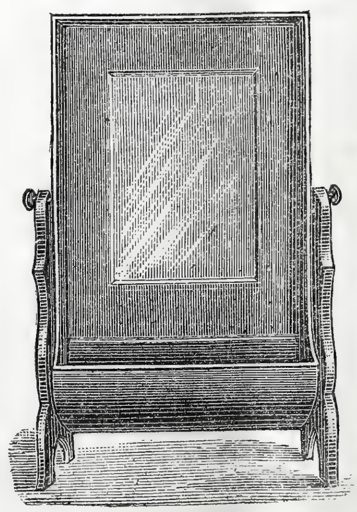
The exhibits of Messrs. Marion and Co. comprise several attractive items. Among these a new pneumatic shutter by Mr. James Cadett is well worthy of the attention it receives from visitors. It differs from any pre-existing pneumatic arrangement, inasmuch as by the pressure of the hand-ball a lever is actuated in such a manner as, by the intervention of a string and pulley, to raise up a drop shutter, which leaves the lens open for such a period of time as the pressure is continued, and on releasing which the shutter is immediately dropped again in front of the lens, this dropping being accelerated by a spring in addition to gravity. Of course it may be adapted to either the inner or outer end of the lens, and will be suitable for either studio or landscape. From the simplicity of the construction, it is probable that when ready to be placed in the market the price will not be such as to prove deterrent to its adoption.

Unless one were really to try the experiment he could not, *a priori*, imagine how easy it is to transfer plates from the plate-box to the dark slides, and *vice versâ*, without seeing them at all, operating by touch instead of by sight through a dim glass. In accordance with this principle Mr. A. Cowan designed a changing-box which finds a place among the exhibits of Messrs. Marion and Co.,



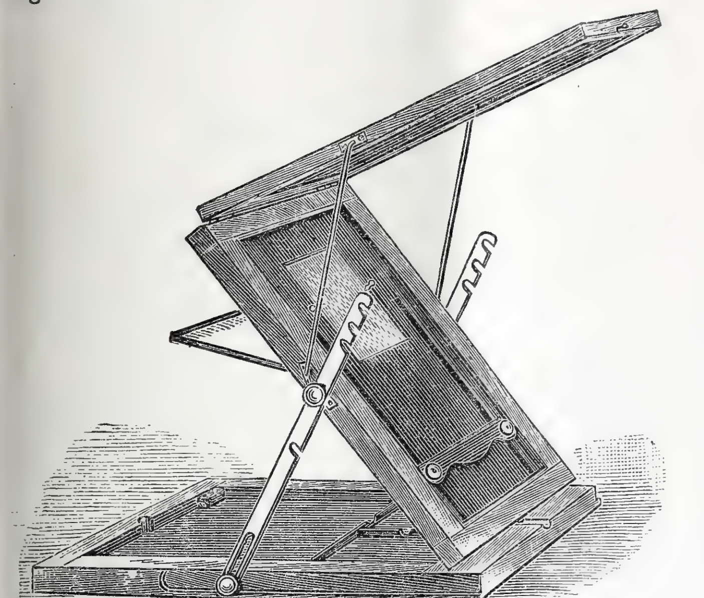
the manufacturers of this handy contrivance, which not only suffices to permit plates up to 12 × 10 size to be changed, but also forms a travelling-case in which may be packed camera, dark slide, and plate-box. Its construction is shown in the above illustration.

If the *plaque* portrait fail to be acclimatised in this country it will not be for want of a press for embossing them, an effective and well-made article of this class forming (together with specimens produced by its aid) a part of the Marion collection. Their transparent rocking and developing tray will, however, be more appreciated than the aforementioned piece of apparatus by the practical photographer. It consists of a *papier-maché* tray having a deep well at one end for containing the solution. In the bottom is a square of glass permitting the progress of the development to be ascertained at any time by tilting up one end and examining the plate against a ruby lamp suitably situated. To permit of this tilting, the tray is pivoted on a stand on the principle of a bedroom mirror. In the diagram the tray is shown when tilted to a vertical position.



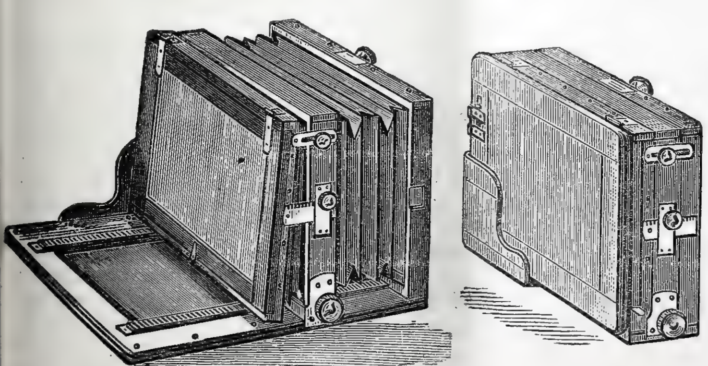
Coles' retouching desk is also exhibited by this firm. The special features in which it differs from other desks consist in the platform on which the white paper or reflector is placed being adjustable at any angle. There is a slit at the top of the instrument to allow the

negative to slide through when it is desired to retouch parts of the image difficult to reach without such provision.



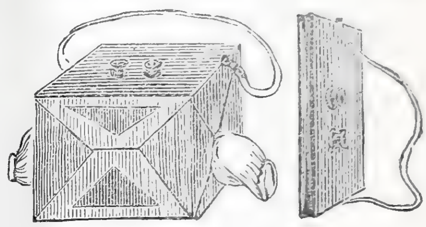
Messrs. Watson and Sons exhibit four cameras, characterised by smoothness of action and elegance of finish. Their newest form packs up in small space, and in the case of the 10 × 8 camera is capable of extending to twenty-three inches. One feature in these cameras is a double hinge to the focussing-screen, by which, instead of its being necessary to throw the ground glass over on the top of the camera during exposure, it becomes displaced, although still remaining attached; and while the dark slide is inserted it remains suspended by the second hinge system in a vertical position outside of and behind the dark slide. The action is simple, yet effective. There is a double swing to the back, and much ingenuity is displayed in effecting the conversion from the rigid to the swing-back. The four representative cameras are of the "tourist" class, being fitted along with their corresponding slides into handsome leather travelling cases. The dimensions of the cameras exhibited by Messrs. Watson and Sons are respectively 10 × 8, whole-plate, half-plate, and quarter-plate.

Messrs. J. F. Shew and Co. contribute a large number of cameras and other pieces of apparatus. Their "new model" camera possesses several useful features, one of which is shown in the adjoining diagram. It is that portion in the centre at the back by which the

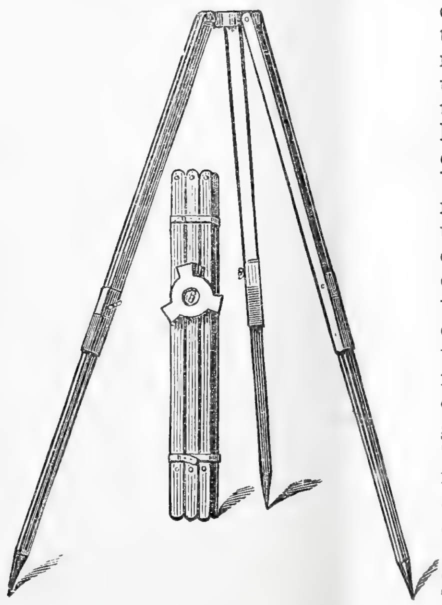


frame holding the ground glass is fixed. This, as will be seen, is made to move in or out by means of a rack and pinion. It effects a swing or tilt in any direction, both vertical and horizontal, and in that figure which shows the camera expanded it represents the ground glass placed obliquely as respects both these positions. This rack-work confers no slight aduantage in taking groups and many forms of landscape or street views. A half-plate camera exhibited expands to twenty inches—an advantage conferred by means of a double bottom. This camera has a reversible back, so as to enable the plate to be placed either vertically or horizontally in the direction of its length. In some of the double dark slides exhibited by Messrs. Shew and Co. they have adopted a system which was originally suggested nearly thirty years ago by a member of the Liverpool Photographic Society, but has scarcely ever been recognised by European makers, although in America it is said to be employed almost exclusively—we mean a slide in which the plates are inserted through an aperture in the end, which is then closed up, so as to exclude light. Individual examples of this adaptation of the old waxed-paper slide to the purposes of dry collodion plates have occasionally been noticed; but, hitherto, English makers have not taken so kindly to it as the merits of the system demand. Messrs. Shew's new slide, while on the system alluded to, differs from the American slides in the manner of carrying the idea into practical operation. There is a wide space sufficient to hold two glass plates and a metallic septum or division, to each side of which is affixed a spring of just sufficient strength to press the plate against the face of the rebate, where it is in sharp focus. The division is not movable, but is immovably fixed in the frame. The operation of inserting the plates is reduced to a state of extreme simplicity, all that is required being to drop the plates down in their respective and very wide divisions, the weight of the plate in its downward passage overcoming the tension of the spring. The lid, which is hinged at one end, is then closed down and fixed automatically, there being no possibility of light entering. We measured one of these slides and found it exactly three-quarters of an inch in thickness.

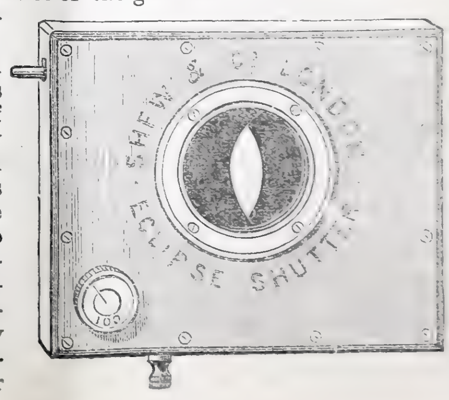
We have spoken of the dry-plate changing-box of Mr. Cowan. Messrs. Shew also exhibit a box for a similar purpose, but, as will be seen from the diagram, theirs is capable, when not in use, of being folded into a small space. On making trial of the one exhibited we found it to fulfil the claim made for it—that it can be put up for use in one minute.



A useful article, exhibited by the same firm, consists of a lengthening body or extension front, which can be adapted to any camera, thus enabling it to be used with a lens of much longer focus than usual. There are two of these extension fronts exhibited. A portmanteau camera-stand, exhibited by the same makers, will not fail to interest the tourist or traveller who objects to carrying a stand of the usual class; for this one occupies a length of only twenty inches when packed up, and yet is quite rigid when opened out. It is of the same general character as the "model stand" of this firm, and examples of it are also in the Exhibition, and the nature of which will be seen from the accompanying illustration. The difference between the "portmanteau" and the model" consists in the whole length of the latter being divided into two, whereas that of the former is divided into three, parts. The legs may be slidden up or down at pleasure to suit inequalities of the ground.



The "eclipse instantaneous shutter" of Messrs. Shew (a figure of which we here present) appears to "tickle the fancy" of the numerous visitors by whom it is examined, and it gives no indication as yet of succumbing to the constant handling to which it is being subjected. By turning the handle in the lower right-hand corner it is set ready for action, and by touching the projecting trigger



two wings open full and close again, the rapidity with which the exposing action takes place being determined by a screw at the bottom. Its range is from a slow, methodical movement capable of being prolonged for an indefinite period if desired, at full opening, up to an instantaneous snap which the eye can scarcely appreciate.

We shall resume our notice of the apparatus next week.

THE MODERN PRINTING PROCESS: COLLODIO-CHLORIDE.

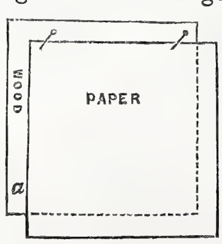
It is not a new process on which I wish to write. It has been described very often in the journals of all countries where photographic periodicals appear; and yet it is, what the title indicates, the modern printing process most successfully used in a good many establishments—at least in Germany—and giving results superior to anything that can be done on albumenised paper.

How is it that such a nice process, about which no secrets exist, has not made the journey around the world like carbon printing and gelatino-bromide? I think this is explained by the fact that the results mentioned are only obtained by the use of a suitably-coated paper. Now it happens that the paper used in lichtdruck for the finest description of printing is just the thing we want; and since this has been recognised, and such paper can be purchased at a price not exceeding that of plain Rives or Saxe, printing with collodio-chloride at once became popular.

The principal arguments adduced for this process may be laid down in the following:—The paper prints much quicker than albumenised paper; all the finest tints in the high lights of the negatives are strictly preserved during the toning and fixing process; the washing of the prints is finished in one hour; the prints do not fade—at least those made in 1866 are quite unchanged, and no case of fading has ever come to my knowledge; a glossy surface like that obtained by enamelling can be given to the prints in a very simple, quick, and economical manner without using a rolling-machine. I may add that where the process has been introduced the public like the results, and prefer them to those obtainable on albumenised paper.

Good formulæ for preparing collodio-chloride have been published many times. The one I use runs thus:—In a glass beaker dissolve eight grammes of nitrate of silver in six grammes of distilled water by heat; drop this solution into a bottle containing 135 c.c. of alcohol. In cold weather it is better to put the bottle in a vessel containing warm water; then add eight grammes of soluble cotton, and, after thorough shaking, 160 c.c. of ether. On further shaking a greyish-white collodion will form itself. In another bottle dissolve one gramme of chloride of lithium in thirty-five c.c. of alcohol, together with one gramme of tartaric acid. This solution is to be dropped into the argentiferous collodion, which must be shaken all the while. This collodion will keep for any time if preserved in a well-corked black bottle or in a fitting dark cover.

Have a thin piece of wood, same size as the paper that is to be coated, with a knob fastened at the under side; pin the lichtdruck paper on it at three of the corners, so that the right and lower edge project a little over the wood (this will cause the collodion not to run under the paper), and the left edge of the paper may be turned up a little; but this will not be found necessary after some practice. Now hold the wood with the left hand by the handle, as you would take a glass plate fixed to a pneumatic plate-holder, and pour the collodio-chloride upon the paper just as you would coat a glass plate with collodion. Having returned the surplus of the collodion to the bottle, take the pins away and hang up the paper to dry. The paper will keep for several weeks.



Some prefer to use a pink-coloured lichtdruck paper, whose colour will obliterate any trace of yellow that might form by keeping it for a longer period.

As to the printing: it must be done in the shade, and weak negatives are better covered by thin, white paper during printing. Toning may be done in an old gold bath that is not too strong. German photographers prefer the following:—Make two stock solutions—one of one gramme of chloride of gold in 1,500 c.c. of water, and one of twenty grammes of sulphocyanide of potassium, three grammes of hyposulphite of soda, and one gramme of carbonate of soda in 1,500 c.c. of water. Before going to work mix equal parts of these solutions, but be sure to pour the gold into the sulphocyanide solution, not *vice versâ*.

After having washed the prints in water three times changed, put them in the gold bath. If it work too quickly it will give grey tones. I usually dilute it with water that it may act more strongly; and for weak negatives I pass the prints before toning through a two-per-cent. solution of sulphocyanide of potassium, the prints becoming of a much richer tone by this. Fix in a five-per-cent. solution of hyposulphite of soda (five minutes will be sufficient), and wash for one hour in water frequently changed.

Now, to make the prints look like enamelled silver prints: clean a sheet of glass, a little larger than the print, and rub it with French chalk; after dusting it off with a brush, lay the print, film side down, on the glasses; put some filtering-paper upon it, and go over it with the hand to make the print adhere and to remove air-bubbles. Allow it to dry, and the print will come away with a very high gloss. A part of this it will lose on mounting; but if you mount it at the corners only, as is sometimes done with enamelled prints, it will retain it all.

I am afraid there is not much that is new in what I have written; but, judging from inquiries that from time to time spring up in this Journal about collodio-chloride printing, I hope it may serve the interest of some of its readers. E. Liesegang, Ph.D.

ON THE REDUCTION OF GELATINE NEGATIVES WHICH HAVE BEEN OVER-INTENSIFIED WITH MERCURY.

[A communication to the North Staffordshire Photographic Association.]

Having successfully reduced several negatives which, after mercuric intensification and subsequent varnishing, were found to be too dense to give a good, delicate print, I thought a description of the *modus operandi* by which I succeeded might prove interesting to the members present.

The first negative in question had been painted black in the sky with Brunswick black. This I removed with turpentine and a soft rag. I then removed as much of the varnish as possible with methylated spirit, and afterwards soaked the plate in a solution of sodic carbonate, which decomposed and removed the remaining adhering portions of varnish. The negative was now well washed and transferred to a bath of iodo-cyanide of potassium (made by adding a drachm of tincture of iodine to a pint of a very weak solution of cyanide of potassium), and then allowed it to remain until sufficiently reduced. The reduction took place equally over the film, leaving a delicate and quick-printing negative.

Some of you will doubtless have noticed in various plates numbers of iridescent markings, accompanied with a certain amount of green fog. I have succeeded in removing both by first *intensifying* the negative with mercuric perchloride followed by ammonia, and then subjecting it to the above iodo-cyanide treatment. C. Alfieri.

NOTE ON NITRO-IODIDE AND BROMIDE OF SILVER

In your article, entitled *A Chapter of Photographic History* (page 584, *ante)*, the subject of iodo- and bromo-nitrate of silver as the predisposing cause of a peculiar kind of photographic blemishes in negatives called "pinholes" is treated of at considerable length. Having been the author of the articles to which reference is made, and which were published nearly twenty years ago, I, perhaps, may be allowed now to state that my investigations at that time not only included a thorough research into the cause of these hitherto mysterious and unwelcome visitors (apart from ordinary dust or dirt), but also, after having ascertained the cause, to prove the matter beyond dispute by isolating the offending compounds, so as to be able to submit them to a more complete examination.

In justice to one of our greatest pioneers of photographic discovery, I must give Major Russell the credit for having suggested to me the probable source of the evil in question; and as this is a historical subject it may be as well to place on record the occasion on which the suggestion was made.

I had sensitised, in rapid succession, about thirty bromised collodion films in a newly-prepared sixty-grain silver bath, each plate having been immersed therein for at least ten minutes. These films were then thoroughly washed, coated with solution of tannin, dried, and stored away for a few days' dry-plate work at Windsor and the upper Thames. Plates so prepared, be it observed, and developed with alkaline pyro., were extremely sensitive to light—at least twice as rapid as the best wet collodion—while at the same time they were capable of yielding the best pictorial results.

On developing these plates a few days afterwards on my return home I found that the last few that had been sensitised in the

silver bath were covered with innumerable "pinholes," some of them, indeed, being larger than a pin's head. At the time I attributed this to dust, derived either from the sensitising bath or water, or from the plates having been much knocked about before exposure and development. On showing the negatives to Major Russell, soon afterwards, he told me that it was no new phenomenon with him, but that if I examined in a "raking" light a bromised film sensitised in a silver solution which had, quite recently, done the same duty for many other plates, I would find the surface of the film, instead of being perfectly smooth, covered with little protuberances like so many grains of sand. On trial I found such to be the case, and that the offending intruders were not *on* but imbedded *in* the film. Further: that when still moist from the bath, if one were examined under the microscope there was observed a nucleus with fine transparent needles radiating from it like the prickles on a sea-urchin or the quills of the "fretful porcupine." Afterwards, on taking the glass trough containing the silver bath solution into a strong light, and stirring up the liquid, no dust was observable; but, instead of that, there were myriads of shining particles exactly like ice spiculæ gleaming in the sunbeams on a bright and frosty morning.

The invading enemy was now found, and the questions arose—What was the nature of his force? and what would be the best means of circumventing his nefarious plans? It was then that the idea occurred to me of isolating these crystals, so that their nature could be more readily ascertained by chemical analysis. It would be uninteresting to detail the first few futile attempts I made to obtain the crystals separately; but at last I succeeded by adopting the following plan, which anyone who is curious on this subject may safely follow:—

Make a strong solution of silver nitrate—the stronger the better, but say 150 to 200 grains to an ounce of water—and place it in a small, clear glass bottle. Add to this, little by little, freshly-precipitated bromide of silver, shaking on each occasion till the silver nitrate will dissolve no more. If the containing bottle be placed in warm water the nitrate will dissolve much more of silver bromide than it would when cold, and this is by far the best plan to obtain a fine crop of the double crystals. As soon as it is seen that no more of the bromide is dissolved, stopper up the bottle and place it at once in a cool place, and where it will not be disturbed by vibrations. As the solution cools, beautifully-transparent, needle-shaped crystals radiate out in all directions, some of them being isolated and some in bundles. If the solution in cooling be disturbed the needle crystals will not be fully developed, but instead of these the compound will be deposited partially in an amorphous form, just as it was in the collodionised films to which I have referred. These beautiful crystals can, if desired, be preserved apparently for any length of time, either in their mother liquor or in *absolute* alcohol or ether, without undergoing change; but the moment they come in contact with water they are decomposed.

I have not found nitro-iodide of silver to assume the crystalline form so readily as the corresponding bromide salt, but it can be readily enough obtained in the amorphous state; and this is just that which it actually does assume in the collodion film.

At the time I was conducting these experiments I gave the late Dr. Miller, Professor of Chemistry at King's College, some specimens of the crystals properly secured in bottles. These were duly labelled and deposited by him in his private room at that Institution. The late Mr. Hadow, too, was frequently with me whilst I was prosecuting my experiments, and both these gentlemen took great interest in the inquiry. For aught I know, these same specimens may still be in existence and have come under the cognisance of Professor Bloxam, who succeeded Dr. Miller in the chair of Chemistry. At all events, the latter gentleman intended to use the information I had given him, and probably would have done so had he lived to edit a new edition of his valuable work on chemistry.

Such is a short *résumé* of a *Chapter of Photographic History*, so far as I am concerned. The double cyanide and other haloid silver salts were only very cursorily examined by me—only sufficiently to make me assured that they *could* be formed. The cyanide came in for more notice than the chloride, &c., from the fact that a photographer (Mr. Tully, I think) had widely published a statement to the effect that the addition of a little solution of potassium cyanide to a pinhole-afflicted bath was a certain remedy for that and sundry other diseases. I have heard several skilled operators aver that this kind of treatment is very efficacious. For my own part I have never found such to be the case, although I have often made the attempt. Yet, if it can be proved that silver cyanide is really useful in such cases, it would be an interesting investigation to find out the reason why it is so. Possibly light might thereby be thrown on some chemical reactions hitherto imperfectly understood.

So much for the historical part of my connection with the subject. Next week I purpose supplementing these remarks with practical observations on the best means of avoiding these pestilential visitors, and, when they do intrude themselves, how they can most readily be expelled.

GEORGE DAWSON, M.A.

THE PRESENT CONDITION OF AMATEUR PHOTOGRAPHY AND ITS PROBABLE FUTURE.

[A communication to the Photographic Society of Ireland.]

ALTHOUGH it is my intention this evening to more particularly examine amateur photography of the present and probable future I must, of necessity, make some slight reference to amateur photography of the past—not only the past of the last three or four years, but a much longer past, namely, that of the earlier days when collodion held universal sway in the production of photographic pictures. At the same time it is not my intention to go into the history of photography, but simply to recall the past and put it side by side in as powerful contrast with the present as I am able; then to see if, from what was and from that which is, I can in any fair way indicate the future. I may, perhaps, definitely lay down, if not what the future will be, yet what I think the future ought to be, and what I feel to be the proper direction for amateurs to work.

To me these intentions embrace so many wide and extensive points of contrast, and suggest so many probabilities — some most desirable ones—that I know the time at my disposal this evening will only allow me to enter upon some one or two; but I think it better to leave many unreferred to, and to at once go into the points—known facts—and put forward the conclusions to be derived. So wonderful has been the progress of amateur photography during the past few years one is apt to be engrossed with the present. I think it well to pause now and then to see are we better than before—are we on the right track. Let us examine one great point—that of the substitution of gelatine for collodion.

If we ask ourselves the question, in a full, all-round way—Are we better for the change? I think we must decide in favour of gelatine; while if we look in a minuter way many of the smaller points must be decided in favour of collodion. On the points of convenience and sensibility to light, gelatine has the advantage; while for brightness, clearness, and sparkle, the advantage lies with collodion. As a rule the prints obtained from a gelatine negative are disappointing. Keeping these points in mind, it is easy to indicate that the direction of our efforts should be to retain the sensitiveness of gelatine and add to it the brightness of collodion. There is no doubt on my mind that gelatine is more uniformly sensitive to the varying degrees of light and shade, and gives a more faithful reproduction of detail.

Another point—the leading one which induced me to address you this evening—is the size of the negative. We will even readily admit that mass, weight, and convenience have all much to do with the practice of amateur photography. Take a given result: if there be two ways in securing it we are always ready to take the easier one. I think I may safely assert that we are anxious to produce larger photographs, but are deterred from attempting to secure them, as we see no way of obtaining them except accompanied by these points of inconvenience—mass, weight, and expense.

Well, I venture to express the opinion that the day is close upon us when we shall be able to secure enlargements of a large size with not only the excellence of, but with many points of excellence over, direct large photographs. I feel this is a strong assumption to put forward; but, all the same, I do not hesitate to venture it, and to add that from our present knowledge we can say that on some points the enlargements now obtained are superior to direct photographs. Until quite recently our enlargements have been faint, washed-out-looking things; now, thanks to the constant working of experimenters — notably to M. Hutinet, of Paris, whose brilliant gelatino-bromide paper is almost all that can be desired—the quality has been constantly improving, and gelatino-bromised enlargements can now be had with nearly all the vigour, brightness, and excellence of direct photographs, while on the points of perspective, uniform sharpness over the various planes or distances in a subject, they are certainly much superior to direct photographs. If this be our certain present condition it is certainly evident that the future of amateur photography will be the taking of small negatives and their subsequent enlargement.

There are numerous other points I could go into, but I rather rely upon what a discussion—which will follow—will bring out as to the size of the negative, its requirements, and necessary qualifications, the method of enlargement, the quality of results obtainable, permanence, expense, and many other points; and so in hope of these few notes eliciting such a discussion I now leave the matter in the hands of the meeting.

J. V. ROBINSON.

COPYRIGHT REGISTRY.

The following are the instructions recently issued for registration of paintings, drawings, and photographs, under the new Copyright Act, 25 and 26 Vict., c. 68:—

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Stationers' Hall, March 7, 1883.

WHERE TO GO WITH THE CAMERA.

MACCLESFIELD AND THE NEIGHBOURHOOD.

Few great centres of industry are looked upon with favour by lovers of the beautiful as likely places from which may lie within easy reach much that is lovely and picturesque in nature; but to those who are perforce located in, or near, these busy centres it cannot be a matter of indifference to be made acquainted with all the easily-accessible spots of beauty and interest that can be reached, in these days of cheap travelling, with a very small expenditure of both time and money.

The articles which have recently appeared in The British Journal of Photography under the title of *Where to Go with the Camera* have been of vast interest and usefulness to many, and are certainly worthy of perpetuation in a more compact and endurable form than in that of the weekly serial.

It is in the hope of contributing my quota to a worthy object that, even at the risk of being obtrusive, I venture, as a citizen of smoke-begrimed Manchester, to sketch out a tour that has proved an attractive hunting-ground to me, and may probably have a similar charm for others.

I will select the London and North Western railway and the Macclesfield and North Staffordshire line, booking at London Road station, Manchester, for the quiet village of Prestbury, where, on arrival, two or three good subjects may be found amongst the quaint old buildings, chiefly in the half-timbered style, which form notable features of the village. The fine old church, hard by, is both picturesque and interesting, on which several plates may be expended, the chancel and south aisle being of about A.D. 1130 and the tower A.D. 1460. At present, however, it has apparently caught the contagion of the nineteenth-century restoration movement, by which many of our ancient halls and churches are, I am grieved to say, fast losing their original charms and characteristics. Let us hope, however, in the case of Prestbury, as of the Manchester Cathedral and Prestwich Parish Church, the restoration fever may be carried no farther than simply to replace with new material the decayed and insecure portions of the original masonry, or restore the parts which, by years of unskilful botchings, have been perverted from their original simplicity and grace. I must not omit to mention the old ivy-clad school-house, or Norman Chapel, with its characteristic doorway, than which there is no better example of the style of that period for many a long mile. The chapel stands in the graveyard close by the church, and is well worth a plate or two.

A convenient train to Macclesfield, some three miles distant, ma now be taken; and on arrival it will, perhaps, be worth while walk over to the Manchester, Sheffield, and Lincolnshire railwa station, which is close by, and take another train to Bollingto from which place a walk of about two miles brings us to the snu little village of Pott Shrigly. Here is an interesting old churc embosomed in a group of very fine lime trees. One or two picture may be made with a wide-angle lens, and a few other plates migh also be expended on the surroundings under favourable condition of light, &c. Lest, however, the place should not be deemed suffi ciently attractive by those who have never previously visited it, I wis to say that I merely mention it *en passant*, and rather as a digressio from the route sketched out in my mind at the commencement of thi article; so we will return to Macclesfield, and prosecute our journe more directly into the heart of Cheshire.

From Macclesfield to Gawsworth (an easy four miles) the route i delightful. For a considerable distance the road is lined on each sid with overhanging trees, and forms a charming avenue, though, perhaps, a trifle too stiff for artistic effect. If, however, no plates be exposed on the road, ample use can be found for them at Gawsworth. Here revel the limes and the sycamores in all the luxuriance of a rich alluvial soil and an untainted atmosphere. The fine old church, nestling amongst the trees, and mirrored in the lake below, forms a charming subject from an almost endless variety of points. There are also the old hall and rectory, both of them fine examples in their way of the half-timbered (or what Mr. Grindon calls the "magpie") style of architecture, specimens of which abound hereabout in great profusion.

Mr. E. Woodward—a Macclesfield gentleman, and a highly-esteemed member of the Manchester Photographic Society—has done some good work here, in the age of wet-plate and tent work, and probably the first photographic views that were taken in this sylvan spot were done by him.

From Gawsworth to Marton, about two miles, through a network of crooked lanes, on the sides of which vegetation runs wild, the walk, or drive, is most enjoyable; and if the period chosen be the height of summer, when the untrimmed fences are all gay with the bloom of the woodbine and the dog rose, the treat is so much the greater. The old hall at Marton is a fine Elizabethan structure in the "magpie" style, and one which well deserves the photographer's attention. So also is the church, though it makes a somewhat inartistic picture unless a portion of the surrounding subject is judiciously brought in.

The great charm of the locality is its unsophisticated character. It is a district where art has little interfered with rusticity, and both the soil and the atmosphere afford an unlimited indulgence to indigenous vegetation. The wayside cottages, each with its patch of flower-garden, give an air of repose and contentment to the village, and their inhabitants seem to be living examples of the grand old adage—"My riches consist in the fewness of my wants."

In the outskirts of the village is the famous "Marton oak"—hale and hearty as to its upper limbs, though its hollow trunk of forty-five to fifty feet circumference tells of the centuries of storm and sunshine it has braved.

The return journey to Macclesfield, about six miles, may be made through the village of Siddington, where there is still another example of the "magpie" era, on which another plate or two may be exposed. The remainder of the road is somewhat tortuous, and presents in its course many picturesque "bits," at which a halt may be made.

J. Pollitt.

ON THE ART OF PICTORIAL COMPOSITION AS APPLIED TO LANDSCAPE PHOTOGRAPHY.

[A communication to the North Staffordshire Photographic Association.]

The lover of the picturesque in our exceptionally-favoured country has, fortunately, not far to go to find subjects either for the pencil or the camera; but it is to the votaries of the latter chiefly that I desire to say a few words this evening, confining my remarks to landscape photography.

The subject of pictorial composition is wide and varied, and, although the canons of art are unalterably fixed, they are by no means universally understood. I would, therefore, humbly treading in the steps of abler writers than myself, endeavour to lay down a few rules, by following which my younger brethren of the camera may at least avoid glaring errors.

The lens of the photographer, although theoretically analogous to that of the human eye, is in truth very different; for no optical lens can represent on a plane surface what the eye sees—or, rather, what the brain feels—when the successive images formed on the retina are presented to it. Moreover, the human eye has the power of ranging in every direction over objects at varying distances and of focussing them as it goes, whatever be their nearness to or their distance from it, and of clearly distinguishing each object in its relative proportion to others, provided only that there be nothing to obstruct the view. The lens of the photographer, nevertheless, possesses the power of representing natural objects with marvellous exactness, and, although scenes projected by it may be sometimes untrue to nature, in so far as

true perspective is occasionally exaggerated, and because objects in different planes cannot be brought equally into focus, yet this latter failing is often a virtue in disguise, as, by the indistinct rendering of extreme distance, a suggestion of atmosphere—so prized in the work of the painter—is fairly simulated.

Pictorial composition may be defined as the art of arranging the forms or objects that constitute a picture, in a manner at once natural and agreeable to the cultivated eye. This definition applies almost as much to the work of the photographic artist as to his brother of the palette, and I need only refer to the productions of such well-known masters of photographic art as Rejlander, Slingsby, Bedford, Frith, Robinson, and a host of others to prove the correctness of my assertion.

It is true that the power of producing artistic effect in a landscape is somewhat limited in photography, because the photographer cannot build his picture up, nor materially alter any natural scene or object which lies within the range of his lens; but by selecting the best point of view, and by choosing the most suitable time of day for the lighting of his subject, he may produce a picture worthy of the name, while another person less skilled or less painstaking would produce a mere mechanical representation.

But the faculty of seeing natural beauty with an artist's eye is only to be acquired by the diligent study of those well-defined principles upon which the art of composition is based; and the evident superiority, in an artistic sense, of the works of one photographer over those of another—although both may be equal in mere technical ability—will not be denied. It is quite evident that, whatever subject be chosen for a photographic picture, there must exist some aspect of it which excels all others in pictorial attractiveness; this, then, is the aspect to be studied and selected. It is equally certain that there must be some conditions of atmosphere and of light which suit it better than any other; these, then, the artist should, if possible, secure. Moreover, every natural scene worthy of his attention should contain some elements of pictorial beauty; and if it be admitted that the true artist can present even the most unpicturesque subject in an attractive guise, what shall be thought of the photographer who, with a scene displayed before him possessing almost every element of pictorial beauty, succeeds only in producing a stale, unprofitable, and soulless rendering of such a landscape?

I will now proceed to show that pictorial composition is based upon laws the correctness of which is generally admitted by all cultivated persons. These are exemplified in the works of great artists of all nations. It is, therefore, of the first importance that the student should know in what artistic excellence consists, and the rules which govern its production.

To proceed to examples: I would premise that the general tendency of lines in a picture should be that which will lead the eye to its chief feature of interest. On looking at any scene whatever the eye determines for itself a range of subject and its line of elevation. This latter is called the "horizontal line," and upon this is placed what is termed the "point of sight."

The "horizontal line" is usually placed transversely at about a third of the width of the picture from the bottom; but its position will vary according to the height at which the spectator is supposed to stand.

The "point of sight" is placed on this line, and should generally be, more or less, removed from the centre of it to avoid formality and inartistic arrangement.

The point of sight being determined the student will next proceed to group, as it were, the various objects in the scene before him around it, shifting it, if necessary, from one side to the other until the various objects in the view balance one another, or, as it is called, "compose artistically." Time and material should never be wasted upon scenes or objects utterly devoid of beauty or pictorial interest; but, having found a subject worthy of reproduction, the photographer's aim should be to present it in its most attractive aspect, and to secure this he should be guided by the following, among many other, laws of composition:—Firstly, his picture should be evenly balanced. By this I do not mean that there should be just as much of the subject on one side of the plate as on the other, but that the lines of the composition should not all run in one direction, but be so arranged that they may support each other and lead the eye to the chief points of interest in the composition. He should carefully exclude objects that tend to distract the eye from these, especially inappropriate figures in unnatural positions or even appropriate ones brought obtrusively into the foreground. If his subject be an avenue of trees, or a church, or other building supported by pillars or arches, he should not stand in the centre of the road or building, as the case may be, but on one side or the other. A street or other view, having a wide expanse of roadway or water in the immediate foreground, will not make a picture unless some object—such as a portion of rock or herbage, or some picturesque object on the margin of the river or lake, or, in the case of the roadway, some rustic figure or accessory—be introduced to break the monotony of the view and give value to the middle and extreme distances of the picture. Finally: the photographic artist should make the best possible use of his judgment as well as of his materials, and, by the well-timed exposure and careful development and manipulation of his negatives, endeavour to approach as near perfection as possible, both in a photographic and in an artistic sense; as Mr. Robinson has justly said:—"Interest may be imparted to the poorest materials, in the hands of a true artist, by judicious selection of the point of view, so that the elements of the picture may compose picturesquely and artistically, and by skilful distribution of suitable light and shade."

Whatever form or size the photographer may select for his picture, he should always endeavour to include within its boundary lines all that is most interesting and picturesque in the scene before him, and, as I have said before, to exclude whatever would tend to mar its general effect. A picture may vary in form according to the subject of it; but its boundary should not be a square, nor should it be so mounted as that a line drawn diagonally across it from any of its four corners may exactly intersect the corners of the mount also. No prominent object in the foreground should occupy exactly the centre of a picture, as such an arrangement is very formal and inartistic.

If the subject of a view be limited to a few trees by a pond, a rustic scene with a few figures, or other simple subject, the vignette form, wherein no boundary line exists, is often very effective and pleasing. It must be remembered, however, that the most artistic arrangement and natural grouping of objects in the scene chosen by the photographer, are at the best tame and uninteresting without effective lighting. Here the great luminary which gives light to and vivifies the whole earth does even more for the photographer than for the painter; for it enables the former to seize and record the reflection of nature's varied moods—the play of the swift shadows coursing each other on the mountain side, the roll of the sea wave on the shore, or the sparkle of the dewdrop on the heather; and in this way almost compensates the photographer for the lack of colour in his pictures, while the marvellous transparency in the shadows of a good photograph excels that of the best engravings.

In selecting the fittest time of the day for the lighting of his view, the landscapist should, if possible, visit the scene beforehand; for pictures taken at haphazard are rarely pleasing or of real pictorial value. He should avoid too glaring a light, however, as tending to produce violent contrasts and a spotty or chalky appearance in his work. The source of light should seldom be immediately behind, but a little to the right or left of the camera, and in the rear of it. Very fine effects are, however, sometimes obtained by skilful workers *against* the light, especially in cloud and marine pictures.

While on the subject of clouds, I would say that no photographic landscape can properly be regarded as a work of art without these, either faintly suggested in the sky or printed boldly from a separate negative where they do not exist in the original. It has, I know, been objected that no clouds can be natural to a picture but those secured at the same time with it; but I think this is an error, since a landscape is not visibly affected by clouds far behind it, and not in any appreciable degree by any others unless the sun be shining and their shadows be cast here and there directly upon it.

In addition to the diligent study of grouping, arrangement, and light and shade, the earnest student should take every opportunity of analysing the works of the best painters, as well as those of the most eminent photographers. Let him carefully examine such works as the *Liber Studiorum* of Turner—the greatest landscape painter, perhaps, that has ever existed—copies of whose works produced by photography can now be had for a few shillings. Let him compare the works of our best photographers with his own, and endeavour to discover in what the excellence of the former consists. Let him, then, do his best to produce their equal, and he will thus be led by degrees to the discrimination and appreciation of the beautiful both in nature and art, and the works which he shall leave behind him will, in their turn, afford treasures of artistic beauty and excellence for the admiration and imitation of those who shall come after him. C. Alfieri.

A TOUR IN HOLLAND WITH THE CAMERA.

When in the early part of the present year I decided to make one of my new lectures *Holland and the Hollanders*, I was told by a friend who had been in that country that the choice was a bad one, as I should find it "flat, stale, and unprofitable." That I should find it (from a distance) *flat* I thought very likely. I was also of opinion that (close to) I might discover some of the canals to be unpleasantly *stale;* but the idea of Holland being unprofitable I could not entertain, so I determined to adhere to my original plan, and visit Holland and the Hollanders with the camera and note-book.

Now, as my intention is merely to point out to my photographic brethren how they may employ their time to the best advantage, should they visit the land of Mynheer van Dunk, I shall, as far as possible, avoid giving them "tourist information" such as is to be found in many other places.

From London and the North of England to Holland the greatest advantages are unquestionably offered by the Great Eastern Railway Company. An express leaves Liverpool-street, London, every week day at 8 p.m., arriving at the Company's magnificent new station at Parkeston about 9.45. Other trains (from the north) are arranged to reach here about the same time, and by a few minutes to ten the tourist may find himself on board one of the large paddle-steamers *en route* for Rotterdam, where he may expect to arrive at about nine o'clock

next morning. How the night is passed depends very much upon the weather and the capabilities of each individual to *enjoy* a channel trip. There is every convenience on board, however, for having a good night's rest, and if the tourist can "calmly and peacefully sleep" he will find himself all the better for it on the morrow.

To those who are very eager for work I would suggest that they rise sufficiently early to sight "land;" after doing so, they will shortly come to the bar at the entrance to the Maas. Here they will generally find several wrecks; one on the right is very picturesque. I do not know how long it has been there, but evidently some time. Particulars are, however, easily obtainable, and a copy of the photograph sent to the underwriters might prove a pleasant *souvenir* and surprise.

Before going further it will be as well to say that the tour to which I am about to direct the attention of my readers is London to Parkeston, thence to Rotterdam (by steamboat), Rotterdam to Delft, La Hague, Schevening, Leyden, Haarlem, and Alkmaar; then to Helder and back to Alkmaar; thence to Hoorn (by *diligence*), Hoorn to Amsterdam (by steamboat), Amsterdam to Utrecht, Gouda, and back to Rotterdam and London. A circular ticket is issued by the Great Eastern Railway Company covering the whole journey (except the *diligence* to Hoorn, and the steamboat from Hoorn to Amsterdam, which 5s. will pay, leaving a balance) for £3 7s. 6d. first class, or £2 5s. 5d. second class.

As regards the Custom-house officials, no difficulty need arise. When your baggage is examined as the boat goes up the Maas, you have only to explain to the searcher that the packets of plates are for photography, "sensitive to light," and show him your apparatus. He will be quite contented, and affix the tissue-paper label with a smile of satisfaction beautiful to behold. On your return, at Parkeston the Customs officers' may lack a little of the Dutch politeness, but they are equally easy to convince, and a hieroglyphic in chalk concludes the business. These gentlemen have their tempers sorely tried at times; but, if you readily unpack your baggage and express your willingness to assist them as far as possible in the execution of their duties, five minutes will generally suffice to do all that is necessary.

We will now suppose it is the nine a.m. alluded to a short time since, and we have arrived at West Quay, Rotterdam. The great aim should be to get to the centre of the town and find a suitable hotel. A tramcar from the Quay will take us to the Beursplein, and within a "stone's throw" are several "subjects." It is not my intention here to recommend particular hotels, but, if any of my readers wish for any information on the subject I will give it with pleasure. Having found an hotel, you boldly sally forth in quest of prey. It is not more than 10.30, and we are back again at the Beursplein. The light will just suit, so we begin on the Post Office—a new square building, rather plain, evidently built more for use than ornament. The Exchange is here also, but it is better taken about seven a.m. if there be any sun, so we go to the Groot Markt to see about the bronze statue of Erasmus. Here, too, we find the House of a Thousand Terrors; but there are so many people that it is almost impossible to get a clear space, so we go to the Boompjes by the side of the river, where there are some fine vessels. Many pretty studies may also be obtained on the canals (even in the most busy parts of the day) if you can manage to "fix up" by the side of the water, or on the stone portions of some of the bridges, so as to prevent people crowding in front. The General Steam Navigation Pier is a good spot if there be no vessel there, and a good view can be obtained of the two bridges crossing the Maas—the foot and carriage bridge in front, and the railway bridge beyond.

As a rule it will be found better to devote the early morning to photography (where the light is suitable, of course), and frequently, in the larger cities, between half-past five and breakfast time, and from eight to twelve, good pictures may be obtained. The remainder of the day can then be devoted to subjects for which the afternoon light is best, visiting the museums and picture galleries, or getting on to the next stopping place.

The following at Rotterdam may be easily done in an hour—say, between seven and eight:—The Exchange, the front of Boyman's Museum, the Fish Market from Houtbrug, with the river frontage, two or three studies of bargaining on the canal bank by the side of the fish market, and a very good *study of boats* from Leuve Brug. After breakfast a tramcar (from Beursplein) will take us to Delftsche-poort—an old gate of the city; and if we walk back along the canal-bank we shall come to a place called Cool West, where there are several fine buildings on the right, with a windmill high up by the canal side. Crossing the bridge, to return to the Beursplein again, we shall pass (nearly opposite the fish market, on the left side) a place where a canal runs between the backs of two rows of old houses. This I have christened "Venice," and it is as pretty and quaint a picture as one could wish. There are several good pictures to be obtained in the Westplein, but, before leaving Rotterdam we will go down just beyond the Spanish quay, and take a general view looking up Oude Haven, which will include the Groot Kerk.

From Rotterdam to Delft is about ten miles. To get there we pass Schiedam—a quiet little station. Those interested in distilleries might find it attractive, or, if anyone were specially fond of pigs (30,000 of which are said to be fed annually on the distillery produce), but otherwise it is not worth a visit.

Arrived at Delft, three or four minutes will bring us to the G Markt, where we find the Nieuwe Kerk and the Stadhuis. A doing these we turn up behind the latter, and walk up the Oude D Here we come to the Oude Kerk, but cannot get a good view o except from the centre of the second bridge on this side of it. We get the church tower, and on each side of the canal an avenue of l trees. Opposite the Oude Kerk is a building now used as a barra It is the palace of the Prinsenhof, where William of Orange was as sinated in 1584. The entrance, with inscription over, makes a v good picture. As we return, if we cross the Groot Markt and b to the right, about ten minutes' walk will bring us to the Poort—an old gate with two spires, of which the Delft folks thin great deal.

A very short ride (four miles) will bring us to La Hague. T tramway terminus is at the railway station, and in a few minutes reach the centre of the town. The principal objects for the cam here are the Vijver (which looks better in itself than as a picture), Hall of Knights in the Binnenhof, the Equestrian Statue of William I Orange in the Noordeinde, the Gevangenpoort, the Protestant Chu in the Spui, *Rue de Poten*, with its new buildings, and the Natio Memorial, in the west plein. The first four of these are best d in the afternoon, and the remainder very early in the morning. I h not forgotten the Great Church and the Town Hall, but both th buildings are undergoing repairs.

Opposite the Vieux Doelen Hotel (Turnoiveld), under the trees, is open smithy for shoeing horses. It would make a very effective pict in a good light; but the only time I could do it was when the weat was so cloudy that the heavy shadow caused by the roof covering m a satisfactory picture impossible.

From the Hague to Schevening is about two miles, and tramcars every quarter of an hour, the fare being threepence. There is a a steam tramway from the Dutch station. Beyond the Grand Hotel Bains there is little at this pleasant seaside place to photograph in way of buildings. On the beach, however, in fine, still weather, m be found studies of customs and people to any extent. If we w back to the Hague through the woods some very charming "bits" m be obtained, not forgetting the Huis ten Bosch.

It is scarcely necessary to remind my readers that the picture gall at the Hague is considered the finest in Holland. Here we have only Rembrandt's wonderful *School of Anatomy* and Potter's *Bull*, dozens of splendid paintings by great Dutch artists worth spend hours over.

Our next stopping-place is Leyden (about nine miles). Here, aga we have tramcars waiting for us—some drawn by horses and others engines. The one going to Hoogewoords will in about ten minutes us down in the centre of the town. Should we arrive there in morning—say about ten o'clock—all the principal objects can be pho graphed before midday. No doubt the enthusiast will "do" m things that escaped my notice, but the five following objects mak very good selection, namely—the entrance to the Burg (the B itself cannot be photographed), St. Pancras Church from Niewestra the Doorway, the Stadhuis—a long building in Breedstraat with a f flight of steps, which may be taken separately—and on the way b to the station, just after crossing the bridge at the entrance to Beesten Markt on the left, will be seen the Morsch Poort, which fr the other side makes a good picture. F. A. BRIDGE

(To be concluded in our next.)

A FEW NOTES OF A TOUR FROM MAINE TO CALIFORN

[A communication to the Edinburgh Photographic Society.

On the 5th of September of last year I left home to make a tour of continent of America. For this purpose we took passage on one of Cunard steamers (the "Aleppo"). This vessel happened not to be the line, but drafted from the Mediterranean, in order to fill the place the "Marathon," which was chartered to take troops to Egypt. passage across was very pleasant, although we had some rough weat Nothing very striking occurred worth noting.

We landed at Boston on the 19th, a clear, bright sunny day, the gen men all appearing in their white vests. I never saw so many in my l Boston is famed for its literary and scientific institutions, as also for crooked streets; the Bostonian thinks it the hub of the Universe. doubt it is an interesting city, its thrilling traditional and histori associations dating from the discovery and colonisation of the contine Through all trials and triumphs of the youthful republic Boston has alw held its position. The principal sights around Boston are Bunker's Monument, Faneuil Hall, The Common, Public Garden, State Ho Library, and the old South Church, famous for its historical associati The old, quaint street views are well fitted for the camera, but the ph graphers in America have not done very much in street photography. terrible conflagration of 1872 swept away a large proportion of the busin houses. The burnt district is now all rebuilt on a more magnificent sc I looked in on my old friend Mr. Black, who still continues to retain high place in the profession. I found him busy at work, still using strong acid bath, dry plates not yet having become a favourite with h He appears to be doing a large business in magic-lantern transparenc Messrs. Allan and Rowell, of Winter-street, still continue to print all t large pictures in carbon. There is very little of this work done in States.

left Boston to have a run through the State of Maine, visiting, among er places, Portland, the commercial metropolis of Maine; Gardiner, ed for its extensive manufactories and fine water-power, furnished by Cobbossecontee, across which are eight stone dams in the space of one e; the scenery all round Gardiner is very beautiful. Augusta, the ital of the State, derives much of its beauty from the great abundance rees and shrubbery. The State House is built of white granite, which ery plentiful in this State; the building itself is considered one of the dsomest in the East. After spending some little time we left for ssachusetts again, and made some little stay in the city of Worcester, of the most beautiful in New England. It is about forty-five miles n Boston, and is in the centre of one of the finest agricultural regions of ssachusetts. It is also noted for its public schools and manufactories. the suburban parts the merchants have erected magnificent homes. It aid that more patents are taken out for Worcester than for any other ce in New England. From Worcester I went to New York, which is tant about 190 miles. The railroad passes through a lovely tract of ntry.

)n my arrival in the great Babylon of the West I had a quiet saunter ng Broadway, taking note of the photographic displays on my way. thing, however, very striking arrested my attention. I found many of the iliar names above the show-cases, telling me that the old pioneers were l in harness. A visit to the Scovill Manufacturing Company's establishnt will never be forgotten. On entering I saw within the desk enclosure the , familiar face of our friend J. T. Taylor—he who was the soul of this iety for many years, and whose contributions to our art have been many l valuable. You may be sure our meeting was an enthusiastic one. I tell by the shake of the hand how the heart beats. I found him busily recting the last proofs of the *Photographic Times*. After all sorts of uiries about old friends we started on an inspection of the establishnt, every turn presenting new surprises. My attention was arrested by hudding, thumping noise, which turned out to be the unloading of iera stands. I do not exaggerate when I say that I saw as many stands ived that day as have been manufactured in Scotland for the last ten rs (more or less). Mr. Adams received me with a cordiality and kindly mth that made me feel quite at home. He told me to come in to write letters or do any business I might have on hands—in fact, to make it a -house as long as I remained in the city. After going through the yrinths of the Scovill Company's factory friend Taylor said, pointing huge pile of packing cases—"These are my traps—I am going off to gland." I had, however, the pleasure of spending two or three days h him before he sailed. In my peregrinations through New York I ted Messrs. Anthony's photographic material establishment, and found h my old friends in excellent health, and vigorously pushing forward ir business. Everything that the photographer requires is to be found e. They do a large business in photographic prints, stereoscopic and er sizes. A stranger is made thoroughly welcome and courteously wn over their large establishment.

Iy next resting-place was Philadelphia. The route from New York nce is not very interesting. Philadelphia is the largest city but one in Union. Its population is nearly 900,000. Photography is well repreted. Many of those present will remember the splendid specimens sent our last exhibition by Gutekunst. He still keeps abreast with his ipeers. No doubt his superior artistic work has caused others to be bitious to get alongside of him, and I was glad to observe that many of m had been successful.

Iy next journey was to Baltimore—the city of monuments and oysters. otography stands well here. The specimens exhibited show careful nipulation and considerable artistic ability.

'he next place of attraction was Washington. One has the choice of routes in going there from Baltimore. There is the Baltimore and io railroad, and the Baltimore and Potomac railroad. The distance the former is forty miles, and by the latter forty-three. The latter was one by which I travelled. The first view of the Capitol on approaching very fine. It is perhaps the finest—indeed, it is probably the most gnificent—public edifice in the world. It crowns the summit of Capitol l, which has an elevation of ninety feet. The main building is 352 long, and 121 feet deep, and two wings, or extensions, 238 feet by 140 . Its whole length is 751 feet. The central building is of a light low freestone painted white, and the extensions are of pure white mar-

The whole surroundings are beautifully laid out and embellished with ntains and statuary. It is not within the range of my paper to give a gthened description of public buildings and other details; but these be found in the ordinary guide-books, which are plentifully supplied. now no city of the Union that presents such a smiling face on a sunny as the city of Washington.

J. G. TUNNY.

(To be continued)

INIONS OF THE LAY PRESS ON THE PHOTOGRAPHIC EXHIBITION.

E PHOTOGRAPHIC SOCIETY'S EXHIBITION.—Every year brings more uits into the ranks of amateur photographers, as well as a marked rovement in the various mechanical and chemical photographic proies, and consequently this annual Exhibition of both amateur and proional work becomes of increasing interest and value. There is much ance this year in the quality of the works exhibited—in particular, n an artistic point of view. More pains have evidently been taken nake a harmonious and complete picture of the subject portrayed, to avoid a mere crude reproduction of a portion of a view which ns attractive at the time when seen with all its surroundings, but ch loses all its charms when it stands apart from them on its own its. In figure composition subjects this improvement is especially ceable, and Mr. Adam Diston, whose picture—entitled *Gloamin'*—we praised last year, has certainly made great strides in art-photography with his *Industry*, *After the Storm*, and *The Poor of the Village*. Both from the standpoint of art composition and execution these little pictures are photographic gems; and in the first-named, which represents an old lady knitting, he has obtained an admirable Rembrandtish effect. Of the other figure subjects, perhaps, we cannot speak so highly. Mr. Lyddell Sawyer, Mr. H. P. Robinson, Mr. E. Berry, and others, have some fairly well-composed groups, but they are for the most part far too stiff, and the models are manifestly conscious of having their portraits taken. It is here that the artist has the better of the photographer, as he can soften down that rigidity of the muscles which so frequently mars the artistic effect of a photograph. Animal photographs form a larger proportion than usual of the exhibits, and Mr. T. J. Dixon is far beyond his compeers in his really splendid portraits of various inhabitants of the Zoological Gardens. His enlarged *Tiger's Head*, his *Puma and Leopard*, and his *Red Deer*, are exceptionally good. There is also a very fair show of marine subjects. Messrs. G. West and Co. have some fine views of yachts, Mr. Henry J. Godbold sends a spirited *Storm at Hastings*, and Mr. W. P. Marsh a startling wave effect in his *High Tide at Bognor*; but the palm in this class of subjects is carried off by Mr. W. Mayland in his *Sea Studies*, one of which—*There is a Sorrow on the Sea*—has been finely enlarged by the Autotype Company. In landscapes Mr. William England, Mr. H. Manfield, Mr. W. Muller, and Mr. Donkin have some excellent Swiss mountain views, Lieut. C. E. Gladstone, R.N., some Irish scenes admirably printed in platinotype, Messrs. Perkins and Sons some good views in the Isle of Wight, and Mr. Vernon Heath some grand *Rocks in South Wales*. Of architectural subjects there is as usual a great paucity, though a brilliant exception is made by Mr. E. H. Griffiths, in his views of the Alhambra and Casa Pilatus at Seville. There are a few good flower subjects—noteworthily some panels for decorative purposes by Mr. Fred Hollyer. Of instantaneous photographs there are some capital pictures of leaping horses and vaulting acrobats shown by Mr. A. Lugardon, and some interesting views from the top of an omnibus in London by Mr. W. Cobb, while we must not omit three photographs of scientific interest—an iceberg taken from a steamer in the Atlantic by Mr. F. Barlow, the interior of a Dene's Hole, taken by oxy-magnesium light, by Mr. Arnold Spiller, and a photograph of the *Great Nebulæ in Orion*, by Mr. A. Common. Altogether the Exhibition is well representative of the great advance which has been made during recent years in both the art and science of photography.—*Graphic.*

RECENT PATENTS.

NOTICE TO PROCEED.

Nos. 4,152-3-4.—"Improved Method or Process of Producing Prints or Transfers of Photographic Pictures." EUGENIO DE ZUCCATO.—*Dated August* 28, 1883.

BELGIUM PATENTS GRANTED, SEPTEMBER 29, 1883.

"Obtaining Relievo-Printing Plates by Photographic Means." BENECKE, FISCHER, and FRANK, St. Louis, U.S.A.—*Dated September* 8, 1883.

"Means of Transporting Paintings in Studios." C. MAROT, of Troyes.—*Dated September* 18, 1883.

AMERICAN PATENT GRANTED, SEPTEMBER 18, 1883.

"An Electric Photographers' Retouching Point." JOHN THOMAS BURKE, Nebraska.—*Application filed June* 1, 1883.

APPARATUS FOR SUPPLYING SENSITIVE PLATES IN PHOTOGRAPHIC CAMERAS.

THE following is the specification of an invention by Messrs. JAMES HENRY HARE and HENRY JAMES DALE, both of London, for an invention patented under the above title:—

Our invention relates to means of supplying sensitive plates to a photographic camera, our object being to have a number of such plates ready to be acted on by exposure in the camera either in direct succession or in any desired order, and to retain these plates protected against farther active action until they can be conveniently developed.

For this purpose we make a box of rectangular form, of a depth somewhat more than double the width of a plate, so that it can contain two tiers of plates, the one tier above the other. Each sensitive plate, if it be transparent, is fitted in a light frame having an opaque backing, which may be a thin plate of metal, and a number of these frames, with the sensitive plates secured in them in each case by a suitable turn-button or catch, are placed in the lower part of the box, where they are pressed forwards towards the front by light springs. Above this lower tier of plates we place an upper tier, which must consist of a number less at least by one than the number in the lower tier. The front of the box is made with a slide or shutter such as is usually employed for exposing plates in cameras. The box is fitted to the back of the camera by tenons sliding in grooves or otherwise. On withdrawing the shutter the front plate of the lower tier is exposed, and on closing the shutter it is protected against farther active action. The box being then removed and turned over and over, this front plate finds its way to a front place in the upper tier, whilst the back plate of the upper tier descends behind the plates of the lower tier. On replacing the box the plate which was originally second of the lower tier can be exposed, or, if it should be desired to pass several plates without exposure, the box can be turned over and over several times so as to change the positions of several of the plates. Thus plate after plate can be exposed either in direct succession or in any desired order. For convenience of ascertaining which of a number of plates occupies at any time the position for exposure we provide in the shutter a hole fitted with non-actinic glass, and

we mark each plate-frame with a number or other distinguishing symbol which can be seen through the glass.

SENSITISING PHOTOGRAPHIC PAPER AND DEVELOPING PICTURES THEREON.

We content ourselves at present with only giving the specification of the patent granted to Mr. W. R. Lake on behalf of Messrs. R. B. West and B. C. West, of Guilford, Conn., U.S.A., reserving any remarks we may feel called upon to make until after we have subjected the process, as described by them, to a full trial.

This invention relates to photography, and has special reference to the sensitising of the paper before printing, and the development of the print, the object of the said invention being principally to avoid the necessity for using the expensive silver solution now generally employed in this class of work. The said invention consists in subjecting the paper to be sensitised to a bath composed of potassium bichromate, magnesium sulphate, and mercuric chloride, and then, after the exposure of the sensitised paper for printing in the usual manner, subjecting the print for development to a bath composed of gallic acid, ferrous sulphate, aluminum and ammonium sulphate, and sodium hyposulphite, as more fully hereinafter described.

In carrying the said invention into practice I provide a bath for rendering the paper sensitive to light as follows: that is to say, I take of potassium bichromate three parts, magnesium sulphate one part, mercuric chloride one part, and I mix and dissolve in the smallest quantity of boiling water for solution and crystallising. Of this compound I take seventy-five grains to each ounce of water employed in the bath. The paper is floated in this bath for (say) three minutes, and is then dried in the dark; when required for printing it is placed under the negative a sufficient time to make the lighter shades in the print visible, the time varying (say) from three to ten minutes under direct sunlight.

The exposed portions of the print will be light brown upon a yellow ground. So soon as this condition is attained, the paper is taken from beneath the negative and soaked in pure water, say for twenty minutes; if the negative be very intense, such as to require ten or more minutes of direct exposure to the sunlight, the soaking should be continued longer, say for half-an-hour; this is desirable because it facilitates the subsequent developing.

The excess of bichromate being removed leaves the whites of a faint yellow tint. Where pure whites are required it becomes necessary to destroy all traces of bichromate where the light has not acted and which are not easily removed by soaking; for this purpose the print is immersed in one per cent. solution of acid sulphite of sodium for one or two minutes.

To prepare the developer, I take of gallic acid two parts, ferrous sulphate three parts, aluminum and ammonium sulphate three parts, and sodium hyposulphite twenty-four parts; the ferrous sulphate, aluminum, and ammonium sulphate and sodium hyposulphite are each dried separately until free from water of crystallisation, and are then pulverised and mixed with the gallic acid. This compound will keep and retain all its properties if protected from dampness. Of this composition I take fifteen grains to each ounce of water.

To develope the print I lay it in a suitable dish and pour upon it the developing solution to cover it—say a quarter of an inch in depth—or if several prints are to be developed at the same time, I take enough of the solution to cover all the prints. While they are in the solution I move them frequently, so as to expose them equally to the developing solution.

When the development of the print is completed, which will generally require about ten minutes, the excess of the developer absorbed by the paper is removed by soaking the print for half-an-hour in water slightly acidulated with acetic acid, after which, and when dry, the picture can be mounted. Its subsequent treatment may be substantially that usually applied to photographic prints.

The sodium hyposulphite and alum in the developer exert a reducing action, which prevents the ferrous salt from becoming oxidised readily when in solution and exposed to the air, and enables the bath to be used repeatedly for several days, if, after use, the precaution is taken of putting it in a tightly-corked bottle, which should be filled by the solution.

Any colour from black to brown can be obtained after soaking out the developer, by immersing the print from one to five minutes in a bath composed of one part taken from the sensitising bath and two parts of water, the time of contact with the bichromate determining the shade, and after such treatment soaking in water until the yellow tint is entirely removed.

If desired to change the colour of a print to reddish brown, I subject it, after development, to a bath composed of a solution of carbonate of soda (one ounce of carbonate to one quart of water), and dry immediately.

In case it is necessary to bleach the picture it should be done after development and before any change of colour is effected, and may be well done by subjecting the print to a solution of one part of citrate of ammonia in twenty parts of water.

The paper may be prepared for sensitising by any of the known processes, but I obtain a very good result from the following treatment—that is to say: I take paper of a good quality, coat it with a mixture composed of starch seven parts, white sugar two parts, glycerine two parts, boiling water two hundred parts, and solution of pure caustic potash sufficient to cause the coating to dry with an even surface, which will require about one-fourth part potash; the first three ingredients are mixed with a little cold water, and then stirred into the boiling water. The coating is applied by floating the paper upon the mixture in the manner usually employed in the application of albumen to paper. After drying the paper is dipped in a two-per-cent. solution of acetic acid and water, and when again dried it is ready for use. In cases where the intensity and appearance of the print is of little importance paper may be used without this treatment. Albumen paper does not under this improved process produce so good results, chiefly on account of its density.

From experiments it is believed the proportions for the sensitising and developing baths above given produce the best results; but these proportions may be varied to some extent without departing from the nature of this invention.

By this process photographic prints are produced fully equal to those produced by the employment of silver, and it will be evident that the cost of the production is very much less than by the usual process employing nitrate of silver.

The printing is also more rapid than by the usual process, and colours may be more readily applied to the print than when the print is prepared under the usual process.

Having thus fully described the said invention, as communicated to me by my foreign correspondents, and the manner of performing the same, I wish it understood that I claim—

First—The improved process of sensitising paper for photographic printing, consisting in subjecting the paper to a bath composed of potassium bichromate, magnesium sulphate, and mercuric chloride, in the proportions substantially as described.

Second—The improved process of developing pictures printed upon sensitised paper, consisting in subjecting the print to a bath composed of gallic acid, ferrous sulphate, aluminum and ammonium sulphate, and sodium hyposulphite, in the proportions substantially as described.

Third—The improved process of sensitising paper for photographic purposes, and developing pictures thereon, consisting in subjecting the paper upon which the print is to be made to a bath composed of potassium bichromate magnesium sulphate, and mercuric chloride, and then, after printing, to a bath composed of gallic acid, ferrous sulphate, aluminum and ammonium sulphate and sodium hyposulphite, in the manner, and the said baths in the proportions, substantially as described.

Our Editorial Table.

Retouching Desk. By G. Atkinson, 40, Cambrian View, Chester.

We have had submitted to us by Mr. Atkinson a retouching desk which he manufactures, and which possesses some good features. It is simple in construction and strongly made, and its dimensions are such as to enable the operator to work freely and without cramping. A matt reflector is employed, consisting of a slab of white plaster, the surface of which can be renewed in a minute or two when it becomes dirty. A revolving carrier enables the negative to be turned in any position desirable. The desk may be used as a table easel, and is equally adapted for night work.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 24	Bristol (Annual Meeting)	Studio, Portland-st., Kingsdown.
" 25	London and Provincial	Masons' Hall, Basinghall-street.
" 25	Liverpool Amateur	Free Library, William Brown-st.
" 25	Oldham	Hare and Hounds, Yorkshire-st.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 11th instant, Mr. A. L. Henderson occupied the chair.

This evening had been fixed upon for the first of the "lecturettes," which it is intended to give once a month during the winter session, and the members and friends mustered in force to take advantage of Mr. W. K. Burton's description and demonstration of the process of gelatine emulsion making.

Mr. Burton said he understood that the object of these lectures was not to bring forward new matter for the consideration of those already proficient; but for the instruction of those who, from not having made themselves familiar with the particular subject to be treated of, were unable to take part in the discussion arising upon that subject. He proposed to show, by two of the most practical methods, all that was necessary to enable amateurs and those professional photographers who wished to prepare plates for their own use how to do so. There were, he (Mr. Burton) said, two well-known methods—the boiling and that by the action of ammonia upon the silver bromide, which had both given good results in his hands, and the formulæ for which, as follows, were hung upon the wall of the room:—

Formula for the Boiling Process.

A.

Nitrate of silver .... 400 grains.
Water .... 4 ounces.

B.

Bromide of potassium.. 320 grains.
Iodide of potassium.. 10 "
Nelson's No. 1 gelatine .... 100 "
Water .... 4 ounces.
Hydrochloric acid—enough to make the solution perceptibly acid.

C.

Heinrich's gelatine .... 600 grains.
Water—enough to thoroughly soak this, all excess being drained off.

FORMULA FOR THE AMMONIA PROCESS.

A.

Nitrate of silver	400 grains.
Water	4 ounces.

B.

Bromide of potassium	320 grains.
Iodide of potassium	20 ,,
Nelson's No. 1 gelatine	100 ,,
Water	4 ounces.

C.

Heinrich's gelatine	200 grains.

Water—enough to soften the gelatine.

D.

Heinrich's gelatine	200 grains.

Water—enough to soften the gelatine.

E.

Liquor ammonia, ·880 (which is best diluted with two or three times its volume of water to prevent its losing strength)	5 drachms.

He (Mr. Burton) said that of the two methods, for his own part, when great rapidity was not required, he preferred the boiling one, but he believed that for rapidity the ammonia plan was the better. On the sensitometer the same number could be obtained by either method; but in the camera the ammonia plates were more rapid than those showing the same sensitometer number but prepared by boiling the emulsion. Much had been said (Mr. Burton continued) about the method of mixing the materials of the emulsion. In his experience and with the formulæ under consideration the manner of mixing made very little, if any, difference. One thing was important, however—that the temperature should be at or nearly 140°. If the temperature were as high as 180° granularity resulted. If, on the other hand, the mixture were made at as low a temperature as 120° granularity also ensued, and at the same time the emulsion was blue. One little variation he would make from the formulæ exhibited on the walls was that, instead of dividing the water into the two quantities indicated in A and B, the whole of the water was added to the ingredients under the heading B, and the silver was put into this in crystals, the whole being then shaken up for a minute or two. [A little was poured on to a glass plate and handed round to show the bright-red colour which an emulsion should exhibit at this stage.] It would be seen that the quantity of bromide given was noticeably in excess of what was required to combine with the silver to about the extent of forty grains; if less excess than this was employed the emulsion required longer boiling to bring it to the sensitive condition; if more, then a thin image and granularity of the emulsion sooner supervened. The question of the value of iodide had been much discussed. He found that it gave a clearer plate and only required longer time of emulsification to get rapidity. The amount of gelatine used with the emulsion in solution B was greatly in excess of what it had been usual to advise; but he found that with the 100 grains given he got a better quality of plate, and rapidity ensued quite as quickly as with a smaller quantity. The quantity of water used was of importance, and very varying proportions to the other ingredients were given in various formulæ. Formerly he had used more water than he did now. The effect of dilution was that it required longer boiling to bring about the change to the sensitive condition. On the other hand, he had never succeeded with the concentrated solutions recommended by Captain Abney in getting all the bromide into an emulsified condition. If the solution were very dilute the addition of acid was not necessary. In the first part of the process, the two emulsions—that for boiling and that for ammonia—were prepared exactly alike, with the exception that for the ammonia lot the quantity of iodide was double that contained in the other. He believed, however, that all the iodide did not remain suspended in the emulsion. The reason for dividing the hard gelatine into two quantities for the ammonia process was that the high temperature and ammonia combined so vitiated the gelatine that it would not set. The addition of a fresh quantity of gelatine at the last, however, conferred setting properties upon the emulsion. When ammonia was added at a high temperature, if only a small quantity of gelatine were employed, as was sufficient in the boiling process, granularity resulted and the emulsion was spoiled. Granularity again ensued if the emulsion were allowed to stand still at a high temperature after the ammonia was added. The ammonia then was added after the addition of the first of the two quantities of 200 grains of gelatine, and the emulsion vessel being placed in water at 140° the mixture was kept constantly stirred until it had cooled to 120°, when the remainder of the gelatine was added, and, after stirring well to ensure proper mixture, the whole was left to set. The batch of emulsion to illustrate the boiling process had now been boiling for some few minutes, and Mr. Burton said that he was quite unable to fix a definite time for the continuance of the boiling. He judged by the colour of a drop on a plate of glass, and when, by transmitted light, this had acquired a blue tint, it was judged to be sufficiently boiled for ordinary use. If the highest sensitiveness were required, the emulsion was boiled for a period twice as long altogether as that occupied in bringing about the blue colour referred to. Ordinarily, to get to the blue stage from a quarter to half-an-hour's boiling was required. As to the size of the batch, the methods given were suitable up to half-a-gallon; for larger batches some modification might be required. The boiling process gave a much more opaque film than the ammonia one, and more gelatine might therefore be added to the emulsion; but the quantity of gelatine in the completed emulsion was not without influence upon the result. If too much were added the sensitiveness was reduced. Taking some emulsion which had been made and set beforehand, Mr. Burton placed it in a breaking-up appliance, which consisted of a square wooden tube of about one foot in length and two inches internal diameter. One end of this tube was covered by wire gauze of perhaps a sixteenth of an inch mesh. A wooden plug was forced into the other end of the tube, and the emulsion divided by the wires of the gauze set to wash in a sieve standing in a jar of water. It was necessary to move it about with the hand and break up any lumps that might be formed by clinging together of the shreds as soon as they were placed in the water. When the emulsion was divided as fine as this a quarter of an hour's washing in water running strongly enough to keep the shreds in motion was sufficient; he did not find any gain in sensitiveness from a more prolonged washing. He (Mr. Burton) showed a very similar dividing appliance of Mr. Henderson's which might well be copied. In this the square wooden tube and plunger were replaced by an ebonite cylinder and plug. After the emulsion was washed and drained it was filtered. Fine muslin was what the lecturer generally used, but some of the emulsion was put through Mr. Henderson's filter. This consisted of a glass globe holding about a quart. Over a neck, of about two inches diameter, at the bottom of this globe was stretched a piece of wash-leather, and a smaller neck at the top served to admit—first, the liquid emulsion, and then a cork fitted with india-rubber tube. Air being forced through this tube, either from the mouth, or more conveniently by the elastic balls of a spray apparatus, the emulsion rapidly passed through into a vessel placed beneath. Two methods of coating were shown. The first plan was that recommended to those not accustomed to judge of the quantity left upon a plate when poured on and off like collodion. To a glass plate, smaller than the size to be coated, three shots were cemented upon each side. This served as a stand. The plate for coating was laid upon this stand, and a measured quantity of emulsion poured on to the middle. A glass rod held at the ends in both hands was brought down upon the emulsion, and passed to one end and then the other of the plate. The coated plate was now laid upon a long, levelled strip of glass, upon which two very fine wires had been stretched. These served to prevent the plate from sticking in case a little emulsion had run upon the back. The other method of coating was the plan usually adopted commercially. A plate was taken with a pneumatic holder and coated from a vessel like a teapot by pouring on and off like collodion. In place of a lid this vessel was furnished with a glass tube enlarged at the top, and of about two inches diameter at the bottom. The bottom of the tube was covered with fine silver wire gauze, so that any dust or bubbles carried into the vessel with the surplus poured back from the plate would be retained. The difference between coating with collodion and gelatine was that with the latter, all that would do so was not poured off as with collodion; but a certain quantity, only to be judged after some experience, was left to form the film. With the ammonia-made emulsion it was necessary to leave more upon the plate than with that prepared by boiling, on account of the greater opacity that the latter possessed. The advantage of the first method of coating shown was that the amount required might be measured. A convenient measure was shown; it consisted of a cup and stem of glass, which held about one-sixth of an ounce. This quantity sufficed with a boiled emulsion for a plate five inches by four, but with an ammoniacally-prepared one for a quarter plate only. The best made plate might be spoiled in drying. The proper mode was to have ordinary temperature and a brisk current of air. High temperature was very injurious. In conclusion: he (Mr. Burton) remarked that when he said that this or that occurred, or was best, he meant it to be understood that that was so in his experience, and not absolutely.

The CHAIRMAN said, looking at the formula with ammonia, that he should use six ounces of water instead of four, and no iodide. He formerly used iodide, but had now abolished its employment. He also would use double the quantity of gelatine that there was of silver. Formerly he had made emulsions by the boiling plan, but never got good results when using acid. He thought, however, that the proper plan was to mix cold. A large manufacturer had recently told him that he used cold emulsification, and that one hour of that gave a plate showing No. 24 in the sensitometer. The particles of silver bromide underwent a change of form during emulsification. First, cubical; as sensitiveness was gained they became octohedral. Passing emulsion through leather filtered it very fine; but the leather must not be too thick, otherwise the breaking up of the bromide into a different form caused diminished sensitiveness. In conjunction with the filtering apparatus, it would be an advantage to have a pair of clamps with a stop to the india-rubber ball. These being closed by the hand, a certain quantity of emulsion would be forced through the filter directly on the plate held underneath, and the stop might be regulated so as to make any desired quantity pass. He had tried Mr. Stebbing's method of emulsifying precipitated bromide of silver when it was first published, but had not succeeded with it. With respect to the effect of ammonia in destroying the setting power of gelatine, he said that he had mixed one ounce of carbonate of ammonia and half-an-ounce of gelatine in eight ounces of solution, and found it set perfectly. A small quantity of alcohol, however, in conjunction with ammonia did prevent setting.

Mr. A. COWAN had always had a sandy deposit when using concentrated solutions such as Mr. Burton employed, but then he had used less gelatine.

Mr. W. COBB said that the quantity of ammonia given in Mr. Burton's formula had been thought large. He considered the amount quite small for a rapid plate. He wished to know whether the lecturer did not find a disadvantage, in the shape of a liability to scum marks, from mixing hard and soft gelatine.

Mr. BURTON replied that he had observed that the last plates of a batch were more liable to scum marks than those first coated. He was not able to say whether the mixture of gelatine had any influence in causing them. As to the quantity of iodide there was no doubt that there was too much for plates made particularly for portraiture. It was useful for outdoor work, because the contrasts were so strong that it was desirable to have full opacity. He thought that for portraiture it would be best to use little or no iodide. He added that plates which frilled when first made commonly lost that defect if kept for some time; and, in answer to a question, said that the quantities given would make thirty ounces of the boiled and twenty of the ammonia emulsion. If the quantities measured more when finished he added more gelatine; if less, he added water to make up the quantity.

Mr. W. E. DEBENHAM had never found it desirable to add water; in washing the emulsion, it always absorbed at least as much as he liked to have.

Mr. H. S. Starnes showed a double stirring spatula to be kept in motion whilst an emulsion was boiling, by a current of steam acting upon a fan. As to the action of light upon a sensitive plate, he thought it was due rather to a cracking action upon the gelatine than to direct influence upon the silver bromide.

Mr. F. W. Hart showed some dishes made for developing purposes of a species of celluloid. They were nicely moulded and very light. He had had one in his sink for eight or nine months past, and it appeared none the worse for that. He had washed prints in boiling water in one of these trays without injury to it.

The meeting was brought to a close with a hearty vote of thanks to Mr. Burton for his lucid demonstration, and to those gentlemen who had brought other exhibits and taken part in the discussion.

It was mentioned that promises of future "lecturettes" had been secured from Mr. J. Traill Taylor, *On Lenses;* Mr. W. M. Ashman, *On Printing;* Mr. A. L. Henderson, *On the Production of Ceramic Enamels;* Mr. C. E. Cooke, *On Art in Photography;* Mr. W. E. Debenham, *On Lenses;* and Mr. W. Coles and Mr. A. Haddon, on subjects not yet announced.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

The Board of Management held its usual monthly meeting, at 181, Aldersgate-street, on Wednesday, the 3rd instant. The minutes of the previous meeting having been taken as read, the Board confirmed the list of members enrolled since the former meeting.

The Secretary then submitted the reply of the Photographic Society of Great Britain, granting an evening at their Exhibition in aid of the funds of the Association. A vote of thanks was passed to the President and Council, and Friday, November 2nd, settled as the date. The Gallery will be open from seven till ten p.m., and it is hoped that as large a number of friends as possible will attend on that evening.

A resolution was then proposed, seconded, and carried that, instead of the charge of sixpence for the rules of the Association, they be supplied free on application.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The first meeting of the Session 1883-84 was held in the Religious Institution Rooms, on Thursday, the 11th instant,—Councillor Robertson in the chair. The minutes of last meeting were read and confirmed.

On the question-box being opened, the question—"As compared to summer what length of exposure should be given for views just now?" was found.

Mr. Paton said that in his studio he had to give an exposure three times as long at the present time as in May. This was considered a pretty correct proportion.

Mr. Falconer asked whether it was preferable to focus with or without a diaphragm. He was informed by several members that if he focussed midway between the centre and the edge of the plate there was no necessity to use a diaphragm when focussing.

The President (Councillor Robertson) then delivered his opening address:—It becomes me, on this occasion, to tender you my most sincere thanks for the honour you have done me in electing me President of the Glasgow Photographic Association, which was established many years ago, and is the successor of two previous societies. It has a connection with a very early date in the history of the art, and takes a good place among photographic societies. It has had ups and downs, or fluctuations of prosperity and adversity; but, taken as a whole, the measure of its success and the good it has accomplished is not to be despised. There have been many happy meetings, a large amount of information for those who attended, and to those who did not come here there was an influence for good emanating from this Society in its published reports in the journals. As in the past, so we hope in the future, that harmony and goodwill shall be conspicuous, and each member be found willing to give and to receive of what he may possess in his store of knowledge, as well as of kindness, &c. This Association combines within its membership all the elements which go to make up a society having a distinct object in view—that is, it includes all willing to join, and who have the true purpose of its objects at heart. Now a photographic association means surely that the members know a little of the art and desire to know more. What they do know (within certain limits) they are willing to communicate and are just as ready to receive. In this way the old words become quite as true here as anywhere else:—"As iron sharpeneth iron, so doth the face of a man his friend." The membership is grouped under three heads—professionals, assistants, and amateurs. But I would ask you if they are not really only one in different stages of development. The assistant or apprentice is gaining a livelihood, and hopes to be a journeyman and master some day. The amateurs of the past are very much the professionals of the present, and from time to time they are yet being drawn—themselves, their families, and friends—into the professional ranks, from one cause or another. Although all amateurs do not become professionals, neither do all assistants; but, whether we take gentlemen amateurs of independent means or the modest young man who requires to be pressed to take a slight consideration for the picture he gives to a friend, just to pay for the "stuff," I say that all of these are like any of us who are called "professionals:" they get their payment either in money or thanks, or in the friendly good feeling which may not even find expression in words, but is none the less acceptable and better as remuneration. This is my belief, and I feel the more sorry that there has lately been an amateur society formed, for many of those friends who were formerly with us have withdrawn, or have not been so often here as they used to be. If there has been any good cause for this separation I am not aware of it, and if the professionals have given any such cause I will say for them that they will be glad "to take a thought and mend." But I am afraid the real cause is the very common one in this country, namely, of every class, be it for better or for worse, separating from the other, a keeping company only with those who compose such classes. I beli there can hardly be a greater wrong done to, or mistake connected wi our humanity, sociality, and Christianity. We ought to meet one anoth not in classes divided and subdivided into so many sections and cast but with something like one aim, one object, one purpose—that of "doi to others as we would that others should do unto us." That, I belie has been the object of your Society in the past. Let us continue to mo on in the same direction, and, whether the membership and attendance great or small, I trust good shall result from our efforts. Having said much about ourselves and our Society, let us try to consider how kno ledge and experience in photography are best to be obtained. Of cour book knowledge is a most desirable thing, and from that source alone c we now expect to get the history and progress of the art-science; and ever one should know something of its history as soon as possible. For the deta of processes and applied photography we must also turn to books, and the proper collection of facts and principles—not to say formulæ—li much of the comfortable working of the man who takes to the pursuit photography, whether it be to earn his bread or to please himself and h friends. But it was said of old—"In the making of books there is no end If the wise man meant photographic books, surely he was very near correct, as it would take a library now to contain what has been writt on the subject. I suppose we had better try not to load our min too much, as perhaps if over-exposed to such an amount of literatu the image left may be found flat. As moderation in all things good, so is it in this. But we must not be satisfied with what w have already attained, or think ourselves already perfect, else t funny remark of one of our youngest members may be found true—th the older hands become "ossified." There is no standing still in th art-science. If we are not going forward we are going back. Co stant experience and practice is needed to attain perfection in manip lation, and continued additions to our knowledge of what is being done also in doing and speaking and hearing of what may be done—all is nece sary to enable us to keep up with the times. Now, although books an journals help us in this way, we require personal contact with on another in order to promote personal progress; and here our Society com opportunely to our aid. A few words from a friend will go farther to clea up a matter than pages of printing; a short time spent in another studi or an hour in a photographic exhibition, will do more for us than a numb of journals, good though the journals are in their own place. There w something also wanted in the way of technical instruction and knowled when this Society was formed, the only process then in use being t collodion for positives and negatives, and printing on albumenised pap (daguerreotypes having then gone out). The range of subjects to spea about and on which to acquire information was small—confined very mu to the developer and the toning bath. Now the knowledge required in o properly "up" in the profession is becoming every day more extensive, an embraces already a wide variety of subjects in science and art, with the pr cesses, manipulations, and applications in all its different phases. You ca not find any profession or trade that does not utilise it, and it is also foun in connection with learning as well as with religion; indeed, it is used i numberless other ways. That being the case, there exists the more ne that we should study and follow up each division. Our Society can he in many ways. One member gives special attention to (say) manipulati in one branch, another to art, a third to mechanical work. As we g these experiments laid before us other thoughts and ideas are brought o in discussion, and all are benefited. It is to be hoped that members wi try to help our Secretary in bringing forward their varied subjects in th way. I have little more to add at present, and your patience is, perhap already exhausted. It has always been a trouble to me to make speech but there is much to think over, to speak about, and to work out in phot graphy. The evident progress of recent times has become conspicuou just as the discovery of how to fix sun pictures was formerly a wond Just think of how a sitter had to remain in the sun an hour or more order to leave an impression on the plate or paper! Now the quicke train or steamboat, the breaking wave, the busy street, the crying laughing baby, can be taken instantaneously. I don't know if the idea our former President (Provost Stuart) has been realised, namely, that would be possible for a gentleman coming down Buchanan-street an lifting his hat to a lady to be able, at the same time, to take her phot graph! But pictures are certainly quite as rapidly done, and well don Whether as a Society we study rapid processes, or the various details whic are needed to make up the sum of our knowledge, here we meet. Let u therefore, help each other to achieve success in life—to strive after t beautiful and true, knowing that "a thing of beauty is a joy for ever; and, while striving after the good of each and the benefit of all, we will gradually prepared for that change which will fix our destiny. Althoug we now seem to be going through a slow process of change, then th instantaneous transition will become a permanent reality.

On the motion of Mr. Urie the President was awarded a hearty vote thanks.

Some specimens of photo-engraving, executed by Messrs. T. and R Annan, were exhibited and were very much admired. The Chairma intimated that a medal had been awarded at the Pall Mall Exhibition t these engravings, and the meeting congratulated Messrs. Annan on the success.

Mr. Dodd proposed, and Mr. Hulme seconded, that a photo-engravi be prepared for this season's presentation print. This was agreed to.

The Treasurer then proposed that a *conversazione* be held abo December or January. Mr. Goodall seconded the motion, which w unanimously agreed to, and a committee was appointed to make t necessary arrangements.

The prizes gained in the competitions of last session were then awarde and were as follow:—

1. A gold medal, presented by Mr. John Jex Long, for the best twel transparencies, was gained by Mr. J. Parker.

. A lawn tennis racquet, presented by the late Secretary, Mr. W. Craig msay, for the second best twelve transparencies, was gained by Mr. ell Anderson.

. A cheque for £1 1s., presented by Mr. Fraser, for the best negative n which members might make transparencies, was gained by Mr. R. tting.

. A fishing-basket, presented by Mr. Falconer, for the best transparency m Mr. Cutting's negative, was gained by Mr. S. Anderson.

This being all the business, the meeting closed with a vote of thanks to Chairman.

PHOTOGRAPHIC SOCIETY OF IRELAND.

E opening meeting of this Society was held on Friday last in the Royal lege of Science,—Mr. Greenwood Pim in the chair.

The minutes of the last meeting having been read and signed, Mr. V. Robinson read a paper on *The Present Condition of Amateur Photophy and its Probable Future.* [See page 623.]

A very animated discussion followed the reading of the paper, clearly wing that at least a wide divergence of opinion existed amongst even se members most likely to be able to judge of the subject.

Mr. ROBINSON exhibited a camera of his own construction, and also ew one by Watson and Sons, of London.

Mr. SAMUEL BAKER showed a series of views of cromlechs in the County Sligo, which he had taken during a recent tour in the west.

Two new names were then handed in as candidates for membership, to balloted for at the next meeting. The meeting was then adjourned.

ORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

EETING of this Association was held on Wednesday, the 3rd inst., at the wn Hall, Hanley,—Mr. Charles Alfieri, Vice-President, occupying the ir.

The minutes of the previous meeting having been read and confirmed, prints and negatives resulting from the last excursion to Trentham were sed round, and some of them pronounced excellent. It was resolved that rint from an 11 × 9 negative of Trentham Hall, taken by Mr. W. B. son, should be placed in the Society's portfolio.

Mr. Burgess exhibited one of Blaike's pocket dark slides, made very light, lack cardboard, and weighing about one ounce.

The CHAIRMAN read a short paper *On the Reduction of Gelatine Negatives h have been Over-Intensified with Mercury.* [See page 622.]

Mr. W. B. ALLISON had employed successfully, for the removal of the dense n, yellow fog, due to forced development, the same treatment, followed dose of ferrous sulphate (wet plate) developer.

The CHAIRMAN then read a paper *On the Art of Pictorial Composition as lied to Landscape Photography.* [See page 624.]

n the proposition of Mr. F. J. EMERY, seconded by Mr. M. KIRKBY, solution was unanimously passed thanking the Chairman for his able very instructive paper.

Messrs. Hills, Hampton, Willat, and Dr. Griffiths were respectively posed, and duly elected, members of the Association.

was decided to hold no more meetings at the Wedgwood Institute, slem. The next meeting to be held at Hanley, on the 31st inst.

he meeting then separated.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

EETING of this Association was held in the Religious Institution Rooms, gow, on Tuesday, the 9th inst.,—Mr. H. Reid, President, in the chair.

he minutes of previous meetings were read and confirmed, and eleven members admitted.

he question-box was then opened and contained the following:—

. Are purely architectural subjects admissible for competition under head of landscapes at the forthcoming exhibition?

is question was decided in the affirmative.

d. Wanted, an intensifier for gelatine plates other than mercurial.

r. J. PARKER recommended the formula of Wratten and Wainwright, posed of protosulphate of iron, gelatine, acetic acid, and nitrate of r. In his hands it had given very satisfactory results.

r. HUME had used Werner's intensifier with success.

r. GOODWIN very strongly recommended the formula given by Mr. W. ks, on page 495 of THE BRITISH JOURNAL OF PHOTOGRAPHY for ust 24th last. It consists of a saturated solution of alum with citric pyrogallic acid, and nitrate of silver added.

d. Are bought cloud negatives allowed to be used for printing skies in res for the forthcoming exhibition?

is question was decided in the negative, it being one of the rules that xhibits must be entirely the work of members.

question put by Mr. Hume, as to whether a professional printer t be employed for printing members' negatives for exhibition, was ered in a similar manner.

. Has any member used the sal-soda developer, and with what ts?

. HUME had tried it, but condemned it on account of its decided ency to cause frilling.

. REID's experience was similar to that of Mr. Hume.

. GOODWIN had used sal-soda in conjunction with hydrokinone, and experienced no frilling. He preferred hydrokinone to pyro. on nt of the greater latitude it allowed in the exposure.

. J. C. PARK found the sal-soda developer very slow in action.

ese being all the questions, Mr. Park handed round a full plate n print on glass, coloured behind with oil colour, somewhat in the of crystoleum. The result was considered very effective.

Mr. REID showed a plate that had been by mistake exposed twice on different landscapes. The result was a complete picture, the two landscapes having so fitted into each other as to give the appearance of only one exposure having been made.

Mr. Reid then exhibited a Scovill combination printing-frame for vignetting.

It was intimated that the next meeting being the one prior to the annual meeting, alteration of rules or changes in the office-bearers should be proposed at that meeting.

It was also intimated that Mr. J. Y. McLellan would at the November meeting read a paper on *Lens Diaphragms.*

Tickets for the exhibition of the Photographic Society of Great Britain, kindly presented to the Association, were then distributed amongst the members present.

The usual vote of thanks concluded the meeting.

LEEDS PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on Thursday, the 4th instant,—Mr. W. Teasdale, F.R.M.S., in the chair.

A very interesting paper, entitled *Reminisences*, was read by a member of the Society, who said his earliest recollection in connection with photography was that of assisting his father and a friend to construct a camera out of an old box. A telescope lens was placed in front, and a piece of paper sensitised with salts of silver was exposed to a view for the whole of a long summer's day. At night, to their surprise, they secured a white landscape with a black sky. This was carefully preserved in the dark and exhibited by candle-light to a favoured few. The daguerreotype process was next described, and the introduction of collodion mentioned. In referring to the waxed-paper process, the speaker described it as producing most soft and artistic pictures, and regretted that amateurs did not at present take more kindly to it. Two prints from waxed-paper negatives and also the negatives were shown; and, although twenty-five years' old, they were as bright as on the day they were printed. The collodio-albumen process was the next with which he was connected, and many interesting and humorous details were given of his experience in working this process. In his opinion it was not equalled for sharpness, half-tone, and latitude of exposure by any other process. Emulsion and bath plates with preservatives were both mentioned, and negatives illustrating each process were exhibited. In conclusion: a reference was made to gelatino-bromide plates, and attention drawn to the great difference in the length of the first exposure to the exposure required now.

The CHAIRMAN spoke at some length on the artistic qualities of the waxed-paper process.

Mr. J. W. RAMSDEN gave a very humorous description of his experiences in working wet plates, and referred to his connection with the various modifications and improvements introduced in photography.

Mr. F. W. BRANSON gave a demonstration of M. Hutinet's enlarging process, and also exhibited enlargements to show the capabilities of the process.

A large and handsome album was presented to the Society by Messrs. Reynolds and Branson, and suitably acknowledged.

The meeting was shortly afterwards adjourned.

COVENTRY AND MIDLAND PHOTOGRAPHIC SOCIETY.

THE ordinary meeting of this Society was held at the Dispensary, Coventry, on Thursday, the 4th inst.,—Mr. H. W. Jones, Vice-President, in the chair.

The CHAIRMAN read a paper describing his method of colouring transparencies. He used a varnish made of dammar dissolved in benzole for writing and colouring upon. There was nothing new in the process.

As the meeting was rather small the adjournment took place earlier than usual.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Society held its first meeting for the season on the 21st September, when, in the absence of Dr. Vogel, who was in America, the chair was taken by Dr. Kayser.

Very little business was transacted. A protest was entered against the correctness of the account given in the *Wochenblatt* of the cause of so many members having left the Association.

A letter from Dr. Vogel, giving details of his visit to the Photographic Convention at Milwaukee and of the state of photographic matters in America, was read.

Several cabinet portraits, by Herr Graf, were shown. The contents of the question-box were attended to, and the meeting was shortly afterwards adjourned.

Correspondence.

IS PHOTOGRAPHY FINE ART?

To the EDITORS.

GENTLEMEN,—When Mr. W. J. Stillman asserts, on the authority of the "artists," that photographers do not belong to this category, I would, firstly, ask him from which body of artists he draws his deduction—artists in words, artists in tone, artists in sculpture, artists in design? He may appeal to many of these and they shall not be of his opinion; his sweeping assertion, therefore, falls to the ground.

I must likewise take exception to the definition of fine art or high art as "the putting into form a mental conception." I prefer to read the beautiful, the ideal, made manifest to the senses by the agency of colour, sound, or design; and Mr. Stillman, dating from Florence, should have little "difficulty" in this acceptation, when the *belle arts*, the *beaux arts*, are to him expressions of everyday life. To admit a mental conception as fine art will be to pass *any* conception as high, fine, or beautiful art, and this point cannot be maintained for an instant. The 'οι πολλοι class anything produced by brush and palette as fine art, and they will exclude a perfect conception from this rank solely because the camera and not the pencil has been the medium by which we are enabled to contemplate the "idea;" but my business is not with those brethren of the brush who have mistaken their vocation. I shall contend—and in very good company, too—that it is quite possible for a leading artist to produce a work, a notorious work, and that work shall not rank as fine art. We are mostly cognisant of Michael Angelo's picture, *The Last Judgment*, and I beg to refer to the preface written by Charles Blanc, in the *Histoire des Peintres de toutes les Ecoles*, where this world-renowned art critic, speaking of the picture I have mentioned, describes it as painted solely to show Michael Angelo's knowledge of anatomy and his power of drawing. But it is not fine art; it is simply the human figure in every variety of pose and foreshortening. Dare I add it is not the beautiful, it is not the ideal; the conception does not elevate the mind by its contemplation? It, therefore, is not fine or beautiful art.

Mr. Stillman is fond of the technical. He should allude to the bricklayer as laying his bricks "in a neat and workmanlike manner." I believe that is the phraseology employed to denote a certain point of perfection for all mechanical labour, so the analogy between the "operator" and the bricklayer must be sought on other lines.

Now, if the photographer pose his model, arrange his draperies, and so manage his light that prominence be given to one feature while another is subdued; if he so work up his sitter's expression till he has before him the glance which emphasises his conception—just the glance which makes his picture tell a story—what, I ask, is this but the labour of an artist? What the work but a work of art—a work of fine art, of beautiful art—if the theme be that which elevates and which raises us from the materialism of our humdrum life to the visionary which is the abode of genius? The photographer may retouch his negative, and what is this but proof of his power—his mastery over his subject? He can realise the beautiful; and his every touch is but to intensify, to idealise, his conception by all means at his command; and if Burne-Jones or Millais were to produce one of their creations by camera in lieu of by brush the result would be the same—fine art. Take *The Huguenot*, *The Order of Release*, and *The Proscribed Royalist*. These works rank as fine art, and they are not out of the province of the dry plate. Are you, then, going to argue that if produced in colour they are classed among the beautiful, but if these same conceptions be transcribed in *one* colour they are no longer fine art? I really cannot pursue this topic.

I do deal with suppositions. Mr. Jones would doubtless object to make a slavish transcript of nature. He is an artist, and is thereby impelled to idealise his works; and he can idealise equally by camera as by palette.

Mr. Stillman says "nature furnishes the design" for the photographer, and beyond choice of hour for his light he can do little else than cut down a tree in his way; but I suppose our photographer can go where there is not a tree that requires cutting down. I suppose there are plenty of "bits" that are simply perfect as landscapes. I equally suppose that no landscape is complete without figures, and that our *artist* takes his models to fit into his perfect "bit" of landscape. I would ask Mr. Stillman if the result of this work is an "arrangement of nature?" Certainly the whole of the work will be that of nature, but the conception of figures with a certain expression or doing a certain thing will belong to the artist who took them to the spot. Nature certainly gives us light by which a picture is produced, but she does not tell us how to manage that light. Nature gives the pigments by means of which a picture is painted; but, though a very good soul in her way, the old dame does not teach us how to use those pigments.

I do not quite see the application of Mr. Stillman's anecdote about the landscape which was painted, the result photographed, and pronounced an excellent transcript from nature by the "figure painter.' I fancy the majority of people would pronounce him a very bad judge of a photograph *et cela va sans dire*

I am ready enough to admit the absurdity of too many photographers being termed artists. They have mistaken their vocation, that is all; but any attempt to degrade a *fine art* to the level of bricklaying because of the shortcomings of those who should never have seen a lens—I repeat, any attempt of this kind will only bring down on the heads of the authors the ridicule and the literary castigation they will richly merit.—I am, yours, &c., AUDI ALTERAM PARTEM.

October 10, 1883.

THE EXHIBITION AWARDS.

To the EDITORS.

GENTLEMEN,—May I again trespass upon your kindness to ask a question or two in the most courteous spirit on the subject of the recent awards of the Photographic Society of Great Britain?

I find that out of more than 600 exhibits only nine prizes w awarded, which, of course, means that more than 590 aspirants photographic fame have been disappointed. Now, I ventured suggest last year, when the same disheartening fact forced itself u one's meditations, that those gentlemen who have been selected decide on the merits of the examples sent to the annual Exhibiti might in a slight degree relax the hard-and-fast rule of confining t awards of merit to nine medals.

Is there anything unreasonable in the suggestion that some noti should be taken of work that, if not of the highest merit, at le comes very near to it, and that a recognition of earnest and pai taking effort might assume the encouraging form of a recogniti analogous to that which obtains at many other annual competiti exhibitions of art, &c., and this simply done to give an impetus a encouragement to the exhibitor's natural thirst for success in t special "hobby" he has espoused? For instance: at our public d shows the judges show a very keen insight into human nature wh they frequently divide their prizes, and also award *special* ones; a further still, when they cannot see their way to award prizes, do t next best thing—give a card entitled "very highly commended "highly commended," or even "commended."

Why not do the same with photographic exhibits? How many enthusiastic amateur would go back to his studio more keen than ev in his devotion to the camera, and work with augmented passion a care to get imprinted on the sensitive film of his gelatine plate a ri to the splendid success of Mr. H. P. Robinson in his masterly com sition, *A Nor' Easter*, or, launching out into another equally-fasci ting venture of colour, try and rival the delicious composition of M H. B. Berkeley in the exquisite shadows of his *Noontide!*

I am sure if this matter were put in the form of a suggestion to t kindly and able members of the Council of the Photographic Society Great Britain they would see no objection to at least giving my suggesti a *trial*, and so inspire a feeling of gratitude in the breasts of many enthusiastic amateur who, like myself, would conciliate your we known courtesy to ventilate his passing impressions in your libe and generous Journal.—I am, yours, &c.,

H. VICTOR MACDONA, M.A.

The Vicarage, Cheadle-Hulme, October 16, 1883.

[The judges this year exceeded the number of medals by thr the actual number awarded being fifteen, not nine, as our co respondent supposes.—EDS.]

THE RECENT COPYRIGHT CASES.

To the EDITORS.

GENTLEMEN,—"Audi Alteram Partem" is in such extacies over t photographs "which make hideous the cheap boxes of cigarettes" th it seems a great pity to have to inform him that these photograp were not "pirated copies," but photographs supplied by the origi photographers and bearing their names.

Whether they will relish his flattering remarks or not, it would as well for him in future to have at least some slight idea of what he talking about before attacking them so fiercely. The other parts his letter I need not refer to. The ideas are so wonderfully clev and, in his exalted position, he is evidently so happy in contemplati their marvellous brilliancy, that it would be very cruel, indeed, disturb him.

With respect to the remarks by "Free Lance," I have to assure h that they do not cause me much uneasiness, even though he can be positive and give so decisive a judgment with only a few words in letter (merely mentioning what I have admitted all along) to gui him. The forced way in which he has misapplied these few words a in which he draws his conclusions shows plainly enough that opinions are far from being unbiassed, though this may not have be intentional. If it were advisable to do so I could easily menti facts which would show how little *personally* I had to do with t matter, and I am certain that if he were fully acquainted with the c cumstances he could not fail to hold different opinions. My remar respecting the copyright and the authorship were *not* intended excuse myself, nor to hide the "turpitude" of what had be done. I wished simply to join in the discussion which was taki place.

Nor in referring to the well-known facts that the leading Lond publishers copy very largely had I any wish *on that ground* to defe the practice, but simply to remind your readers that the very fir who have complained most loudly do not scruple to copy simi photographs when they can do so with impunity, and yet they c look upon the compensations received from other minor offenders "established sources of income."

Whatever be the moral aspect of copying it is no secret that it is pretty general custom amongst photographers, and it would, therefo be better if the law could be so simplified as to avoid mistakes, es cially considering that the photographs which have not been paid in the usual way by the sitter, and which he has, therefore, a perf right to publish or have copied, &c., where and how he chooses, such an infinitesimal portion.

"Free Lance" has misquoted one of my remarks. I do *not* state t the saleable value of portraits of celebrities is not in the artistic sh, but that this value was *not so much* in the artistic merit as in popularity of the person. No doubt the merit of the photograph lf has a great deal to do with the sale; but the very term "portraits celebrities" is a sufficient proof that the first essential is the oriety of the person represented. Many photographs have been of at saleable value which could in no sense have been termed artistic. h, for instance, as portraits of notorious criminals and others.

Vith reference to the right of the sitters to the copyright and con- of their own portraits, "Free Lance's" own reference to the traits of Lord Cairns's future daughter-in-law is, at least, one reason upport of this.—I am, yours, &c., JOHN H. JACKSON.

eah House, New Wortley, Leeds,
October 16, 1883.

To the EDITORS.

ENTLEMEN,—It is one of the misfortunes of language that words, or means employed for the expression of thought, are often so distorted n their original signification that they become the source of end- confusion. The primary object of a judicial mind should be to imise this confusion instead of blindly following a corrupted accep- on. In the case before us the judges observed that one of the main nts was the meaning of the word "author." I have ridiculed their rpretation because it was not a truthful one, and to emphasise my ition I have logically followed their definition to an absurdity:— uthor of a picture: the man who lays on the paint;" but many ntings, avowedly the work of one man, are the productions of two or e masters, or they are the outcome of master and pupils' labour, le the works pass as the works of those whose brains or whose genius e birth to the "idea." No one ventures to call in dispute the horship, even though the master-hand did not paint the whole; so , strictly following precedent, and for the moment dispensing with nology, the author of a picture is *not* correctly described as the man painted it, but as the man whose conception it is. This latter nition admits the possibility of extraneous aid, while the judges limit to one man; and to follow their guidance the author of a edral *must* be the man who lays down the stones instead of the hor of the "creation" itself.

ow, in the matter before us, I expressly repudiated any notion of thorship" in an artistic sense as applied to the group of the keters, or to the great majority of photographic groups consisting of a of heads, and another and another according to quantity, arranged arallel lines one below the other. In cases of this description the loyer knows but too well what will come home if he send a man— necessarily to the Oval—to take a group; and, as I contend, I can- credit a production of this nature, with any ideality with any eption, when the figures tumble into their own places. I must *end* from the fine art standpoint and give whatever there is of nation to the one who conceived the project even of sending to the l. Suppose an arrangement of these particular figures had been e (say) as Watteau would have grouped an Australian Eleven, we should have had an "idea" (its materials were to hand for he subject would have been "idealised;" but I have only to deal facts, and as here no "idea" was embodied beyond the carrying of orders received, it follows that whatever authorship there is t belong to the proprietary which gave the command to "go to the l," *in pursuance of a preconceived arrangement on the part of this rietary.*

vill now briefly touch "the meaning of the word author," which such a hazy point in the Court of Appeal that I am not at all sur- d at the muddle which has arisen therefrom. This word *author,* h means strictly *one who makes a thing to grow—one who, by reflect- eeks to promote anything,* is derived, as any schoolboy knows, from atin *auctor—an originator;* now, I believe, I am within my right serting that the inception of a thing will be the origination of that ; and in the case of the cricketers a something must have been nated or incepted, else why the command to "go to the Oval." r comes from the Latin *augere*—to increase, to cause to grow, *by s of others in any manner whatever, by occasioning or causing, rection or leading, by moving or proposing, or by advice.*—I am , &c., AUDI ALTERAM PARTEM.

E OF THE DANGERS OF PHOTOGRAPHY.—A somewhat singular and one which contains an obvious moral, came before a Chicago e recently. Nathan Goldstone and his sweetheart visited the y of T. H. Mink. There the pair sat on a stile and were photo- ed, the pose of the pair indicating that there was "nothing half so in life as love's young dream." The "artist" who caught this er living as it rose was greatly impressed with the idea, and ex- the picture in his public showcase as an example for other lovers ow. This would have been all smooth enough had not the sweet- quarrelled and suddenly become obnoxious to each other. When hearts and other lips their tales of love had told to Nathan tone, he walked past the gallery and beheld himself perched on a stile and spooning. He climbed the stairs faster than a pedestrian champion, and threatened "to split the skull and flatten the nose" of the photographer for his temerity in so vividly calling up scenes in the past. This reckless stroking of Mr. Mink's fur led to the immediate arrest of Nathan, who was sent for trial. No sterner lesson has been afforded to lovers for some time.

PHOTOGRAPHY IN COURT.—The following case was heard at the Edmonton County Court, on Monday last, the 15th inst., before J. T. Abdy, Esq., judge, Mr. Avery, solicitor, appearing for the defendants:—*Hugo.* v. *Tune and Co.*—In this case the plaintiff, a solicitor, sued Messrs. Tune and Co., photographers, of Tottenham, for 5s. 6d., being money paid for half-a-dozen photographs of his little boy, taken about six months since. Mr. Hugo, who appeared in the witness-box with his child, stated that he paid the defendants the sum in question for half-a-dozen *cartes-de-visite* of his son, and upon the proof being sent he found it did not represent his child at all—in fact, was not a bit like him—and as Messrs. Tune and Co. would not take him again he sued for the money paid. Cross-examined by Mr. Avery, he could not tell in what respect the portrait was not like his little boy. It was much too large. He did not take the child to Messrs. Tune and Co.'s himself; his wife did. Mrs. Hugo was then examined by Mr. Avery. She took her little son to Messrs. Tune's. She ordered the portrait to be as large as possible on the card. Mr. Tune offered to retake the child upon the payment of 2s., but she would not pay it. She had received one of Messrs. Tune and Co.'s price lists. At this stage his Honour, after examining the portrait, stopped the case, saying that the portrait was an exceedingly good one of the child, and quite a work of art; he would not mind one as good at the same cost. It was taken large specially to suit Mrs. Hugo, and as she was supplied with a price list with the charge for re-sitting in it, that charge constituted part of the contract, therefore, he entered a verdict for the defendants, with costs for three witnesses, who were in attendance.

CARBON PHOTOGRAPHS.—In noticing the contents of the Dorset County Museum last week, we referred to the Roman pavement found in the prison having been restored by the aid of a photograph taken by Mr. John Pouncy, of South-street. The pavement had been entirely dislocated and practically destroyed during its removal in the course of alterations in the gaol; all trace of the pattern had been obliterated, and the tessere thrown together in a confused heap. Happily Mr. Pouncy's photograph, taken at the time of the "find," proved a guide for re-setting the mosaic, which is now restored to almost its original state. We are very pleased to acknowledge the debt that archæology owes to the art of photography, for without its assistance this valuable relic of classic times would have been lost for ever. But it is Mr. Pouncy, inventor of the carbonic photography, that we have to thank for preserving to us this interesting example of Roman art, since a photograph prepared by any other process must have faded long before the expiration of a quarter of a century. But in Mr. Pouncy's picture every detail is as sharp and fresh as in the pavement itself. This is a fact that ought to be kept in mind by those who value permanence in their portraits; for the remark as to the durability of Mr. Pouncy's work applies equally to his portraits, as well as to his many other productions, such as decorations on wood for furniture, &c. During a series of lectures at the Society of Arts, in giving a description of the various photographic processes, the lecturer, holding up a picture, said "Mr. Le Neve Foster, the secretary, has lent me a carbon print made by Mr. Pouncy twenty years ago, and if you examine it you will see that in detail and delicacy of gradation it is quite equal to the productions of more recent date." This evidence is incontestable. This statement proves Mr. Pouncy to be twenty years before his fellow-workers; and, although others have followed in his steps, at the time above referred to no other carbon prints were produced. Moreover, there are in our own town, at the Dorchester Savings Bank, graining done by Mr. Pouncy when that block of houses was first built, about forty years ago, as good as ever, although nothing has been done to the doors, &c., since the time to which we refer, and when Mr. Pouncy then introduced various portraits in the graining. The various specimens of Mr. Pouncy's productions in oil colour on canvas to be seen only at 9, South-street, Dorchester, still proves the fact that he is far in advance of his *collaborateurs* in the photographic art.—*Dorset County Chronicle.*

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

I will exchange eight volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY, from 1852 to 1863, neatly bound, for a good view lens, whole plate, or magic lantern by a good maker; also a spendid quarter-plate view lens, by Darlot, will cover half-plate double combination, for anything useful in photography, or offers.—Address, S. HYAMS, Albert-terrace, Charroterie, Guernsey.

Wanted, patent "Eclipse" or other light, for night-work, in exchange for a half-plate bellows-body camera and lens, gem camera and lenses, or other material.—Address, PHOTO., 1, Cotton-buildings, Exeter.

I will exchange a Cadett's instantaneous shutter, fitting a 10 × 8 rapid symmetrical, good as new, for a Marion's academy camera; must be perfect.—Address, W. R., 43, Queen's-road, Brownswood Park, London, N.

I will exchange an English concertina, in perfect order, half-plate bellows-body camera, Victoria and gem camera and lenses, for a strong iron head-rest, backgrounds, focussing-glass, or other useful apparatus.—Address, THE WENSLEYDALE PHOTOGRAPHIC STUDIO, Leyburn, Yorkshire.

We will exchange a "college" microscope, by Swift and Sons, London, with one-inch and quarter-inch objectives, mahogany case, and glass shade, cost over £7, and as good as new, for a good 12 × 10 folding camera, square, with bellows-body; must have double swing-back and two or three dark slides in good order.—Photograph of microscope will be sent on application to REID BROS., 81, High-street, Belfast.

I will exchange a Spanish mahogany camera, with stereoscopic rising front, dark slide for plates 7¼ × 4¾; ditto, with sliding and rising front, for taking one, two, three, or four pictures on a plate 7½ × 4½, three dark slides; capital Spanish mahogany camera, quarter-plate, square, 4¼ × 4¼; folding camera, with double dark slide, for plates 7½ × 5; excellent studio camera stand, six printing-frames, 8 × 5, six ditto, 5 × 4, six ditto, stereoscopic, 12 × 10 glass bath in mahogany water-tight case, iron head-rest, &c. Wanted, Ross's symmetrical or Dallmeyer's wide-angle or rectilinear.—Address, SMITH, photographer, 1, Regent-place, Cheltenham.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

S. J. B.—Messrs. Marion and Co., Soho Square, will supply the metal rims in any quantity. You cannot do better than apply to them.

B. C. BURROUGHS.—There are several very good examples of the process in the present Photographic Exhibition. Examine them carefully.

QUERIST.—The exact size of the negative from which the print was made is, we learn, fifty-three by thirty-six inches. Of course it is on glass—not paper.

RALPH.—There is no means of restoring the image which has been destroyed with nitric acid, although the paper may still be intact. The picture is irretrievably ruined.

MARINE DRAUGHTSMAN and several other correspondents this week have not conformed to our rule by enclosing their names and addresses; hence their queries remain unanswered.

J. J. WILLIAMSON.—It is clear that, by some means or other, the paper has been allowed to become damp; hence the cause of the impure whites. Probably the pads of the printing-frames were not free from moisture.

WARDER.—Why not abandon the collodion process and adopt the gelatine? If you do this, two-thirds, at least, of your present difficulties will be surmounted. The lens is, on the whole, the most suitable you can employ.

H. C. FARRANT.—We do not know of anyone who supplies wood ready grooved suitable for making dark slides. You might write to some of the camera makers and ask if they will supply what you require, but we doubt very much if they will.

W. J. D.—There is no satisfactory method of enlarging direct on to artists' prepared canvas. Enlargements on canvas for oil painting are generally produced either by the carbon or the powder process. Possibly one or other of these processes will answer your purpose.

W. S. (Edinburgh).—Increase the strength of the sensitising-bath considerably from that you have been using. One ounce of bichromate of potash in a pint of water is a very suitable strength for this season of the year. To each pint of solution about twenty minims of liquor ammonia should be added.

C. W. G. USHERWOOD.—We see no fault in the perspective of the machine. If the wheel had been desired to appear perfectly round it would have been necessary to place the lens on a level with the axle and not above it. There is no fault whatever with the lens, notwithstanding anything that may be said to the contrary.

HIBERNIAN.—A series of pictures of Irish peasant life would be very interesting, and, doubtless, could be made very picturesque; but as to whether they would possess any great commercial value we should not like to hazard an opinion. You cannot do better than communicate with some of the London publishing houses.

CALCO.—It is quite possible that, although the toning-bath has only been once used, it is exhausted of its gold. A precipitate being thrown down on the addition of sulphate of iron does not prove that the bath contains gold. The precipitate may be silver. You must bear in mind that a well-used toning-bath always contains more silver than gold.

J. E. F.—Messrs. A. and M. Zimmerman, 27, Mincing Lane, are the agents for Heinrich's gelatine. The simplest way to recover the silver from washed emulsion is to melt it, and then add about one-fifth its bulk of sulphuric acid and stir well. The whole of the bromide will, in a few hours, then subside to the bottom of the vessel. Wash in three or four changes of water, dry, and use in the same manner as if it were the chloride.

D. D.—One thickness of ruby and one of orange will be quite suffici the glass be of good quality.

S. H.—1. The exposed picture should be floated, not immersed, little dexterity is necessary to prevent wetting the back.—2. The will require thorough washing after fixing, though not so much as were on albumenised paper.—3. If the solution be made accordi the formulæ no crystals should be deposited.

R. T. (Glasgow) asks how to spot prints that are to be enamelled, so the colour may not be removed when the picture is wetted with the tion of gelatine.——The only effective plan is to do the spotting wit colours. Take the oil colours sold in tubes, and dilute with spir turpentine; match the tint of the photograph, and apply the sam you would water-colours. The colour when thinned with turpe alone will dry very rapidly.

RECEIVED.—Robert Davies; Herbert S. Starnes; G. A. Herschel, M W. J. Stillman; "Free Lance." Thanks.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next Mon Technical Meeting of this Society will take place on Tuesday next, 23rd instant, at 8 p.m., in the Exhibition Gallery, 5A, Pall Mall E when the apparatus exhibited will be explained and other ma brought forward.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—the next meeting of this Club, on Wednesday next, the 24th inst., subject for discussion will be the *Iron Development of Gelatine Plate* The nomination of officers for the ensuing year will take place, notice of any alteration of the rules must be given.

ROYAL PHOTOGRAPHS.—During the recent visit of the Duke Duchess of Albany to Yorkshire, Mr. Vincent Hatch, of Huddersf and Richmond (Surrey), had the honour of photographing H.R.H. Duke of Albany on Monday last, at Whitby Hall, the residenc H. F. Beaumont, Esq.; also of taking the Duke and Duchess in a g with other distinguished visitors at the Hall, where they were sta on account of the opening of the new Beaumont Park by their R Highnesses on the 13th inst. We believe that very satisfactory re were secured on Wratten and Wainwright's plates, although the at the disposal of Mr. Hatch was very limited.

FORTHCOMING INTERNATIONAL PHOTOGRAPHIC EXHIBITION.—In advertising pages is announced the second Triennial Exhibitio Bristol, to be held under the auspices of the indefatigable Bristol West of England Photographic Society. The former Exhibitior 1880, proved a great success; and as the promoters are very liber their offer of medals on the present occasion, we hope to be ab chronicle in due time that the Exhibition of 1883-4 has been more successful than its predecessor. The Exhibition will re open from December 17, 1883, to January 14, 1844. Mr. H. A. Daniel, the Hon. Secretary, will afford intending exhibitors al formation. Meanwhile we refer our readers to the advertisement.

LONDON GAZETTE, *Tuesday, October* 16, 1883.

PETITION FOR LIQUIDATION BY ARRANGEMENT.

GEORGE SAMUEL LEE, 9, Croekherbtown, Cardiff, photographer and a colourman; trading as Lee and Co.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For the Week ending October 10, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Oct.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
4	29·50	N	50	47	—	55	42	Overcast
5	30·13	NW	50	45	89	56	45	Cloudy,
6	30·23	N	49	46	89	57	43	Fine.
8	30·54	NE	50	55	70	63	47	Foggy.
9	30·44	W	56	54	—	61	54	Overcast
10	30·10	W	54	51	—	57	49	Foggy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1225. Vol. XXX.—OCTOBER 26, 1883.

PHOTOMICROGRAPHY.

To obviate the trouble of finding the actinic focus, the Count Castracane, in 1864, proposed the use of homogeneous illumination by using a prism of large dispersive power, by which a spectrum of the solar light was formed; and by a diaphragm properly placed the object was illuminated by only the blue-green rays, which possess great actinic power. By this method the chromatic aberrations were largely eliminated, whilst details of very delicate objects, with difficulty visible in the ordinary illumination, were readily seen. Both M. Bertsch and M. Neyt used a prism with parallactic movement, and secured most beautiful results. Such a prism, with its mountings, is rather expensive; and as the dry gelatino-bromide process is now so rapid, there is less necessity for a prism in ordinary work. Other plans have been adopted, and are more commonly in use, as the employment of an ammoniacal solution of sulphate of copper, through which the illuminating rays pass before reaching the object. The solution is placed in a cell of requisite size, furnished with parallel glass sides, and this is put between the source of light and the condenser, or between it and the sub-stage condenser. The nearer to the source of light the stronger its action upon the transmitted rays.

Barreswil's liquid can also be used in the same way, though this latter cuts off more of the ultra-violet rays which the former allows to pass, and, though thus limiting the actinic power, it was found by Dr. Moitessier to be more favourable for the object in view, although the period of exposure was slightly increased. The same author states that the two solutions ought to contain the same amount of sulphate of copper in a definite quantity of water. For the former solution, twenty grammes of the sulphate of copper are dissolved in 100 grammes of distilled water, and strong liquor ammonia gradually added until the precipitate, at first thrown down, is redissolved. It is then made up to the amount of 300 cubic centimetres by distilled water and kept carefully corked. For the latter solution, twenty grammes of the cupric salt are dissolved in 150 grammes of distilled water. In another 150 grammes of distilled water are dissolved sixty grammes of pure caustic potash and eighty grammes of the tartrate of soda and potash. The two solutions are filtered and mixed. This, as it alters under the action of light, is to be kept in the dark, and after use rejected. The strength of the solution to be adopted Dr. Moitessier fixes at one-fifteenth of its weight in sulphate of copper, the thickness of the liquid in the cell being equal to four or five millimetres.

Dr. Sternberg, U.S.A., employs a cell about two inches square, the sides separated about half-an-inch, and filled with a saturated solution of the sulphate of copper in strong ammonia water. In using these solutions we either placed a large cell between the mirror and condenser, or when the mirror was dispensed with a smaller cell was suspended just behind the sub-stage condenser. Dr. Woodward, U.S.A., not only employed the ammonio-sulphate of copper cell, but also largely used objectives made expressly for photographic use, these being especially corrected so as to bring to one focus the rays in the violet end of the spectrum, where the actinic power resides, instead of mean, white light, as is the case with ordinary achromatic objectives. These objectives were constructed for him by Mr. W. Wales, the optician, and the amplifiers or achromatised concaves, used in conjunction with some of the objectives, were also corrected in the same way. By using sunlight reflected from a heliostat, violet light, and these actinically-corrected objectives, exceedingly sharp definition was secured for considerable magnifications of many of the most difficult test objects. We can testify to the value of this method and the objectives, by our use of the same. M. Neyt likewise used actinicaly-corrected objectives.

For the convenience of cleaning the cells with parallel plate-glass surfaces lead cells have been proposed, by Dr. Carl Seiler, made so as to screw together, having an india-rubber washer interposed, as the cells made with brass are readily affected and often difficult to unscrew. A deposit is often formed on the inner surface of the glass under the action of the light, and loss of the excess of ammonia. Cobalt-blue glass is frequently made to take the place of the blue cell; but it is very rare to obtain a suitable piece, as it generally allows too many of the red rays to pass. It should be tested by the spectroscope, be without striæ, and perfectly polished.

A difficulty is often met with from the colour of the object itself, which largely interferes with the production of a good negative, although the visual focus may appear perfect. The staining of objects for the purpose of the differentiation of their tissues sometimes rather increases this difficulty, the actinic rays passing rapidly through some parts, causing the effect of over-exposure before they have been enabled in the same time to impress the detail in the parts which are greatly non-actinic. Roudanovski, who published an atlas of photographs of the nervous tissues in 1868-70, recommends the use of different coloured rays, the choice being fixed by the nature of the preparation and the effect desired. He uses either a prism or coloured glass, but prefers the usual ammonio-sulphate of copper cells in which to place different liquids of varying degrees of concentration. For yellow, he uses aniline yellow; for blue, ammonio-sulphate of copper; and for green, acetate of copper, with the addition of aniline yellow. He prefers to impress the image slowly, the colour of the object determining the colour of the light to be employed and the time of exposure. By white light the image he finds more readily impressed if the object be uncoloured, next the green, then the yellow, and lastly the orange. The nerve elements of a preparation, he remarks, differ little visually as regards their transparency, and hence do not produce good photographic images with white light, but with monochromatic light they are better rendered. He finds aniline red the most useful for studying anatomical details, but white light fails to render them satisfactorily photographically.

This was pointed out many years since by Mr. Wenham, and we tried to take advantage of the suggestion by using various coloured glasses, also coloured varnishes upon the under side of the object slide, likewise variously coloured gelatine films; but success was not entirely satisfactory, though often by these means the details were visually increased. Possibly a sheet of gelatine of some thickness, free from striæ and surface irregularities, that contained transparent colouring matter of various tints and density, might be found useful to accomplish the same ends, as proposed

by Roudanovski. We are not aware if sunlight reflected from variously-coloured media has ever been tried, or the coloured flames of artificial light, which offer an abundant field for experiment upon coloured objects.

The ingenious method advocated by Mr. James Smith for the ordinary illumination of microscopic objects, and which differs considerably from Mr. Rainey's plan, might find its application in photomicrography. With the Kelner eyepiece—whether with its lenses in their usual position and employed as a condenser for high powers, or with the field and eye lenses separated, to be used for powers as low as the three-inch objective—an equilateral prism is used, having a selected pale-blue glass cemented to one of its sides. The light can, therefore, be reflected from either side of the prism, or transmitted through the blue glass, thus furnishing a very useful kind of monochromatic light. "When the light is taken by *reflection* from the coloured glass a delicate monochromatic light is obtained." The tint of the glass can be varied in depth, and differently-coloured glasses—if uniform, without striæ, and well polished—could be temporarily fitted to one side of the prism according to the colour required, thus approaching the plan specialised by Roudanovski. For particulars we must refer the reader to page 828 of the *Journ. R. M. Soc.*, 1881. The blue or other coloured glasses could likewise be attached to the flat surface of the bull's-eye condenser, or this lens may be of coloured glass, as it is sometimes made; but, as we have not used the coloured glasses in this way, we cannot speak with certainty as to their real utility for the object in view.

When the focus has been taken through the blue cells, and it be then removed, the visual image under the low powers will not be sharply defined—the focus being affected in the same way as by withdrawing the objective, so that, to recover the exact visual focus for detail, the object-glass will have to be advanced, assuming the lens be, as usual, over-corrected for colour. For the perfect rendering of histological preparations much yet remains to be accomplished.

THE ELECTRIC LIGHT IN PHOTOGRAPHY.

In continuation of the subject of the employment of the electric light in photography, we shall now consider the question when the electricity is to be obtained from a dynamo machine. Last week, it may be remembered, we gave the approximate cost of the necessary plant for producing the light by the aid of a battery, and also the probable cost in working, for material alone—labour of charging and uncharging the battery, breakages, and wear and tear not being taken into consideration. For these items, it may be well to mention that a good—indeed, wide—margin must be allowed in actual practice.

The first consideration in establishing a dynamo machine is a position wherein to fix it. This must always be in close proximity to the engine by which it is to be driven—not of necessity in the vicinity of the studio, or where the light is to be employed, because the current, when once generated, can be conducted anywhere with suitable leads. The most desirable situation for the installation is in the basement of the building, if it be available, as then a solid foundation can be secured. By this means all vibration in the building will be avoided, which is not always possible if it be in the upper part, unless unusual precautions be taken. When fixed in the basement the noise of the engine and the "whiz" of the machine will not reach the ears of the sitter. Having fixed upon a place for its installation let us now consider the dynamo itself.

At the present time there is such a multiplicity of machines in the market—continuous current, shunt wound, alternating current, &c., as well as different systems of constructing the machines—that there is little wonder the uninitiated should get somewhat perplexed as to which kind of machine to select. Particularly is this the case if they consult the prospectuses of the different makers, each of whom claim—and apparently show—that machines on their principle are much superior to those on any other. In the matter of price, too, there is a great variation; though, when that is thoroughly examined, there is not the great discrepancy which at first sight appears.

Taking a price list now before us, that of Messrs. Siemens Brothers whose machines are so well known, and are amongst those which we are aware are now being satisfactorily employed in several photographic establishments in London, we find they supply a small, continuous-current machine (the type required for our present purpose) for fifty-five pounds. This machine requires some two-horse power to drive it. Although the so-called candle power is not stated, we imagine from the quantity of current—given in amperes—it will be from twelve to fifteen hundred. The next size larger costs seventy pounds the power required to drive it being three-horse. This machine judging from the data above, will probably yield a light equal to about three thousand standard candles. The next larger machine is quoted at ninety-five pounds, and this requires an engine power equal to four-horse, the light produced, we imagine, being something like double that of the previous one, or six thousand candles. From this it will be seen that the larger the machine the cheaper it is in proportion, and the less proportionately is the power required to drive it. The largest size mentioned above, while probably yielding four times the amount of light of the smallest, only requires double the motive power to work it, and the price is but some two-thirds more.

We direct particular attention to this fact, because the stronger the light the farther it can be placed from the sitter; so that by the aid of a reflector it may be distributed over a much larger area without entailing an unduly long exposure. Furthermore: as the major portion of the intense heat evolved is reflected on to the sitter with the light, it becomes very unpleasant when the light is near. For this reason we advise those who intend to adopt the electric light in the studio to select one of the larger machines—the largest by preference. This machine is quite powerful enough to permit of the light being diffused over a sufficiently large area to enable full-length figures or groups to be taken with a very brief exposure, which is not the case with the smaller machines. On the whole, therefore, it will be seen this size of machine is the most generally useful that the portraitist can adopt. Now for the motive power to drive the machine.

One great essential in electric lighting is that the dynamo machine should be driven at a uniform speed. Unfortunately it happens, as engineers know, that all engines, whether steam or gas—the latter especially—when worked up to their maximum power are no longer regular in their action; hence, for electric lighting it is found better, in practice, to have a considerable reserve of power in the engine over that stated to be necessary to drive the machine at the requisite velocity. With steam engines it is customary to have half as much more, and with gas double.

A combined steam-engine and boiler of (say) three horse-power, for the smallest machine we have quoted, will cost somewhere about a hundred pounds; one for the next size, say five horse, about a hundred and twenty; and for the largest, say six horse, one hundred and fifty to one hundred and eighty pounds. Since the very general adoption of gas engines for minor powers, second-hand small steam engines have become a drug in the market, so that frequently one may be bought for a comparatively low figure. But, as a precaution, we should advise that a second-hand engine should never be purchased until it has been thoroughly overhauled by a competent engineer, or it may in the end, though low in price, prove very expensive.

We imagine, however, that few adopting the electric light for portraiture—or indeed for any other purpose in photography—will employ the steam engine as a motor, as it possesses so many disadvantages as compared with gas. For instance, it will always take somewhere about an hour to get up steam to begin with. Steam will have to be kept up during the whole day, so that it may always be ready when the light is required. Although, perhaps, the aggregate time the light will be burning does not exceed, on some days, half-an-hour, yet the consumption of fuel is going on continuously during business hours; also, a man must be in constant attendance to watch it, which of course materially increases the cost of working. Added to this, whenever a steam engine is on the premises the fire insurance premium is much increased, and photographers are already very heavily rated in this respect. With gas as a motive power no increased premium is enforced. A gas engine may be started at a

ıoment's notice to full working power, and be stopped as readily. t requires but little or no attention, as it may be left running for ours without supervision, at the cost of a few pence only for gas. ıastly: what is a great desideratum, when the engine is not running, here is no consumption of fuel going on as there is in the case of team.

Unfortunately, at present, the first cost of gas engines is some-'hat high. Quoting from a list now before us—the Otto—we find hat one suitable for the smallest machine we have alluded to, costs ne hundred and seventy-four pounds; a six horse, suitable for he next size, two hundred and fifteen pounds; and an eight horse, he most suitable for the largest size, two hundred and fifty-six ounds. It will be noticed that, as in the case with dynamo ıachines, the price of the engines is proportionately cheaper for the arger size than the small. Hence it will be seen the cost of the mallest size dynamo, together with a suitable gas engine—a size, e it remembered, which is not to be recommended for practical urposes—is two hundred and twenty-nine pounds; while for the ıext size—double the light—it is but two hundred and eighty-five; ınd for the largest size—yielding probably double the light of the ast mentioned—three hundred and fifty-one pounds. We may ıere mention that to our knowledge an eight-horse "Otto" is now 'unning in each of at least three London establishments where the ·lectric light is utilised for portraiture. To the figures given above nust be added some fifteen or twenty pounds extra for gas-fittings, leads, belting, reflector, expense of fitting, &c.

From this, and the previous article, the reader will be enabled to estimate the probable cost of electric lighting as applied to photography, both with the battery and a dynamo machine as a source of electricity.

STUDIO BUILDING.—RIGHTS OF LIGHT.

One of the most important subjects for consideration in making arrangements for the erection of a photographic studio is the question of "rights of light;" and these in most cases, as many an unfortunate man knows to his cost, may not be ignored with impunity, especially in the face of determination to protect them by the person who holds or "enjoys" these rights. Many instances of trouble from this cause have come under our own observation; and it will be evident that throughout the whole country numberless cases must happen of which few but those in the confidence of the persons interested are cognisant. Thus, a photographer desires to build a studio, or to extend or alter an already-existing one. He fixes upon a site (possibly having to purchase a building), draws out his plans, gets an estimate, and places the work in the hands of the builder; or he may purchase a plot of ground for the express purpose of erecting his studio, as is often done in growing seaside and other places; or, again, he may wish to throw out a printing-stage, an addition to his dark room, or in any other way build up something that may obstruct other person's light.

In all these cases, when a competent architect is called in, the prospective studio builder will, no doubt, be put in possession of all facts bearing on his and his neighbours' rights. But as expense is often incurred before such a professional man is required, or engagements entered into that might otherwise not have been, and as, finally, it is highly desirable that, in a matter of such prime importance, every one owning, or contemplating building, a studio should have some knowledge of the legal aspects of the question of his own and his neighbours' rights as regards windows and skylights, &c., we think it may be useful to put our readers in possession of some information upon the subject. This we do with the hope that it may save them from unnecessary expense in the one case and from rushing into litigation in the other, than which nothing is more to be deplored. "Going to law" about questions of rights of light is both tedious and expensive; for, as many disputed points end in questions of evidence or opinion rather than of facts, they go to a jury, and the decisions of such bodies often are of a very erratic character, tending to lead to the carrying of cases from court to court—the verdict being, like a shuttlecock, first given to one side and then to the other, and ending in heavy loss, if not ruin, even to the successful litigant.

We may first touch upon the putting in of a window (which term must be understood to include any studio light) in a place where none previously existed, and this we will look at from two aspects. There is a very widely-spread belief that the making of a fresh window in a place where none had previously existed is an illegal and punishable act; that any one so doing is committing a trespass, for which he can be punished; that when a window is so put in the trespasser can be "summoned," and by some legal process compelled remove such window, if even he be not also fined and mulcted in costs. Let us, while asking our readers carefully to note our further remarks in this direction, say at once that this opinion is entirely erroneous and untenable, from every point of view.

A man may put a hundred windows on every side of his own house without anyone being able to lift a finger to prevent him; and he cannot be put to one penny of legal expense on that account, though he completely overlook the uttermost privacy of his neighbour's grounds and domicile. Error on this point is so widespread, and, indeed, existent in quarters where it might be thought impossible, that we venture here to give an extract from the words of a great legal authority on the question. Every man, he says, "may erect on his land a house with as many windows as he pleases; and he may build this house on the very extremity of his land, close to the land of his neighbour. By so doing he confers no new right, and inflicts no injury on his neighbour. It is true that the windows of this building may command a view of his neighbour's gardens, or pleasure-grounds, or even of the interior of his house—may so invade his privacy, and consequently lessen the value of his property; but this is not considered by the law as a wrong for which any remedy is given." Another authority—a Vice-Chancellor—on the same point said:—"No doubt the owner of a house would prefer that a neighbour should not have the right of looking into his windows or yard. But neither this Court nor a court of law will interfere on the mere ground of invasion of privacy; and a party has a right to open new windows, although he is thereby enabled to overlook his neighbour's premises, and so interfere, perhaps, with his comfort." Many more extracts to the same effect might be given, but the statements made are so plain as points of law—not merely the opinions of justices or individuals—that it is unnecessary to encumber our article with more of them.

It is thus seen that the fear which many photographers have of illegally interfering with their neighbours' rights and rendering themselves liable to prosecution by putting side-lights or skylights which would overlook adjacent houses and intrude upon their privacy are perfectly groundless. We have laid great stress upon this view from a personal knowledge of cases where this erroneous impression has been operative in preventing improvements and alterations in studio arrangements.

There is, however, a "but" in connection with most legal matters, and it comes in here in a very positive manner. Notwithstanding his undoubted right to place as many windows as he likes in his own mansion or business premises, a man may be prevented from having any real advantage from such windows unless he have a legal right to that advantage or benefit. In other words, though he may legally place windows in his walls, his neighbour, under certain possibly existing conditions, may legally place some object in such a position as to entirely prevent any light coming through the windows; in which case the right would be a barren one and not worth the exercising.

Under certain circumstances a man may have not only an indefeasible right to a window, but also a further right to all the light of the sky that may possibly enter that window, and such rights may enable him to take legal proceedings in order to have any obstacle removed that may be erected so as to obscure or diminish that light.

This is the important consideration for the photographer, as it would be absurd to build a studio with the certainty of having its light blocked up. Here, too, come in certain interesting legal obligations and certain recognised laws on the subject, and of these we propose to treat in our next issue.

THE PHOTOGRAPHIC EXHIBITION.

[Third Notice.]

Resuming our tour of the gallery we come upon Messrs. Chaffin and Sons' picture, *The Truants* (No. 40). This is hung rather high, and thus is scarcely amenable to close examination. It is composed of a pretty bit of woodland and, at first sight, only a single figure, but upon closer scrutiny the second "truant" may be descried in one of the trees. The next picture, *On Pleasure Bound* (No. 41), is merely a very ordinary river view, with a pleasure party disembarking. It is altogether below Messrs. Chaffin and Sons' standard. *Chit-Chat* (No. 70) is the best production of these artists. It consists of a garden scene with two figures in conversation. The composition is good and the poses natural, but the *motif* is too slender for a picture of its size.

Mr. H. Everett exhibits a frame of landscapes which are tolerably good, but suffer apparently from over-exposure and, possibly, also under-printing. Many of them are well known subjects at Bettws-y-Coed and elsewhere, the best being, perhaps, No. 6 in the frame, *On the Llugwy*—the favourite view below the Miner's Bridge, well rendered by Bedford years ago.

Mr W. Cotesworth has several frames of *Reminiscences of Cannes*, comprising sea, street, and rustic views in the neighbourhood of that favourite health resort. In frame No. 73, which contains instantaneous views of yachts and boats, there is good work, but inferior to other exhibits in the same class. No. 145 comprises street and lane scenes, the former being specially noticeable as showing the characteristic street architecture of this southern town. More rustic in character are the views from the same neighbourhood in No. 408. An entirely different class of subjects is dealt with *In Hampshire Meadows* (No. 552). Here we have excellent combinations of cattle, water, and foliage, which are very attractive.—Miss E. M. Cotesworth has a very charming and effective picture, *On Lake Como* (No. 596).

Mr. S. Norman's frames of miscellaneous landscape and figure studies are worthy of attention. In No. 74 the best of the pictures is the centre one, *River Ouse, Lindfield*, though the other two are good combinations of figure and landscape. In No. 85 Nos. 1, 2, 6, and 7 are haymaking scenes, and are amongst the best of their class; but the pick of the frame is *Foot Bridge, Avery's Farm,*

No. 85—*Foot Bridge, Avery's Farm.* By S. Norman.

Burgess Hill (No. 4)—a picturesque rustic bridge backed by foliage, with a group of children to heighten the artistic effect. This is one of our selected illustrations.

We must not pass over Mr. J. Crosby's study, *What the Journals Say* (No. 79), as it is a subject in which we may consider ourselves somewhat interested. It is probably one of the best of his collection this year. *Nelly Sanders* (No. 264), by the same artist, is crude and unfinished, but *A Yorkshire Bairn* (No. 305) is a pretty and effective figure study. Of *Buy the Last, Sir?* (No. 306) we know not what to say, except that we are sorry to see such a thing hung. A picture of a girl trying to sell the last *Evening Standard* in the middle of a field, without a human being in sight to tender the needful coin, is an anomaly that would scarcely be allowed to creep into any but a photographic exhibition.

No. 291—*Industry.* By Adam Diston.

Mr. W. McLeish, whose picture, *A Misty Morning on the Wear*, was so much admired last year, follows with another rendering of the same bit of landscape, under the title of *A May Morning on the Wear.* It is an open secret that the "misty morning" was simply an accident—a fogged negative that was put on one side as a failure

No. 94—*Stepping Stones.* By E. Berry.

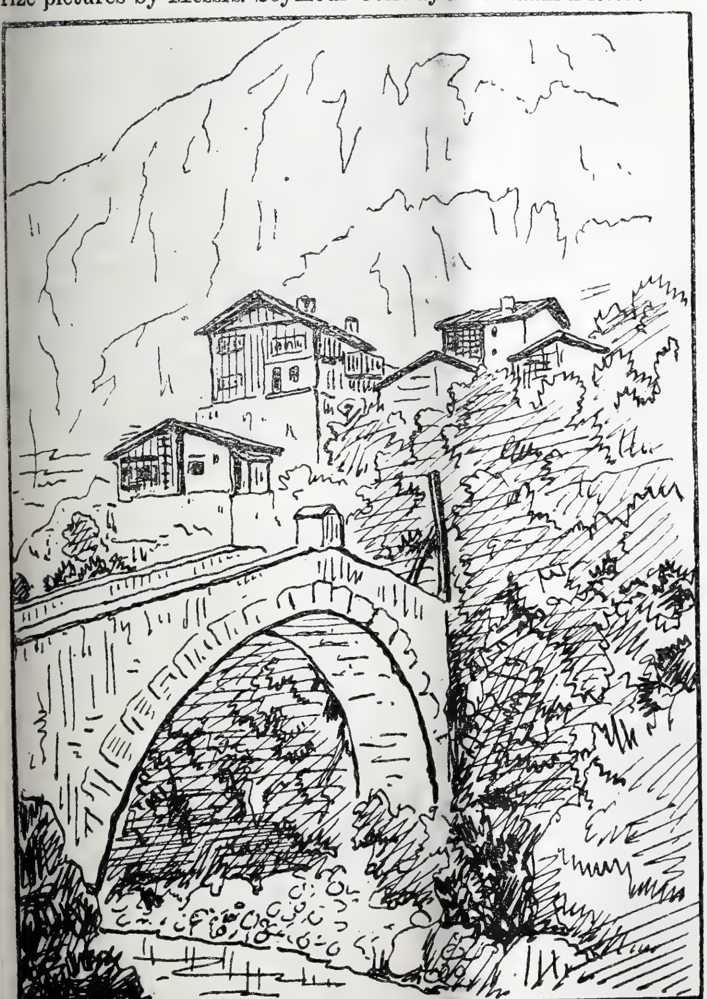
and another one taken. If the "May morning" be the result of the second exposure there is little doubt the "failure" was the better picture of the two, though, perhaps, not the better *photograph. Nature's Mirror*, by the same artist, is a pretty subject.

Mr. E. Berry has a number of figure studies and groups, some of hich are very effective. The best is *Stepping Stones*, which we ave selected as an illustration in the present number. It consists : a group of children crossing the bed of a shallow stream, and is lmirably conceived and executed.

The remaining illustrations in the present number are *Lake*

No. 27—*Lake Maggiore*. By H. MANFIELD.

Maggiore (No. 27), by Mr. H. Manfield, noticed last week, and the rize pictures by Messrs. Seymour Conway and Adam Diston.



No. 83—*View in Switzerland*. By SEYMOUR CONWAY.

WE do not think that the *Revue Photographique*, whose September number consists in the main of translations from our own pages (the source being honestly acknowledged), will have any objection to our transcribing the following anecdote from its columns. "All is not *couleur de rose* in the life of inventors!" it says, in introducing a story told by M. Dumas at the unveiling of the statue to Daguerre. M. Dumas said :—"It was in 1827. I was young then—about twenty-seven. Some one came to my laboratory to say a lady wished to see me. I asked her to come in. It was Madame Daguerre. She came to consult me upon the subject of the investigations which her husband was engaged in. She believed they would be a failure. She did not conceal from me her uneasiness as to the future in store for him, and inquired if I could possibly imagine any prospect of seeing the dreams of her husband realised, and she timidly asked 'if something ought not to be done to prohibit them.' I replied to her that, far from that, Daguerre's experiments ought to be continued; that the end he was seeking could be attained. Shortly afterwards I had the satisfaction to see that I was not deceived. Daguerre found the solution of the problem he had been engaged upon—a solution which has made him famous. So you see," continued the speaker, with a smile, "what waits upon a discoverer: prohibition. After experiments, struggles, sleepless nights, want—prohibition or the lunatic asylum!"

IN a lecture to working men, delivered by Mr. Norman Lockyer, F.R.S., he lately said :—"It will be very easily seen how wonderfully the construction of the eye has been imitated in a photographic camera. The front lens is practically the equivalent of those three refractive media of the eye—the aqueous and vitreous humours and the crystalline lens; whilst the iris, which in the eye serves to limit the amount of light entering, has the exact representation in the 'stop,' which serves the same end in the camera. The photographic plate is, it need hardly be said, the exact counterpart of the retina, and has consequently been beautifully described as 'a retina which does not forget.' Similarly, there is just such an arrangement for focussing the light as exists in the eye. In fact, a camera is a rather better machine altogether than the eye, because the range is greater and the focussing power is not lost as age increases." By "range," in the above sentence, Mr. Lockyer must mean angle of view, for the eye can focus any object between four or five inches' distance from the eye and infinity.

FURTHER on Mr. Lockyer also speaks of the eye as though it were truly an achromatic combination. Now, it has long since been shown—notably by Fraunhofer—that the eye is by no means achromatic, as is so commonly supposed; in fact, that physicist measured the amount of its chromatic aberration. Anyone with average eyes can readily test this property of the eye for himself by looking at a distant street lamp through a piece of glass coloured with cobalt oxide (which allows red and blue rays to pass, but stops others). They will see a red flame, surrounded by a broad, bluish-violet halo, which is the dispersive image of the lamp light thrown by its blue and violet light.

SPEAKING of the eye, as an optical instrument only, Helmholtz says :—"Now, it is not too much to say that if an optician wanted to sell me an instrument which had all these defects I should think myself quite justified in blaming his carelessness in the strongest terms and giving him back his instrument."

THE meterological observatory upon Ben Nevis, of which we have on previous occasions written, was officially opened on Wednesday, the 17th inst., with some amount of ceremony. There is no doubt that good work of a most useful character will be done there, and we may, of course, expect that the aid of photography will be frequently called in. An interesting little handbook has been published, describing the observatory and the objects it is intended to promote. The handbook serves as a ticket entitling the holder to the use of the new path, which is six feet wide, has no steeper gradient than one in five, and by means of which the ascent may be accomplished in little over two hours. There is inserted a capital map in which this road is laid down and the various modes of approach indicated. Our readers may remember that, taking a hint from the photographic pigeon post of Paris, attempts have been made to train pigeons to fly from the Ben with messages to the lower level of the inhabited districts. A number of pigeons were collected and trained by degrees to come down from consider-

able heights. One by one they were lost, and a little time ago the the last disappeared. They could manage any distance, but clouds were a complete obstacle.

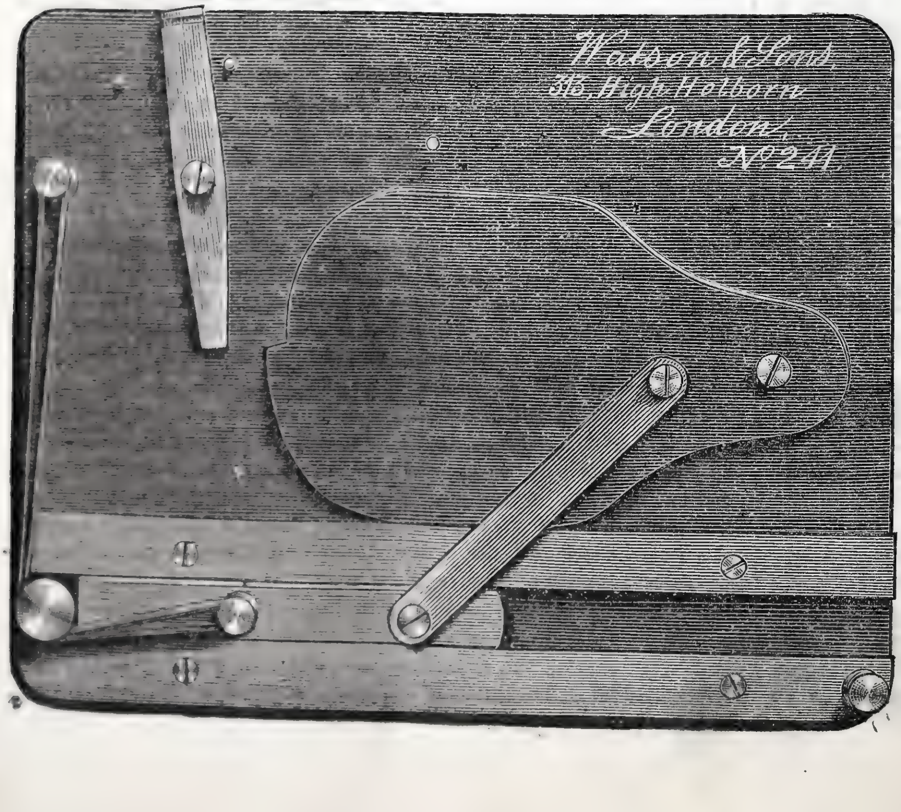
A LITTLE while ago we dealt with the topic of "diffusion," pointing out the use of the application of a knowledge of its laws to photographic processes. It is a fact, however, that when a salt dissolved in water has over it a long column of water the time required for complete diffusion to take place is enormous. Singularly enough, it far exceeds that required for the mingling of molten metals under similar conditions. At the British Association Professor Chandler Roberts, in a paper on *The Rapid Diffusion of Molten Metals*, described how, when lead and gold were placed in a molten state in a U-shaped tube, the lead occupying the lower portion and the gold the top of the limb, in a space of time no longer than forty minutes the two metals were thoroughly mixed. Sir William Thompson said that salt would take years to diffuse in a similar manner.

THE APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

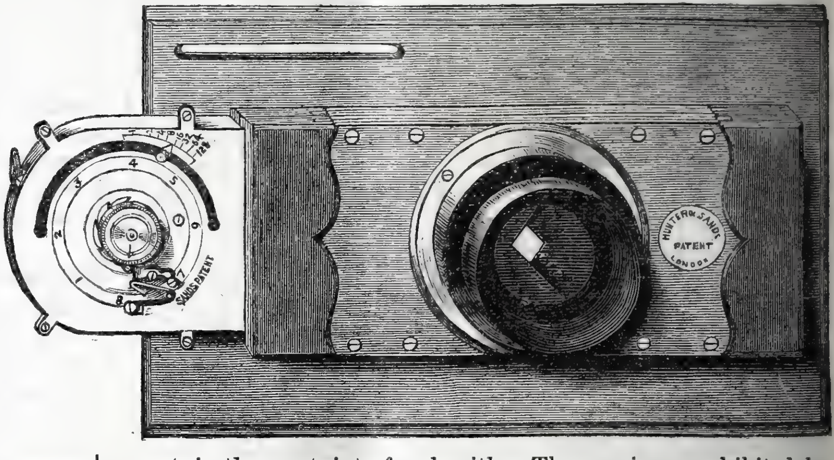
[SECOND NOTICE.]

THE severest test to which pieces of photographic mechanism of the nature of drop or instantaneous shutters can be subjected is the placing of them on the table with other apparatus, where they can be handled by the numerous visitors to the Exhibition. These visitors comprise all classes—from the schoolboy who is bound by the necessities of natural tendencies to examine everything capable of being handled, to the grandsire who feels bound to explain the various actions of the mechanical exhibits to the younger branches of his family, himself being in a state of ignorance respecting them. What wonder is it that some articles of apparatus—and among them instantaneous shutters—have been placed *hors de combat?* The wonder would be were it otherwise. In one instance an ingenious shutter "came to grief" on the opening day of the Exhibition, its place being supplied with a successor, which only retained its original state of perfection for a few hours. Manufacturers have only themselves, in a large measure, to blame. If complex pieces of delicate apparatus are submitted for public inspection and handling it would be well that a note should be attached to each showing in what manner it is to be used.

In a former article we mentioned one shutter which has successfully resisted every kind of ungentle usage. There are others which it seems difficult, if not impossible, to put out of gear. Among these is Watson's "snap" shutter, the action of which is simple while its construction is such as to defy rough handling. On a plate of ebonite are screwed two brass slips, between the parallel faces of which a third slip slides easily without falling out, as the faces are dovetailed. A metallic strap connects this running piece with an ebonite shutter, which closes the circular aperture through which light is admitted to the lens. An elastic rubber band passing over a pulley, seen in the lower left-hand corner, ensures the arrangement of the parts as shown in the diagram. To set the shutter the runner is drawn to the right, the shutter being opened full and closed again during this motion. The discharging lever or stop is then moved on its axis, so as to face the check of the shutter. To effect an exposure all that is required is to push the upper end of the lever to one side, when the tension of the rubber band causes the runner to assume its original position with a snap, the shutter having been thrown open to the full extent during the transit.



A camera by Messrs. Sands and Hunter is fitted with one of their patent instantaneous shutters. This consists of two thin metallic plates each containing a square aperture. These slide over each other in opposite directions, their action being to show at first a small opening, which gradually widens to full aperture and then closes again. The rapidity of the action is controlled by a spring at one end which, when wound up to a greater or less extent, imparts a corresponding degree of rapidity to the movement of the sliding pieces. As it is intended to employ this shutter between the lenses of a combination it is requisite that a special mount be constructed for the adaptation of the cells containing the glasses. The original



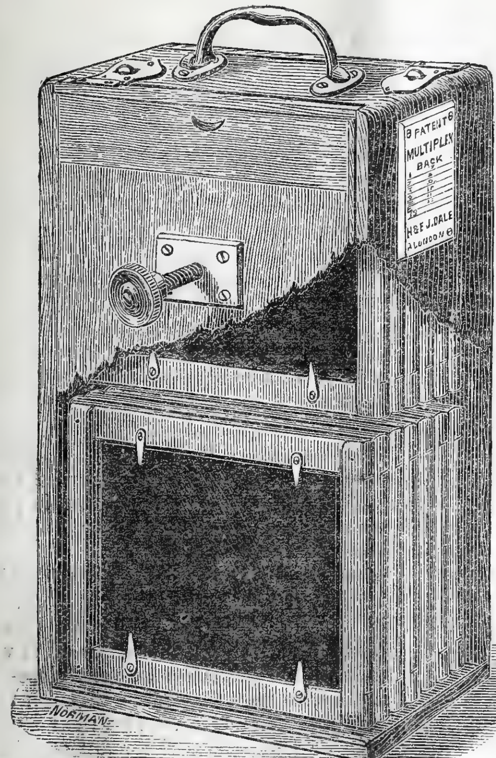
mount is thus not interfered with. The specimen exhibited has Waterhouse stops adapted to it.

The camera to which this shutter is attached is one of a class designated as "exhibition" cameras, for $7\frac{1}{2} \times 5$ plates. It is well finished, and has a reversible back frame for holding the dark slide, so that the picture can be taken either way without altering the position of the camera. The focussing range is extra long. It has three double backs. Connected with it by a small, rigid, detachable arm is a "finder," by which the amount of subject included on the ground glass can be ascertained without having recourse to the camera itself for such purpose. This "finder" is attached to the front portion of the camera, and projects at the right hand side, necessitating the employment of the left eye in order to secure the most convenient inspection of the view. But it is evident that it could be placed at either side at will. In devising this finder Messrs. Sands and Hunter have departed from the system hitherto usually employed when such an addition to a camera has been made, and by which the sight-hole is at the back and on the top of the camera. This firm has a second "exhibition" camera with three double backs, for 5×4 plates, nicely fitted in leather case; also two "improved tourist" cameras, respectively for $8\frac{1}{2} \times 6\frac{1}{2}$ and $7\frac{1}{2} \times 5$ plates.

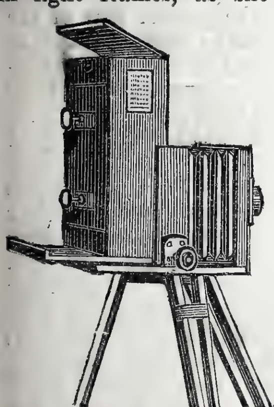
The "phœnix" shutter, by Messrs. Reynolds and Branson, of Leeds, and the "instantaneous" shutter of Messrs. H. and E. J. Dale, are similar as regards their principle of action, but differ in some of their details. In both the exposure is made by raising a flap shutter, and when quite raised permits

f a drop falling by which the lens is covered. In the former of hese the flap is raised by a milled head projecting from the side, nd which operation may be prolonged at pleasure, the drop being ropelled downwards by the force of a rubber band. In the latter he flap is, upon releasing a catch, rapidly pulled open by a rubber and, the drop then falling by gravity. The Leeds shutter ppears to have had a circular spring action originally to quicken he motion of the flap, but it has become detached since being laced in the Exhibition.

Messrs. H. and E. J. Dale also exhibit their patent multiplex amera back. This is a cabinet capable of containing thirteen



plates in two tiers—six above and seven below. These are secured in light frames, as shown in the foregoing illustration. By merely turning the cabinet round, so as to make one of the plates fall from the division containing the greater number, a complete rotation of the thirteen plates is ensured; and, by ingenious appliances, with which one side is provided, any one of them may be brought opposite to the shutter. The annexed illustration indicates by what means the multiplex back is placed in the camera. With an arrangement of this kind no dark slides whatever are required. This firm also exhibit a camera-stand of a well-known type, but having facilities for lengthening or shortening any of the legs at will.



An "instantaneous" shutter, by P. Boca, of Paris—which is really a shutter of the chronometric order—displays much ingenuity; but in the specimen exhibited the clockwork makes a loud noise during the time of exposure. This might probably be easily rectified.

We shall resume our notices of the apparatus next week.

IODIDE IN EMULSION: ITS EFFECTS IN INCREASING THE RANGE OF LIGHT GRADATIONS WHICH ARE REPRESENTED IN A NEGATIVE.

In a demonstration of the gelatine emulsion process which I recently gave before the London and Provincial Photographic Association I presented two formulæ, in each of which there was a certain amount of iodide. During the discussion which followed the demonstration exception was taken to the use of iodide—not on the usual grounds that the sensitiveness is thereby reduced, but because it was said that the colour of film given by the iodide being somewhat non-actinic, light was prevented from penetrating; that thus only a small portion of the film was utilised, and that the remainder might as well not be there. This argument is certainly worth looking into, as, did it hold good, it would be a serious one against the use of iodide. I hope to show that it does not, except, perhaps, in the case of a very limited set of subjects.

A point which has to be considered in connection with the colour of a film is its powers of absorbing light of different colours. It must appear evident that light which is either reflected from a film or is transmitted through it cannot have any influence in reducing silver bromide. Compare, now, the difference in this respect between a pure bromide film and a bromo-iodide one. The first is blue by transmitted light, and a slightly-bluish white by reflected light; that is to say, the rays which are transmitted and reflected, and which, therefore, cannot do work, are the very ones which are most energetic in their photographic action.

In the case of the bromo-iodide film, on the other hand, the colour is slightly more inclined to orange or yellow by transmitted light, whilst the colour by reflected light is very distinctly yellow. Here it will be seen that we are letting far less light escape, without the possibility of doing photographic work, than in the other case. Distinctly more energy of the kind which performs photographic work will be utilised in the bromo-iodide film than in the pure bromide.

It is true, however, that this is not everything. If the action were confined in this one case to the surface of the film, whilst in the other case it penetrated comparatively deeply, we might have no great gain. It must, however, be borne in mind that when once reduction of silver has commenced, this reduction will, in presence of a developer, communicate itself to contiguous silver bromide particles, even if these have not been affected by light. It is quite possible to develope a film completely to the back, which is so opaque that no light could have passed through it; indeed, to take an extreme case, a plate may be coated with an emulsion which has been neither boiled nor treated with ammonium, and which gives a film almost as non-actinic as a piece of orange glass. There will, nevertheless, be found no difficulty in developing to the very back of the film such portions as may have received sufficient exposure to become at once reduced on the surface.

It is, however, certain that films which transmit actinic light do somewhat more readily develope through a considerable thickness than do those which are of a non-actinic colour. It is probable that the one film will by chemical or molecular action, or whatever we please to call it, develope to quite as great a depth as the other, if time be given; but, if the time be the same, certainly the penetrable film will develope slightly more deeply than the other. But is it altogether an advantage—or, indeed, an advantage at all—that a film should very readily develope through its whole thickness? I think that certainly in most cases it is not.

Decidedly one of the greatest defects in photography is that the total range of light gradations which any film can register is much smaller than the eye can recognise. If an exposure be given, such that the darkest distinguishable gradations have their representation in the film, bright gradations (which are by no means too bright to be also distinguishable to the eye) will not be distinguished by the photographic film. A point is soon reached in the case of the photographic film beyond which it can give no rendering of further additions of light. A similar point is also reached with regard to the eye, but it is not till a far greater degree of brightness has been reached. Even when sun spots are of such a size as to be visible to the eye when the sun is looked at through a piece of smoked glass, no sign of them is visible if we glance for an instant with the unprotected eye at the dazzling orb. The detail of very brightly-lighted clouds is also in a great measure beyond the range of the eye. If we look at a bank of brilliantly-illuminated clouds—first with the naked eye, and then through a piece of slightly-smoked glass—we will see very much more detail in the latter case than in the former.

However, we do not want the photographic film to register more than the eye will. If it could be made to register as much it would do very well indeed. As a fact, no film does. It is only too well known to all photographers that if, for example, a landscape with deep shadows be photographed, sufficient exposure being given to bring out all the detail in the shadows which is visible to the eye, there will be no trace visible of such clouds as there may chance to be in the sky; but, on the other hand, the sky portion of the negative will be all of one uniform density.

Plates of different makers vary much in their powers of rendering widely-different gradations of brightness. Some will render a longer scale, others a shorter, and there is no doubt that a film

readily penetrable by light will render a shorter scale than one which is not readily penetrable. The reason of this is quite evident. In the case of the light-penetrable film a comparatively small quantity of light is sufficient to cause the film to be reduced to the back on the application of the developer. Since further action can reduce it no more, it is evident that any increase of light beyond that amount can find no further representation, but that all must be represented by a uniform density. In the case of the non-actinic film this point is not so soon reached, and a much longer range of light finds a fairly-correct representation.

To pass from theory to practice: it is an undoubted fact that gelatine plates containing a certain proportion of iodide do register a greater range of light than those which are made with pure bromide only. With a bromo-iodide plate there is less likelihood of chalkiness in the high lights than with a pure bromide plate, and clouds are more likely to be found in the negative which is sufficiently exposed to bring out detail in the shadows of the landscape.

I have made bromo-iodide plates in which, in almost all cases, where there were clouds in the sky these had their representation as well as the landscape; but I have never succeeded in securing the same effects with pure iodide plates.

It must not, however, be left out of consideration that there is a certain class of subject which does not present an excessive range of light, and where, therefore, the endeavour is not to get a film which will register a great number of gradations, but rather to get one which will show a marked contrast when representing a comparatively small range of light. Of this nature are portraits with a certain style of lighting and landscapes which have no deep shadows.

Now, it will be readily seen that a film which registers a great range of light cannot give great contrast with a subject which shows only a small range. This small range may be looked upon as a portion only of the large one, and the amount of contrast will be the same only as would be found in the representation of that portion. For such subjects I do not think it is too much to say that a pure bromide film will give the best result. These subjects are the ones which are also better rendered by an ammonia emulsion than a boiled one. A plate coated with an ammonia emulsion registers a far shorter gradation of light than does a plate coated with a boiled emulsion.

A wet-collodion plate, as a rule, registers even a shorter range of light than a plate coated with ammonia emulsion. A wet plate is, therefore, the best of all suited for the kind of subject which I have described; that is to say, one in which the difficulty is rather to give an exaggerated rendering of the scale of brightness which is shown than to continue to find differences of gradations to represent a very extended scale.

To recapitulate: it would appear that the yellow colour given by iodide offers an advantage, in that by its means light which would otherwise be reflected or transmitted is absorbed by the film, and thus may do photographic work. It does not follow that, because the non-actinic colour given by the iodide prevents the penetration of light, therefore reduction of the silver and salts cannot take place throughout the films.

It is, however, the case that reduction does not penetrate quite so deeply in a bromo-iodide as in a pure iodide film; but this is in most cases an advantage, as it gives a plate which will register a wider range of light gradation. There is, however, a certain class of subject which presents no very great contrast of light, and for such it would appear that a pure bromide film gives a better result than a bromo-iodide.

W. K. BURTON.

NOTE ON NITRO-IODIDE AND BROMIDE OF SILVER.

[CONCLUSION.]

HAVING, in my previous communication (page 622, *ante*), described the general appearance presented by these crystallisable compounds, and also the peculiar and pernicious effects which their presence produces in collodion negatives, I now proceed to indicate the means which I have successfully adopted to remedy such disordered silver solutions. But, before doing so, and for the information of those photographers who take an interest in the purely scientific aspect of the question, I may state that the chemical composition of one at least of these double salts has been given by Gmelin as $Ag\,O\,NO_5 + 2\,Ag\,Cy$ (old notation); or, by the new, $Ag\,NO_3\,2\,Ag\,Cy$. This represents nitro-cyanide of silver. The more important salts to the photographer—namely, the nitro-iodide and the nitro-bromide—have a precisely analogous constitution, the only difference being that the $2\,Ag\,Cy$ is replaced by $2\,Ag\,Br$, or $2\,Ag\,I$, as the case may be. The late Dr. Miller was of opinion that such was their composition, and the more recent investigation of Professor Bloxam into the nature of nitro-cyanide of silver confirms this view. It may be here stated, however, that the latter salt has nothing whatever to do with the formation of pinholes in negatives, for the simple reason that neither the sensitive film nor the negative come into contact with cyanide at all until it is placed in a fixing solution of the latter—that is, *after* the pinholes have already been developed to their full extent.

Let us now see how we can apply to practically-useful purposes the information derived from a study of the nature of these double salts.

First. They are formed by and held together in solutions of silver nitrate in proportion to the strength of these when saturated with silver bromide, iodide, &c.

Second. When a strong nitrate solution saturated (say) with bromide of silver (which we shall take as a type) is diluted with water it will throw down the latter just in proportion to the amount of water added. In other words, *water decomposes this double salt.*

Third. If, instead of water, we add *absolute* alcohol or ether this decomposition does not take place. On the other hand, such addition instantly determines a copious formation of the transparent crystalline needles, and these will go on accumulating for some time if the solution be kept cool and undisturbed.

The above are the main characteristics of this class of double salts, and those which particularly affect the work of the photographer. Now, if we carefully study their peculiarities it will be easy to deduce a system for the regeneration of silver solutions for negative work, after they have become useless from their tendency to the production of pinholes and other abominations. At the same time it is very doubtful whether the trouble involved in effecting a cure is compensated for by the results obtained. Nevertheless, as a matter of fact, such regeneration can be effected by the following simple plan, which would be found useful when one is placed in circumstances where it is not convenient or, may be, impracticable to mix a fresh solution:—

Dilute the offending silver bath with about an equal bulk of distilled or filtered rain water. By this dilution a large proportion of the dissolved silver iodide and bromide is thrown down in a state of very fine division—so fine, indeed, that some of it will pass through the pores of a filter unless the latter be very close-grained. It may be necessary, therefore, to pass the liquid through the *same* filter twice before it becomes perfectly clear. The next step in the rectification is to evaporate or boil down the solution till it has attained its original bulk; or, if more bath solution be wanted, silver nitrate may be added till, by the argentometer, the requisite strength is reached. This evaporating or vapourising treatment has the good effect, too, of getting rid of the greater part of the alcohol and ether with which the bath had been charged; and, as we have seen that the presence of alcohol and ether are very conducive to the formation of this pernicious double compound, their absence is a decided gain. Baths so rectified have invariably, in my hands, behaved themselves quite as well and lasted as long in good working order as new ones.

But, in addition to the bath being afflicted with a tendency to pinholes, it may also have become surcharged with organic matter held in solution. This, as every photographer must be aware, gives rise to hazy or fogged negatives. To get rid of this effectually a different mode of treatment will be found necessary. Render the solution slightly alkaline or, at least, neutral—preferably with bicarbonate of soda. This precipitates a little carbonate of silver, which is useful as forming nuclei for the reduced organic compound. The solution is then placed in a *transparent*, wide-mouthed bottle or glass jar, and submitted for some days to the action of the strongest available light of an actinic character. Occasional shaking or stirring up is useful. The reason why a wide mouth is preferable to a narrow one is because it favours the evaporation of the alcohol and ether with which the solution may be charged, and thus lessens its propensity to the formation of these double salts.

I have thus gone over the ground which I wished to traverse in investigating this interesting question. If I have not been sufficiently explicit on some points it is because I think sufficient has been said to enable any intelligent operator to meet the difficulties treated of when they arise, and to adopt means of avoiding them in the course of his ordinary photographic work.

As having a direct bearing on the question which we have been discussing, I propose next week to describe briefly what I consider the most approved method of compounding a new negative silver bath, also the best means of preserving it in good working order for a lengthened period. Indeed, it appears to me that judicious

reatment of this delicately-constituted and very easily-disarranged *ine quâ non* to the wet-plate photographer is one of the essential neans of ensuring the highest and, at the same time, unvarying success in photographic operations. GEORGE DAWSON, M.A.

THE ACTION OF LIGHT ON A SENSITIVE FILM.

In this communication I propose to lay before the readers of this Journal what I think to be the reason of the difference in sensitiveness between various films containing salts of silver—whether held in suspension in gelatine or collodion. I believe each particle of the silver salt employed is surrounded by a thin film or cell of gelatine or collodion, and that it depends on the strength of these cells when the silver salts are acted upon by the waves of light whether a long or short exposure is required. In the case of gelatine I believe the cause of the increased sensitiveness, compared with collodion, is that the contraction of the cells, on the particles of the silver salts on drying, produces an extreme tension of the casing of gelatine, so that the probable expansion of the particles or other action by the rays of light cause these cells to either burst * or be damaged in some way, so as to allow the developer to reduce to a metallic state the particles of silver bromide contained in them, and that where the light has not acted the undamaged gelatine cell or film protects the particles from the action of the pyrogallic acid or other developing agent.

And now let us apply this theory to each separate operation, from the making of the emulsion to the development of the plate. I will take Captain Abney's standard formula as an example:—

No. 1.

Potassium iodide	10 grains.
Ammonium bromide	140 „
Nelson's No. 1 gelatine	30 „
Water	$1\frac{5}{8}$ ounce.

No. 2.

Nitrate of silver	200 grains.
Water	$1\frac{1}{2}$ ounce.

On dissolving No. 1 the result is, of course, that the molecules of bromide and iodide are contained in a very thin jelly of gelatine and water. On the addition of the silver this jelly is not powerful enough to prevent the formation of bromide of silver; but directly that formation is accomplished it closes in on the particles of silver haloid, and the water which contained the silver goes to make the jelly thinner and less viscous.

It is proved that gelatine is like a minute sponge, containing a numberless quantity of cells. In this case we have thirty grains of gelatine in over three ounces of water. If we could take a small atom, such as the smallest grain known, and dip it into this viscous fluid, on taking it out it would be covered with a most minute film. On drying, this film, of course, contracts; and when we think that this contraction takes place on each separate particle of the thousands contained in even a small amount of emulsion, can we wonder, then, as these films are so marvellously thin, that light, which has power to turn a Crookes's radiometer,† has also power to split or break them up by its action on the particles of silver haloid? Whether this action is to reduce them to a sub-haloid, or whatever it may be, there is no doubt it is a physical action.

The mind can hardly grasp how thin these film cells must be, and even if each cell be further sub-divided by numberless sponge-like cells, is it not reasonable to suppose that the particles of pyrogallic acid or other developing agent are so large, that the gelatine film cells are sufficiently compact to protect the silver bromide particles contained in them from the developer, until, by the action of light or other means, they have been burst or destroyed.

On the addition of the bulk of gelatine I believe that, on account of the small amount of water added, the sponge-like cells are so coarse that the particles of the developer can easily pass through them, and that they are also so coarse that they do not affect the thin cells which case in the particles.

I believe that the action is the same with collodion. On coating a plate with iodised collodion and then putting it into a nitrate of silver bath, the cells covering the molecules of iodide of potassium, &c., are not strong enough to prevent the formation of silver iodide; but directly the strain of the formation is completed they are still sufficiently elastic to cover up the particles.

Further: I think the following is the effect of boiling on an emulsion., viz., that it expands the particles of silver bromide and thereby strains the cells of gelatine, and that, if the boiling or other means of emulsifying be too prolonged, the cells are either burst or destroyed through the decomposition of the gelatine, and fog is produced through the exposure of the particles of silver bromide to the action of the developer. Or it may be that it does not act on the particles at all, but only partially decomposes or destroys the film surrounding them, though, probably, the first explanation is the correct one.

Captain Abney, in his work on *Photography with Emulsions*, page 115, writes:—"When an emulsion is boiled an inspection of the films after different lengths of boiling will convince us that the longer an emulsion is boiled the larger the size of the particles which are embedded in the gelatine." This must produce an increased strain on the gelatine surrounding them, as in the case of soap-bubbles. At first the film of the bubble is comparatively strong, but by continued blowing the film is gradually strained until it bursts.

I think that the colours seen by looking through an emulsion film by transmitted light are produced in the same way as in the soap-bubble, namely, by the prismatic division of the light by the thin film. The more extreme the tension on the cells, and in consequence the thinner the film, the nearer it approaches the blue colour, and the thicker the cell the nearer the colour approaches the red or orange rays. Captain Abney, in his work, says:—"The colour of the silver bromide may be due to two causes: it may be due to the colour of the silver bromide itself, which is what we may call its 'molecular colour;' or a variation in colour may be due to the scattering of light by the different sizes of the particles, each particle being probably composed of thousands of molecules."

But in a lecture given by Mr. W. K. Burton, some time since, he showed that a film which had been dried required to be re-wetted before the colour by transmitted light could be seen. I cannot find that wetting particles of silver bromide produces any difference in the colour, but the examination of an air-bubble on the surface of thin dissolved gelatine will show that the rays of light are split up the same as by a soap-bubble; and I think this proves that the colour is given by the gelatine and not by an alteration in the colour of the particles. I think this is further proved on examining an emulsion which has undergone a prolonged boiling by transmitted light; it will be found that the bright prismatic colour is lost, and that the film gives only a cold grey colour.

Now, we know that the gelatine must have been decomposed by the prolonged boiling; but is there anything to prove that the particles of silver bromide have been? Rapid gelatine plates are much more likely to fog under development than slow ones; and I feel convinced it is because the cells of gelatine containing the particles are weaker, and, therefore, less able to protect them from the developer, which is also the reason of the film being more sensitive.

And, now, as to the emulsification by ammonia: I believe the action is just the same as in the boiling process; but whether the ammonia (when added to the nitrate of silver until the oxide is redissolved and then added to the bromide) enlarges the particles of silver bromide and thereby produces a strain on the cells of gelatine, or whether it only partially decomposes the gelatine and thus renders it more easy for the particles to burst the cells when set in motion by the waves of light, I am unable to say.

But there are three most convincing proofs, to my mind, as to the correctness of this theory. They are—1st. I will quote Captain Abney's words:—"Whatever may be the cause of fog—whether the emulsion itself be in fault or whether the plates have seen light—we have found that there is one certain sure cure, namely, putting the emulsion or plates in a solution of *potassium bichromate*." Does not this prove that the action of the bichromate must be on the gelatine, which hardens the cells and protects the particles of silver bromide from the developer?

2nd. As to the action of ammonia in the developer: it is known as the accelerator. Is it not because it decomposes the cells of gelatine, and allows the pyrogallic acid to reduce the particles contained in them to a metallic state?

3rd. It is well known that friction or pressure on a gelatine film will act in somewhat the same way as the action of light. It cannot be that it is caused by the heat of the friction, because plates can be dried in a drying-box at a temperature which will nearly melt the gelatine without any injury to the particles of silver.

I remember some weeks ago Mr. A. L. Henderson, at a meeting of the society of which he is one of the trustees, exhibited a plate which had been in close contact with one of Warnerke's sensitometers; it showed clearly the name and other marks which were on the sensitometer. This proved that the action on the film must

* A microphone might tell if there were any sound on the exposure of a film to light.

† It has been shown that it is not *light* but *heat* rays which influence the radiometer.—EDS.

have been produced by physical and not chemical means. Was it not caused by the breaking of the cells by friction or pressure in the same way as light acts on the film? I have also noticed, when large, rapid plates have been packed in boxes with a piece of paper between each plate, that they will often fog, when under similar development, &c., slow plates will not, neither will small rapid plates ($4\frac{1}{4} \times 3\frac{1}{4}$). Does not this prove that the weight of the plates causes sufficient pressure on the lower ones to break or damage the minute gelatine cells, which the action of the ammonia in the developer continues to destroy, and fog is produced. In the case of the slow plates the cells are strong enough to resist the pressure.

I regret that neither time nor opportunity will allow me to undertake a long series of experiments; but I hope there is sufficient in the theory I have advanced to tempt others more fortunately situated to take up the question where I am, reluctantly, compelled to leave it. HERBERT S. STARNES.

A TOUR IN HOLLAND WITH THE CAMERA.*

EIGHTEEN miles from Leyden we come to Haarlem. It is as well to arrive here on a Thursday if possible, for two reasons:—There is a free recital on the Grand Organ in the Groot Kerk from two to three o'clock; and it enables us to get to Alkmaar the same night, and note some good work for the Friday morning great cheese market. The Town Hall at Haarlem and the Ancien Boucherie or Vleeshall (now used as a bottle warehouse) are best taken in the morning, and the Groot Kerk and Statue of Coster, the inventor (according to the Haarlemites) of printing, in the afternoon. They are all situated in the Groot Markt. A straight walk of ten minutes down the Kriusweg from the station will bring us here, or we can go by tramcar for twopence.

The Town Hall contains a good museum and a very fine collection of pictures by Frans Hals and Van der Helst. There is also an excellent modern painting (1854) over the bench in the Common Hall by Mr. Thomas Wilson, an Englishman. The subject is the *Siege of Haarlem.* The park on the south side of the town is very attractive, some fine old beeches being well worth a plate or two. Near here is the Chateau, or Pavilion, containing about 200 paintings. Some are very good, but, after those we have already seen, do not favourably impress us.

The journey from Haarlem to Alkmaar by rail occupies only an hour and a-quarter. A little omnibus belonging to the Hotel de Burg meets most of the trains, and will take us to the centre of the town. It is scarcely worth while to go by it, however, unless we have much luggage, as a walk of five minutes through some pleasure grounds and very clean streets will bring us to the Weighing House. This Weighing House is one of the great attractions of the place. Here every Friday morning scores of carts and barges bring tons of cheese to be weighed. It has a very handsome tower, and is about 300 years old. Two views ought to be taken of it—one from the first bridge parallel with it, and one from the opposite canal bank on the right side. The Stadhuis in the Lang-street is also worth a couple of plates—one which will include a part of the Church of St. Laurence (a satisfactory picture of which alone cannot be obtained, and would not be worth the trouble if it could), and one closer view showing the handsome steps at the entrance.

Near the Weighing House is a covered piece of canal called "Mient," and on the south side of this will be found a row of houses about as quaint and different in style as could possibly be wished. Passing these, and bearing along the canal bank to the left for about ten minutes, we shall come to the watergate called "Acceynes." All these pictures should be taken in the morning, and the earlier the better. I may mention that at every stroke of the Weighing House clock two "cavaliers on horseback" pass each other. The aperture is just below the dial. Here is a good opportunity for instantaneous plates and shutters.

The railway journey to Nieuwediep (Helder) occupies about an hour. Photographically, however, the tourist who goes there will, I am afraid, be doomed to disappointment. Of course there are plenty of "subjects" in the harbour, the wharfs, the lighthouse, the great dyke, &c.; but, unless he is really overburdened with spare time and plates, I should say a couple of hours at Helder was ample, so we will get back to Alkmaar without delay, and see about starting to Hoorn.

The ride from Alkmaar to Hoorn by *diligence* takes about three hours, and, unless we can induce the coachman to pull up while we take a North Holland Farm or a number of windmills in full work (another chance for instantaneous shutters), I am afraid we cannot do any more until we arrive at Hoorn. Once there, however, there is no lack of material—old and quaint buildings without stint. It has been said that the beautiful Water-gate is worth the journey to see. I am not quite sure of *that*, but without doubt it is very fine. The back of it should be taken in the afternoon and the front in the morning. Among the other attractions may be mentioned the East-gate, the Justice House, the Weighing House, the Town Hall, and the new Post Office.

* Concluded from page 626.

The steamboat for Amsterdam leaves Hoorn at seven a.m., and a pleasant trip of three hours will bring us to the greatest city in Holland. How many plates could profitably be exposed in Amsterdam it would be difficult to say. I will just enumerate some prominent points, however, and leave the rest to individual taste. There are a few views that can be taken in the middle of the day, such as the Post Office, the Oude Kerk, the Damrak, and any others that can be taken from the sides or bridges on the canals. The principal buildings, however, are on the Dam, and to work comfortably these should be done very early in the morning. By beginning about 5.30 the following may be done before breakfast:—The Palace, the Law Offices, the Monument, and the Exchange (these are all on the Dam); a walk towards the Exhibition and we shall find the new American Hotel, the great Theatre, and the new Museum. Coming back by way of the Amstel we shall be able to do the Munt Tower, and in the new market the building called St. Anthonieswaag, now used by the fire brigade. Behind this is the Fish Market, and if there be any time yet to spare before the morning meal there will be no difficulty in filling it up here.

The great attraction in Amsterdam at the present time is the exhibition. It is no use, however, my pointing out the best things to take in it, because the sole right to photograph within the enclosure is sold. I should like to express myself very strongly with regard to the published productions of those having this "sole right," but, perhaps, I had better not.

About an hour from Amsterdam suffices to bring us to Utrecht—a very pretty place with a very fine cathedral tower. This may be taken from a street called Kortlange, on the south side, almost anytime in the middle of the day. The cathedral itself, which is immediately behind, is quite detached, and must be made a separate picture of. The best position to get an effective view of Utrecht, which will include the celebrated tower, is from the corner of Stroosteg or Haverstraat, on the Oude Gracht. The tower of Beaukirk would make a very good picture, but I was unable to find a satisfactory spot from which to take it. The Post Office is a fine building, but the Stadhuis is the plainest and most commonplace I saw in Holland. Some very nice "bits" can be made in the cloisters, between the cathedral and the university, and also at the Maliebaan, on the east side of the town.

Three-quarters of an hour's railway journey and we make the acquaintance of Gouda. The walk from the station to the town is very pleasant, and the new church may be taken on the road if thought worth while. Just below this is the Market Place, in the centre of which we have the Stadhuis, with the Weighing House behind it. The latter, however, is scarcely worth a plate. The most satisfactory picture I think that can be taken of the Groot Kerk is from here, as it is seen far above the houses on the opposite side. It is so built round that it is impossible to get a plate of it by itself. It is worth going into, however, as it contains some very good stained glass.

Twelve miles and a-half more and we are back in Rotterdam. Before leaving for home it is well worth while to make an excursion to Dordrecht, and instead of going by rail we can take the steamboat. Arrived there we, of course, steer for the Groot Kerk, the tower of which can be seen long before we get near it. The front of it from the further side of the canal bridge makes a very good picture, and in the canal some effective "bits" may be had. The Staduis lies rather awkwardly, but can be got from the street facing it. The Museum is not much to look at, nor, with few exceptions, are the pictures it contains; but the statue of Ary Scheffer in the open space in the Wijnstraat is quite worth a plate. Having noted one or two pretty views on the canal we wend our way back to Rotterdam *en route* for home.

In the foregoing sketch of objects worthy of being photographed, it will be noticed I have avoided interiors. Permission can sometimes be obtained to do these, but it is generally more trouble and occupies more time than the average tourist has to spare. I have also avoided all reference to lenses, cameras, and exposures, as those who do not understand their "tools" had better commence work nearer home. One hint and I have done:—Take as little luggage as possible; it is then very easy to deposit it at a railway station while you take a few pictures, should you not wish to stay in the towns you visit. It is almost unnecessary to add that most of the places I have alluded to have very interesting histories attached to them. These, however, together with my notes on the manners, customs, and habits of the clean, industrious, and obliging Hollanders, I have thought it best to reserve for the lecture-room. F. A. BRIDGE.

FOREIGN NOTES AND NEWS

CHARACTER CARDS FOR PHOTOGRAPHERS' ASSISTANTS.

ON the continent most workmen on quitting one employer for another have to present to the police a small book containing many particulars regarding themselves, such as copies of their birth and baptism registrations duly attested, particulars of when and where they passed their apprenticeship, reasons for quitting their last employer, time they were in his employment, &c. The main object of the respective governments in enforcing these regulations seems to be

to prevent anyone from shirking conscription; but that that is not the sole object is evident from the fact of female domestic servants also having to keep their *livrets*. The result is that employers are very shy of employing anyone who has not all his papers in order, and that the fact of anyone who presents himself as a candidate for employment having duly served an apprenticeship to most trades can easily be ascertained. Photography appears still to be an exception to this state of matters, its status as a trade or as an art is still undefined, and very few of its "professors" have served a regular apprenticeship such as is required by all other trades of even far less complicated working. Continental photographers are, like their English brethren, much troubled by assistants who seek employment from them as operators, printers, &c., who yet when engaged are found to know nothing of their business, and sometimes do not possess even the most elementary knowledge of it. From time to time the subject of the engaging of assistants, teaching, and giving characters to apprentices has been discussed at meetings of the various photographic societies, and attempts have been made to get all the employers to pledge themselves to engage no assistant without obtaining a character from his previous employer; but few of the employers would give the desired pledge. It then occurred to the directors of the Berlin Photographic Society that something might be done by means of cards of identity or character being given to assistants, and they have issued such a card, which is not unlike in appearance the tickets of membership of some societies. The card is chocolate-brown on the outside and white inside. Its measurement when laid flat is about six and a-half inches by five, and it folds in two along the centre line, which is half cut through to allow it to do so.

GERMAN PHOTOGRAPHIC SOCIETY.

IDENTITY CARD

FOR

(say) John Smith ....

of ....

....

Presented by ....

Photographer, in ....

On the..........th.........................188

N.B.—Should this card become soiled or broken and therefore useless, the possessor may get it replaced by sending it, along with an unmounted portrait of himself, to the President of the German Photographic Society, Herr K. Schwier, Weimar.

Portrait of the holder.	German Photographic Society.
	Certificate.
	For (name of *employé*)..................
	Born on...........188....at............
	The above-named, whose portrait is upon the opposite page, was in my employment
	from ....188....to..........188..
	as (printer, say)......................
	His conduct was ....
	His ability was ....
	He left my employment on account of
	....
Space for the portrait of holder, to be pasted in and stamped with the business stamp or seal of his employer.	Remarks ....
	Place and date ....
Signature of holder	Signature of employer..................
....	His business stamp.

The card bears the portrait of the possessor, authenticated by his own signature and the signature and business stamp of his employer. It tells the *employé's* age, the time he was in the employment of the certifying employer, the quality of his work and conduct during that time, and, finally, the cause of leaving. The objection which has been raised to this card is twofold:—First, it is said that of late years workmen have been objecting to the *livret*, and this card bears too close a resemblance to it to be acceptable; and, secondly, that no workman would ask for such a card who did not expect to be well reported of in it. The first objection may be a good one; but the second is hardly so, if all good workmen would provide themselves with such a card and bad ones would not. The non-possession of such a card would then at once tell the intending employer that he need not take the trouble of making further inquiries. The Berlin Photographic Society seems sanguine that its card will meet a great want; it is also very enthusiastic, for it seems to distribute them gratis, though probably only to its own members.

ON THINGS IN GENERAL.

As the topic of the season, it behoves me to commence my lucubrations with some comments upon the Exhibition in Pall Mall, which I think that the impartial critic will join with me in saying points to a distinct advance made in photographic *technique* and artistic excellence. Among the exhibits there are several I should be proud to place upon the walls of my own house; and I saw pictures in which were plainly shown the results of study, thought, and feeling. One of the gems of the Exhibition was the beautiful study of a most attractive model catalogued simply as *A Portrait*, by Mr. J. Bullock. Mr. H. B. Berkeley's *Noontide* is as exquisite a piece of photography as has ever been produced—a scene chosen with a true artistic eye, a difficult subject cleverly executed, and owing not a little to the process by which it is printed—platinotype. The yacht picture of Messrs. G. West and Sons is exquisite, and will be one of the attractions of the Exhibition. There are many other pictures I should like to draw attention to but that my communication would soon run into a critique on the Exhibition, and that is being more effectively done in other columns. There is one picture of flowers (labelled "*hors concours*") that is deserving of the highest praise as a piece of decorative photography. I allude to that panel of flowers, by Mr. Fred. Hollyer, situated to the left as we face the screen. It is a beautiful photograph, and the deft manner in which the print is obtained by pasting two separate pieces together conveys no notion of trickery, nor is it a trick or anything but a legitimate device.

I think about the best compliment the outside critics have paid the pictures is their anxiety to prove that whatever merits may be present in the collection everything goes to show that photography is not a *fine art*. These people are loyal to their craft, but they are deficient in education. We can scarcely blame them for not daring to depart from the beaten track and recognise fine art in a photographic picture. It is a good many years since Peg Woffington popped her head behind an unsuccessful artist's gilt frame, placed on a draped easel in a corner of his studio, and listened to the remarks and criticisms of the *cognoscenti* of the period, who, believing they had a canvas before them, pulled to pieces the execution of the picture and the attempt at a likeness. Her mocking laugh as she emerged from her post will be but a parallel to the dismay of the art writers of the present day when some bold spirit among acknowledged artists of the brush will confess and publicly proclaim that photography is a fine art, limited though its scope may be. They are so illogical! None of them give better logic than that which would let a sign painter be mustered on the roll of artists.

This train of thought leads one to think of Mr. W. J. Stillman and his remarks upon the text—*Is Photography Art?* In one sense his article is so much ink thrown away. Now, I have a very great respect for Mr. Stillman and what he writes, usually, as it is to the point, and is the outcome of the practical experience of a cultivated man and clever photographer; but he is "all at sea" in his remarks. At the outset he says:—"The artists * * * decide with unanimity that photography is not art in any sense of the word." Now, this is nonsense. If Mr. Stillman will read current literature he will find plenty of admissions by "artists" that photography is an *art*. The denials are as to its position as a *fine art*. Hence the rest of his matter falls to the ground. Let him take Mr. Bullock's *Portrait*, Messrs. West and Son's *Yachts*, or Mr. Berkeley's *Noontide*, frame them up as engravings, hang them with other artists' work, get the cleverest artist friend he has to pass an opinion on them without knowing the mode of their production—the said friend being kept at such a distance that he cannot use a magnifying glass to ascertain the texture. I am very sure there would be no statement that the pictures were not done by an artist. It would only be when the process was discovered that the art label would be taken off. The confusion is in the failure to distinguish between works of fine art and workers in fine art.

The London correspondent of the *Manchester Guardian* writes, under date of Tuesday, the 16th instant, the best and most honest criticism on the critics I have yet read, and the writer is a man of culture:—"It is curious that, although the Photographic Exhibition is held in the Rooms of the Royal Society of Painters in Water-Colours, few members of the institution have visited it either recently or in previous years. There is a general tendency amongst artists to decry, or to pretend to decry, the value of photography, yet there are many of our best painters who avail themselves largely of its aid." That is just it! They don't know what they are talking about, and so can talk and decry with the greater vigour.

I have run away from the Exhibition, but I would say a word or two in praise of the many exhibits of apparatus there displayed. Among them was a very ingenious apparatus for changing plates—very like conjuring till you got used to it; then, I am told, it is very simple. All very well for those who are guiltless of the swing-back addition to their camera. Then there was a huge thing to hold in one's hand to retouch with by means of electricity. A stipple was produced. I tried, and many others tried in my presence, to obtain the stipple. We could not do so, but we could *feel* it very easily.

When Mr. Muybridge was in England his work was looked upon by the artists almost as a revelation; but now, the fever being over, they fail to see the logic of putting into their pictures an animal either with his legs apparently tied in a knot or in any other position of which no one knew of the existence till a machine was invented to prove its reality. They will have to learn the same lesson as to sea photographs. What is the use of representing phases of water motion that only occupy a hundredth part of a second? The eye sees ten of them to obtain one mental image, and of course mixes them well up. A ray of sunlight so taken would represent a number of individual, distorted suns. Is such a representation the slightest approach to what the eye takes cognisance of and sends on to the brain? I wish to bear testimony to the utmost to the skill and patience required to produce such a picture as Mr. Mayland's waves:—

"There is sorrow on the sea;
It cannot be quiet."

And for the mastery of technical difficulties it well deserves a medal; but did any one ever see water in the condition the photograph shows it in that part immediately in the foreground?

I was much interested in reading Mr. Huggins' paper at the British Association meeting, about photographing the sun without an eclipse. It gave force to the recommendation once published—I forget by whom—in this Journal, to the effect that by using coloured glass in front of the lens distant views were enabled to be more clearly photographed. What a remarkable thing that no one made a secret process of it and exploited a new method for curing fog! It would have taken well!

Speaking of secret processes reminds me of the Obernetter squabble, an account of which I saw had got to America and was "ventilated" at the Convention. Whatever secret there once was seems to have become public property now, seeing that a full account of the process, with recipes and all details, was published at the Convention by one of its members. All the same, I cannot say I have one word to give in favour of any man who, buying a secret process and plighting his word to keep the secret, breaks his parole and betrays the secret. Nothing short of proved dishonesty on the process-vendor's part can, in my opinion, excuse such conduct. FREE LANCE.

WHERE TO GO WITH THE CAMERA.

MACCLESFIELD AND THE NEIGHBOURHOOD.

A SHORT distance beyond Macclesfield, and on the same line of railway made use of for the route described in my previous article, namely, the North Staffordshire, is North Rode station.

Alighting here on a fine autumnal day there will be found a good subject near to the station, in the picturesque old bridge crossing the river Dane, on which it will be well worth while to expose a plate, and another one or two on the church close by. A good picture may also be secured on the canal locks with boats passing through; but this will necessitate the use of very rapid plates and a quick-acting lens.

An hour or two may be thus pleasantly spent, until we can resume our journey on the same line, by a later train, to Mow Cop station, at which place we find, on inquiry, a footpath across some fields leading to Moreton Old Hall. Here is to be seen one of the finest specimens of half-timbered work to be found in any part of Cheshire. The style of architecture is a mixture of Gothic and Italian. The latter ideas, at the time of its erection, were just beginning to crop up into notice. The building is now used as a farm-house, and its once magnificent ball-room converted into a granary! It is becoming greatly dilapidated, and ere many more years elapse must either fall into the hands of the so-called "restorer" (mayhap *spoiler*) or else crumble into hopeless ruin through sheer decay.

Several plates may be advantageously exposed on this grand example of old "black and white;" but, before doing so, let me advise that permission be courteously asked, not only in this particular case, but in all similar cases where, it may be, some little trespass is likely to be committed in getting at our desired standpoint. It is not to the credit of the photographer of the present day to take "French leave" everywhere, or to rudely fix up his camera in front of any private residence of which he may take a fancy to have a picture, whether it be the homely cottage or the princely mansion. I have more than once in my career experienced a feeling of humiliation when, on seeking the privilege of access to some place of historical interest or pictorial attractiveness, I have been met with a complaint of some such liberty having been taken by someone previously, without permission being sought for and obtained—a course of conduct which has been strongly denounced as a piece of rude impertinence.

Leaving Moreton Old Hall by way of the turnpike road, and passing the new Hall, a walk of about two miles brings us to the village of Astbury, the lofty spire of whose noble church is seen for a considerable distance, and serves the purpose of a landmark in guiding us to the place. The village is a good deal screened on the east and south sides by gigantic trees, and it is not until we actually enter the graveyard that we realise the extent and beauty of the church. There is a unique gateway leading into the churchyard on the west side, and entering from the village, the lines of which compose well with the church and surroundings from two or three points of view. The interior of the church is very fine, and is said to contain the best rood-screen in Cheshire. It also contains some good stained glass and well-carved choir stalls. The spire is partially detached from the body of the church on the north-west, and makes a good picture on that side, when taken from a corner of the yard showing the east windows. There is also a good view to be obtained from a field on the south side, taking in some of the large trees to which I have already referred. Altogether I should say a good afternoon's work could be done in connection with the church alone.

The nearest railway station from here is Congleton—a distance of about two miles; but the town of Congleton is some distance from the station, and it would, therefore, be preferable, if it be visited at all, to take it *en route* to the station. It is a somewhat roundabout way, certainly, of getting to the station; but, if there be sufficient time, one or two good subjects may be found in the town—notably the Black Swan, which is another example of the "magpie." The state of decay into which many of our fine old buildings are falling leads me to think that photographers may spend a portion of their time usefully, as well as pleasantly, in securing negatives of this class of subjects from all good examples which may be conveniently approached.

Mr. Henry Taylor, architect, of Manchester, has now in the press a very interesting work on the principal old halls and churches in various parts of England, and I believe those of Cheshire and Lancashire will be largely treated, and copiously illustrated with carefully-executed bird's-eye lithographic views—a method which brings at once the plan and style of a building more completely within mental grasp than any other form of delineation can possibly do. The high appreciation in which a work of this nature is held has been attested by the fact that within ten days from the publication of the prospectus the whole of the issue—four hundred copies—was subscribed for.

J. POLLITT.

THE NEW PATENT LAW.

FOR the guidance of the public, pending the completion of the new Rules under the Patents Act, the following information has been issued by direction of the Board of Trade:—

1. Applications and all other documents will be required upon strong wide-ruled foolscap paper (written or printed on one side only), having a margin of two inches on the left-hand part thereof. The use of parchment will be discontinued. Copies of specifications will no longer be required.

2. The sizes of the drawings will remain unchanged, but they will be required upon drawing-paper instead of on parchment. A copy of the drawings will be required upon thin Bristol board.

3. Forms of application (stamped) will be placed on sale at the chief post-offices in the United Kingdom.

4. The forms required for an application will be (*a*) for provisional protection; application form and form of provisional specification; (*b*) for complete protection; application form and form of complete specification. Where a complete specification is not left in the first instance it may be left at any time within nine months after application for provisional protection.

5. The fees will be £1 for each stamped form of application and £3 for each stamped form of complete specification. No fee will be charged for the form for provisional specification.

6. Applications may be left at the Patent Office or sent by post. If sent by post they must be addressed to the Comptroller, Patent Office.

7. The "Declaration" in the application form must be made by the inventor or inventors. All other documents may be prepared and signed by agents.

"Applications" for letters patent made during the present year must be proceeded with in accordance with the existing laws and rules.

A FEW NOTES OF A TOUR FROM MAINE TO CALIFORNIA.*

OUR footsteps were now directed to the Baltimore and Potomac depôt. We took a Pullman sleeping-car, which runs through to Louisville, without change, by the Chesapeake and Ohio railway. This line, which now forms one of the main trunk lines from the Atlantic sea-board to the Ohio river was commenced a few years before the late war. It was not long before the inspectors discovered the great mineral wealth of the mountains which the line traverses. Along this route the scenery is grand beyond all description. We had been comfortably snoozing away the dark hours of the night in our

* Continued from page 627.

nk in the Pullman car, and awoke with the dawn to view a panorama of enanting loveliness. As the darkness takes flight we pull up at the Kanawha lls, perhaps a little disappointed through the over-exaggeration of the pend-ink enthusiast that we had been reading. But all is made up ere we oceed far by the banks of this winding river—the ever-changing beauty this turn and that, clinging to cliff and crag, and whirling by precipitous ights that seemed to have been erected by nature as battlements for the fence of the valleys below. The train hurried on till we reached the io river. We followed its course for fifteen miles, and entered the Swisse mountain scenery of Eastern Kentucky. The historic interest of the intry through which we passed is not less interesting to the student of ent events. Just beyond Charlotteville is the University of Virginia, iere many of the great American statesmen have graduated. A little ther on we have the Virginian Military Institute, which is esteemed the st in reputation in the Southern States. On the adjoining ground is the ashington-Lee University, founded by General Washington, and afterrds presided over by General Lee. Lexington is the general's last ting-place. Stonewall Jackson and many other eminent officers are also tombed here. We next passed the famous battlefields of Manassas, Bulls' in, and many others of less importance, and reached Louisville, putting at the Galt House. The city is well laid out, the streets are lined with ady trees, and the residences are noted for their beauty. Our next place s Cave City, upwards of eighty miles south of Louisville. We then had journey of eight miles by stage in order to reach the famous Mammoth ve of Kentucky. Much has been written about its wonderful caverns, ers, and lakes, eyeless fish and fish with eyes that have no sight, and ists have been engaged in picturing its domes and pits; but all have consed inability to do so. The raging sea and the rising sun from the mounn peak have not been more difficult to place on canvas than the wonders this underground labyrinth. We spent four or five hours in exploring its dless caverns, and found after this fagging journey that it would have cen six or seven hours more to have explored its greatest wonders. One rious fact with regard to the temperature is that it never varies; the thermeter stands at 55° throughout the year. We now returned to Louisville, k up our abode in the Pullman car, and found ourselves in the morning St. Louis. Our first inspection was the great steel bridge crossing the ississippi river, connecting the States of Illinois and Missouri. It is built two storeys—the lower for the railway traffic and the upper for carriage d footways. The river boats cause considerable wonderment, owing to eir great size and height. We took the Chicago and Alton rail, one of the st roads in the West, for Kansas. Sixty miles from Kansas city is Topeka, e capital of Kansas. The State House here is one of the finest in the est. The Aitchison, Topeka, and Santo Fè R. R. has its head-quarters re. This line runs through the famous Golden Belt: this name is given it because of its great fertility. Kansas is 404 miles east and west. In ssing the vast meadows of Kansas one sometimes gets a glimpse of the er and antelope. The buffalo has long ceased to come within sight of the n horse.

We next crossed the boundary line into Colorado, and soon got a glimpse the Rocky Mountains, still upwards of ninety miles distant. Pike's Peak on comes in sight, which is computed to be at a distance of 150 miles. hen we reached Pueblo the great mountain range came better into view, d the black fissures became more distinct. Pueblo is the chief city of uthern Colorado. From here we took the Denver and Rio Grande rail-y. This line has been the means of rapidly developing the resources of lorado. The route, being so picturesque, has been designated the scenic e of America. It runs north and south from Denver to Santa Fè—a tance of more than 300 miles. The Denver and Rio Grande R. R. sses the Rocky Mountains eight times, some of the passes reaching an vation of nearly 12,000 feet. In four instances it reaches a greater ight than any other railway in the world. The next place we come to is anitou, passing the Colorado Springs. In this delightful retreat we spent ne little time, enjoying carriage drives to the Iron Spring, the Ute Pass, d Garden of the Gods. At every turn we saw some curious freak of ture in a blind effort at architecture and sculpture—stupendous castles nging to the cliffs, towers and minarets, Gothic pulpits in niches—all ads of silaceous formations balancing rock-cone colossal columns, and a ousand other forms that excited wonder and admiration. The Garden of e Gods is a lovely park of 500 acres, peopled with strange rock caricatures, ne of them standing at a height of nearly 350 feet. The sandstone out which these various carvings have been effected is a brilliant red lour.

We left Manitou with many wishes that our stay could have been proaged, all declaring that scenes such as we had been enjoying could never witnessed again, unless by some happy circumstance we might revisit anitou. We took a special train for Denver, passing through the famous onument Park, the train spinning along the base of Pike's Peak, and irting the Rocky Mountains. This day's ride of eighty miles was ignificent. Denver, the capital of the State, has a population of forty ousand; ten years ago it had not more than fifteen thousand. The eets are beautifully laid out, and the mining princes have some ignificent residences. The smelting furnaces in the vicinity of Denver e the largest in the country. One of them has an ore house upwards of) feet, and another adjoining 300 feet, in length. We were very urteously shown over the works, and saw the various processes. We t Denver delighted and edified. We now commenced the ascent of the ountains in Colorado, and after a night's journey reached La Veta Pass. r nearly a mile the ascent averages 213 feet. The elevation of this pass 9,339 feet—twice as high as any of the passes of the Alps. The air is ghly electrical; we felt so buoyant we fancied we could jump over the on. The descent on the other side is not nearly so precipitous, but the enery continues to be magnificent. We reached Alamosa in time for nner, and then continued our journey further into the mountains, and tered the over-awing Toltec Gorge. Sometimes the mountain stream is en and heard gurgling along a thousand feet below; for ten miles the imessiveness of scenery is of unequalled grandeur. The territory of Mexico we next invaded. Entering by the wonderful Raton Pass, we crossed a range of mountains in striking contrast to the monotonous Plains of Kansas.

(To be continued) J. G. Tunny.

RECENT PATENTS.

APPARATUS FOR WASHING PHOTOGRAPHS.

This invention, by James Weaver Tattersall, received provisional protection only. Its object is to wash photographs on paper and glass more expeditiously and more effectually than hitherto.

I accomplish my object in the following manner: I construct a casing of zinc, tin, wood or other suitable material for a small business, and for large businesses I fit up a room. Into the case or room, as the business requires, I so arrange piping connected with the town's main or other water supply, with jets, so constructed as to break up the water issuing from such jets into fine spray; this spray is brought into either direct or indirect contact with the photographs, which in one case I place upon trays above the outlet for overflow, and in the other somewhat below such overflow.

I know of no mode of washing by any apparatus which will accomplish the effectual washing in less than four hours. By my improved apparatus I can effectually wash photographs in less than thirty minutes.

Our Editorial Table.

Woodburytype Colour-Printed Photomicrographs.

In a reprint from Dr. Stacks's paper on the *Replantation and Transplantation of Teeth (Trans. of the Acad. of Med., Ireland,* vol. i.), kindly forwarded to us by Dr. R. A. Hayes, of Stevens' Hospital, Dublin, and containing four microphotographs (photomicrographs) by him of the sections of such teeth, prepared by P. S. Abraham, Esq., M.A., the Curator of the Museum of the Royal College of Surgeons, Ireland, we gladly notice an attempt to convey, by the colour of the prints, a faithful rendering of the stained sections as seen under the microscope. Of the value of the pathological or regenerative changes discovered in the sections we can form no opinion; but certainly the attempt made by Dr. Hayes, by having the negatives printed by the Woodburytype process in the same colour as the stained objects, appears to us to be quite worthy of further efforts.

We are not aware that such a method of printing has been before applied to photomicrographs of stained objects. We feel, however, somewhat doubtful whether the negatives, if taken from unstained sections, would not have yielded more detail. We are perfectly aware of the value of staining for differentiating purposes; and if the Woodbury process admitted of double printing, then we should have the full value of copying the object as seen when double stained. We would suggest, for Dr. Hayes' consideration, the experiment of taking photographs of the objects before and after staining, and silver print them; also to have the prints of the negatives, after staining, printed of the same colour as the stain used. This would largely help to determine which method in the print yields the greatest detail, as seen in the same object under the microscope. We notice the print *fig.* 4 (× 200 diam. of the pulp of the tooth of one of the sections) is very good, and is apparently more in actinic focus than the others, though this may arise from some difference in the thickness of the sections as well as from their intense colouration. The negatives, we learn, in the reprint were produced by the aid of the oxyhydrogen light, the objectives used being a one-inch and a quarter-inch Powell and Lealand, the achromatic condenser stopped down by a pinhole cap, and no allowance made for the difference of the visual and actinic foci.

We trust Dr. Hayes will continue his experiments and thus further help forward the subject of photomicrography, to which we are now, by a series of leading articles, attempting to direct the attention of our readers.

"Our Baby." By C. Johnson, 43, Nethergate, Dundee.

This little photograph of a negro baby bids fair to rival in popularity Rejlander's famous "Ginx's Baby," which had such a run some years ago. Mr. Johnson, the late Secretary of the Dundee and West of Scotland Photographic Association, has been fortunate in securing such a subject, about which there hangs quite a story of romance. Alino Eso was one of twins born at Old Calabar, and in accordance with native superstition should have been sacrificed, the other one having been actually poisoned by the mother. Alino Eso—or, as she has been rechristened, Annie Jane Annan—was, however, saved from sacrifice by Miss M. Slesser, a missionary lady, who has adopted her, and so been the means of giving to the public one of the most comical little pictures we have seen for some time.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 31	North Staffordshire (A. Meet.)	Town Hall, Hanley.
November 1	London and Provincial	Masons' Hall, Basinghall-street.
,, 1	South London	Society of Arts, John-st., Adelphi.
,, 1	Leeds (Annual Meeting)	Mechanics' Institute.
,, 1	Bolton ,, ,,	The Baths.
,, 1	Glasgow	172, Buchanan-street.
,, 1	Dundee	Lamb's Hotel, Reform-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The technical meeting of this Society was held on Tuesday last, the 23rd instant,—Captain W. de W. Abney, F.R.S., in the chair.

As had been announced, the evening was devoted to the display and explanation of the apparatus included in the Exhibition. As these exhibits have all been either described already, or will be found to be fully dealt with in another column, it will suffice here to mention them merely, and give any remarks of general interest which were called forth by the various appliances and the demonstrations of the method of using them.

Mr. Dale showed the combined changing-box and dark slide introduced by Mr. J. H. Hare and himself.

The Chairman did not like changing-boxes, but there was a look about this one which he did like.

Mr. Samuels showed a camera with a changing-back, to which boxes of plates could be supplied and fresh plates brought in in place of the exposed ones with extreme rapidity. Admiration was expressed at the ingenuity of the arrangement by which this was brought about.

Mr. Geo. Smith exhibited a brattice stand, in which some modification had been introduced since it was shown last year. Mr. Smith showed a double dark slide and a bellows extender for the camera front, which appeared remarkably rigid. He also exhibited a camera stand, which, from the shortness to which it could be reduced for packing, he called the "portmanteau stand." He further exhibited a folding camera, the sliding body of which worked in a V-shaped groove. By this means he considered the rack and pinion were kept better together to their work. Mr. Smith showed a camera with front falling down to form an extending baseboard. The pinion working on the rack was peculiar. The right-hand end was furnished with the usual milled head for working the pinion in focussing the camera; and the left hand had another milled head which, upon being turned, tightened the pinion and kept it from working further along the rackwork.

Mr. C. Sands showed a camera-finder and view-meter, also one of his shutters, which had an additional adaptation to take the usual diaphragms. He also exhibited a folding dark-room lantern, adapted for both oil and candle.

Messrs. Dring and Fage showed a camera, by Professor Stebbing, for films on rollers, which we described when that gentleman exhibited it at a meeting of the London and Provincial Photographic Association.

The Chairman thought that there should be some method of measuring precisely the amount of film wound off for each exposure, as any given movement of the roller would wind a larger quantity when full than when only a few layers covered it.

Mr. Watson exhibited a camera and method of using it. For use in climates where there was danger to the bellows from insects he made the latter of Russia leather.

The Chairman had not found that Russia leather possessed the immunity from insect attacks that was attributed to it. He thought the idea rather a superstition than a fact.

Messrs. Marion and Co. showed a modification of Cadett's pneumatic shutter, in which the moving part was a shutter working in grooves instead of a flap. The same firm also exhibited a box for carrying camera, &c., and changing plates by feeling—the contrivance of Mr. Cowan.

Mr. W. E. Debenham said that it was quite practicable to change plates without seeing them. He had done this, using a black bag for the purpose. He had attached to the back of each plate in the box a label projecting about half-an-inch above the top of the plate. This served to mark which was the back, and as he tore it off when placing the plate in the slide it could be told at once which plates had been out of the box for exposure.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 18th instant, Mr. W. J. Orsman occupied the chair.

Mr. A. Cowan showed a frame containing two dozen transparencies on gelatino-chloride plates, all printed from the same negative, and all exposed for the same length of time—five seconds—to ordinary daylight. They had been developed with various modifications of the citrate and oxalate developers, and exhibited great variety of tones. The development had been stopped, in each case, as soon as the proper depth had been reached; and the time that had been occupied in development and the particular developer used was noted in each instance. Four of the most characteristic results were produced by the following formulæ:—

Acid Ammonio Citrate of Iron.

Citric acid	180 grains.
Water	1 ounce.
Carbonate of ammonia	60 grains.

To three parts of this add one part of—

Sulphate of iron	140 grains.
Water	1 ounce.
Sulphuric acid	1 drop.

Ferrous Citro-Oxalate Developer.

Neutral citrate of potash	135 grains.
,, oxalate ,,	44 ,,
Water	1 ounce.

To three parts of this add one part of—

Sulphate of iron	140 grains.
Water	1 ounce.
Sulphuric acid	1 drop.

Magnesium-Citrate Developer.

Citric acid	120 grains.
Magnesium carbonate	76 ,,
Water	1 ounce.

To three parts of this add one part of—

Sulphate of iron	140 grains.
Sulphuric acid	1 drop.
Water	1 ounce.

Sodium-Citrate Developer.

Citric acid	120 grains.
Sodium carbonate (common washing soda)	205 ,,
Water	1 ounce.

To three parts of this add one part of—

Sulphate of iron	140 grains.
Sulphuric acid	1 drop.
Water	1 ounce.

No restraining haloid was used with any of these solutions. The excess of citric acid in the first formula appeared to act as a restrainer. The time required in each developing solution was very different. The first solution required four minutes and gave a warm brown tone. The second developed in one minute and the colour of the image was of a rich black. The magnesium-citrate developer gave a much warmer colour and took eight minutes. The sodium citrate acted still more slowly and gave a very warm colour. On the whole, for his own taste, Mr. Cowan preferred a mixture of the magnesium citrate and the ferrous-citro oxalate—three parts of the former and one of the latter giving a very good result. So did equal parts; and in this case the development was quicker, being completed in four minutes. The developer in each case should be acid. If it were neutral, or with only a trace of acid, green fog resulted. If the acid were twenty per cent. in excess of that required to neutralise the alkali the result was brighter. The colour of the magnesium-developed pictures did not alter in drying.

Mr. A. L. Henderson inquired whether the warm tones did not change in time.

Mr. Cowan replied that he had some that were made eighteen months ago, and they did not show any change.

Mr. A. J. Brown could see no reason why the redder prints should be less permanent than others.

Mr. W. Cobb thought that developed prints were less liable to change than those printed direct. He had lately seen some that were produced twenty-five years ago by Sutton's serum of milk process, and they now looked perfectly fresh.

Mr. J. Barker said that colour was due to organic substance. Chloride of silver, alone, changes to black.

Mr. Henderson inquired whether Mr. Cowan had examined the images under the microscope to see whether the deposit was coarser in the black-toned prints.

Mr. Cowan had not done this.

The Chairman suggested that three specimens of characteristic colour should be enlarged to see and examine the grain. He thought that organic matter had nothing to do with colour.

Mr. Henderson produced some negatives showing pinholes; one of the plates and some emulsion had been sent to him by a photographer in the country. He had filtered the emulsion through wash-leather, but the spots still appeared. On one plate which had been washed for a long time the spots disappeared.

Mr. Barker considered the spots were due to iodide of silver.

Mr. A. Haddon thought they were not due to iodide but to the gelatine. At a previous meeting he had shown a plate with spots resembling these and which he had traced to the particular sample of gelatine.

Mr. Henderson thought the spots were caused by sulphate of silver.

Mr. W. E. Debenham suggested that sulphate of silver would be decomposed by the excess of haloid used in making the emulsion.

Mr. Henderson showed a plate which in part had been reduced in intensity by the fumes given off by a solution of cyanide of potassium. It was necessary for this action that the film should not be dry, and that there should be access of air. The plate in question had been placed half over the side of a dish containing the cyanide solution, and that half was very much thinned. There was no sharp line of division between the two halves of the plate. The first action was to remove any green fog that might be present. Afterwards the image was gradually removed. He had kept the plate about half-an-inch from the surface of the solution.

Mr. Cobb had tried this vapour plan for reducing, but had not succeeded.

Mr. F. W. Hart said that the carbonic acid present in the air decomposed the vapour given off from the cyanide, and formed ammonia. Cyanide of ammonia was then formed and acted upon the silver of the image. Being deliquescent there would be no crystals in the gelatine film to denote its presence.

A question was read asking for a good method of locally reducing negatives.

The Chairman suggested the use of a camels'-hair brush and a solution of perchloride of iron.

Mr. Henderson said that the negative might be rubbed thinner with pumice powder.

Mr. Barker said for very dense negatives he preferred flour emery, and for thinner ones rottenstone.

Mr. Hart preferred iodine and cyanide of potassium.

Mr. Debenham said that a solution of chrome alum and ozone bleach, followed by immersion in hypo., answered well.

Mr. Henderson remarked that he had used chrome alum and ozone ach, followed by cyanide. The plan gave a negative of beautiful inting character and colour, like a wet-collodion plate.

Mr. J. B. B. Wellington showed a transparency which had been tensified in three divisions. The first with bichloride of mercury alone, e second with bichloride combined with bromide of potassium, and the ird with bichloride and a soluble chloride added. The second half did ot blacken under the subsequent action of ammonia as the others did, d he wished to know why the addition of bromide had caused this effect. ll three blackened under cyanide and silver.

Mr. Debenham said that there was no necessity to assume that a black y-bromide should be formed by the addition of ammonia corresponding ith the oxy-chloride produced with chloride of mercury.

Another question was read:—"Why does a phosphorescent plate become hite when exposed to daylight after it has been for some time kept in the ark?"

Mr. Debenham said that on being exposed to light it became sensitised, and gave out phosphorescent rays. These being somewhat violet colour gave, in combination with the yellowish colour of the tablet itself, whiter colour than the unsensitised tablet possessed.

Another question was read:—"How much flux should be added to silver esidues for reduction?"

The Chairman said that the theoretical quantity was one-third of the lver, but it was better and more usual to use equal parts.

Mr. Barker said that the best plan was to put the mixture into the elting-pot by degrees. There was then always a good excess of flux resent.

Messrs. James Burgess, A. S. Cranbrook, E. Morrow, and W. T. Vilkinson were elected members of the Association.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

'he ordinary meeting of the above Association took place on Tuesday, the th instant, in the College of Physical Science, Newcastle-on-Tyne,—Mr. P. M. Laws in the chair.

The minutes of the last ordinary meeting were read and passed. Mr. Day and Mr. Balsdon were elected members by ballot.

Several questions found in the box were discussed.

A lantern exhibition was then given by Mr. Payne of slides lent for the occasion by Mr. Templeton and Mr. Welford. Some by the latter gentleman, showing the kind and quality of pictures which can be taken with a guinea set of apparatus, were much admired.

The meeting terminated with votes of thanks to the Chairman and Mr. Payne.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The annual meeting of the above Society was held in the Masonic Hall, on Tuesday, the 2nd instant,—Dr. Morton, President, in the chair.

The minutes of the last meeting having been read and confirmed, and business arising thereout discussed, the accounts for the past year were presented, having been audited by Messrs. Collinson and Yeomans, who reported a substantial balance in favour of the Society. The election of officers was then proceeded with, with the following results:—*President:* Councillor T. Firth.—*Vice-Presidents:* Dr. Morton and G. V. Yates.—*Treasurer:* W. B. Hatfield.—*Council:* Messrs. Rawson, Yeomans, and the officers.—*Hon. Secretary:* J. Taylor, Holland-place, London-road.

The thanks of the Society were voted to the retiring officers for their services, to which Dr. Morton briefly responded.

Mr. Firth then took the chair, and in doing so expressed the hope that the next year would be more prosperous, photographically speaking, than the last, and that some good work would be shown at the approaching exhibition.

The proposed exhibition then came up for discussion, and a committee was appointed, together with the officers, to make all necessary arrangements. The exhibition will be held early in January.

It was also resolved that the next meeting be preceded by a substantial tea to be provided by the Steward.

The meeting was then adjourned.

Correspondence.

PHOTOGRAPHY AND ART.

To the Editors.

Gentlemen,—Mr. H. Norwood Atkins, in comment on my views on Art *versus* Photography, seems to think that I "have not the courage of my opinions." I don't see how my opinions could be more clearly expressed than in saying that as photography is a process or combination of processes it is not, and cannot be, Art; and that, therefore, a photographer *as such* cannot be an artist in the primary and direct sense of the term. To talk of the "ideal" in any connection with photography is a curious confusion of terms which I cannot controvert, because I cannot comprehend it; and the funny *reductio ad absurdum* of Mr. Atkins—"that because a photographer is at the last moment compelled to uncap a lens he must not be considered an artist or his work be called art"—ought to have been sent to *Punch.* The difficulty is not in his having to "uncap a lens at the last moment," but in his having to use a lens at all. An artist, in the sense in which we use that word, means one who designs; that is, puts a picture or statue of his mental construction into such a material shape as may be recognised by other men. Without the power of conception lying behind the pencil he is not an artist, even if he paints.

The distinction of colour which Mr. Atkins holds to is no distinction at all, because artists do not always use colour. Designers commonly work in monochrome and sometimes merely in outline, but that makes no community on artistic grounds with photography. Etching and sculpture are both designs; but what excludes photography from the realm of design, imperiously and uncompromisingly, is that in the result, were it ever so perfect, there is no element of design, but the chemical reproduction of what nature has placed before the camera.

When we say that a thing is artistic we mean to distinguish it from art by characterising it as in a certain measure resembling art or what an artist would create. A certain bit of landscape, for instance, comes so nearly into the arrangement that an artist would have made that we call it an artistic bit; anything which simulates design, either in composition or colour, we call artistic. All that a photographer can do is to recognise and select those accidental phases of nature's work in which the most distinct hints towards an ideal or perfect combination are given him—an operation which we characterise as the exercise of taste. When a photographer succeeds in an eminent degree in this he is properly considered "artistic," but this is no more design than any other photography. An "artistic" person is a person of taste, be it in dress, landscape, gardening, or even humbler occupations.

There is at the bottom of Mr. Atkins' ideas on this subject a grave delusion. He speaks of a photographer as studying "nature's moods." Now Nature has no moods at all, and the poetic exaggeration which makes her sympathise with *our* moods must not be made a basis for an argument. The moods are the artist's, and the expression of them by the artist, through symbols and forms or shades chosen from those which nature presents to him, has no analogy whatever with those uses of the same facts which the photographer makes. A photograph is the record of a fact, nothing more; and the quality is that of nature, not of art.

"The laws of art guide the beginner as to arrangement of lines, proportion of light and shade," &c. But this is just the difference: the laws of art guide the artist to wise and effective design, and he *creates* his forms accordingly; the photographer must wander about till he finds them made for him, and must take them as they are. The artist never finds them absolutely what he wants, and modifies them more or less to make them so, or creates entirely; but what is before the camera is reproduced faithfully, but slavishly—mechanically; and no perseverance in previous subject-hunting, and no judgment in choosing when found, will modify in one hair's breadth what the lens conveys to the plate. The most melting mood, the most poetic associations in the photographer's mind, do not flow into the plate or modify the impression; while it is just this modification of what one sees which makes the artist *par excellence.*

It may, again, be easy to "imagine that artists of a certain class will always run down photography;" but it is certain that these will be of doubtful position as artists. The true artist is a lover of Nature, if not a slave to her; and will always have a just appreciation of photography—neither over-estimating it or "running it down." W. J. Stillman.

Florence, October 16, 1883.

THE RECENT COPYRIGHT CASE.

To the Editors.

Gentlemen,—It is one thing to "join in a discussion," but it is quite another matter to persistently ignore the main point of that discussion—the meaning of the word "author"—and by way of attempted excuse for grievious ill-doing, to hurl an unfounded stigma upon an honourable profession.

This is the course adopted by the arch-apologist for the pirates—the defendant in the recent case—who in his last letter unblushing asserts it to be "no secret that it (copying) is a pretty general custom amongst photographers." We are not considering the legitimate reproduction of family reliques, of works of art, of trade patterns, &c., with the full sanction of all concerned, and which reproduction is part of every photographer's business. Our concern is with immoral copying, with fraudulent copying, with the surreptitious filching of other men's brains without question or acknowledgment; and I pronounce it a deliberate insult (if nothing worse) on our body to be plainly told that "whatever the moral aspect * * * it is a pretty general custom amongst us." Mr. Jackson must be perfectly cognisant of the nature of his remark, for he expressly states, "whatever its moral aspect." This clearly shows that the subject of his thought is one of *questionable morality;* and, therefore, on the part of the profession, I beg respectfully to cast back this very ungenerous and most untrue accusation.

As a rule, photographers have no particular liking for copying of the legitimate description; but it is too gross to class us all with the "smudgers"—with the individuals who would plant a lens in a back yard in front of anything so long as they received their miserable share of the plunder by their guilty appropriation of other people's labour.

It is no answer to me that "the leading London publishers copy very largely;" and here is another statement at variance with fact, because

the leading houses do not produce at all—they simply receive and publish the choice productions from our best men all over the country. And, let me state, that so careful are these men of their reputations that in more quarters than one have I known of prints being destroyed as unfit for the London market solely because of most minute deviation from a perfect harmony in them. I grant there are "producers" who are their own publishers, and who, to meet a demand, will reproduce their subjects, and in such a manner as to lose all beauty they originals possessed; and I have seen these "smears" duly affixed—with the name of the house attached—to the "cheap boxes of cigarettes," thereby making the aforesaid boxes "hideous." But, then, the house in question is simply "copying" *its own property*, and I imagine even Mr. Jackson will not question the right of this house to do as it will with its own.

But here comes the trouble in the shape of the piratical copyists who follow suit on these very subjects and share profit with the "house" without permission, without liability, and against the will of the owners of the property. Perpaps Mr. Jackson, being in that state of mind best described in his own language as free from "much uneasiness"—I say, perhaps he will give us his ideas on this turpitude, this system of fattening on other people's brains without permission and against consent; and perhaps he will sympathetically enlighten us with the name of one of his "London publishers" who, when enabled to do so with impuuity, "has not scrupled to copy" in this very unscrupulous and most dishonest manner.

It is sad, from a social point of view, to find morality sunk so low that this state of things—the moral turpitude we have under consideration—shall actually find one amongst us courageous enough to say a word in its defence; and the existence of the cancer is the most potent argument for a speedy reversal of an erroneous judgment—a judgment founded on a corrupted signification of a common English word, and in an utter forgetfulness of the etymology of that word. The judges have not even a loophole in the derivation of the Latin from the Greek being in any way false—*augere*, from *αυγω*; that is, *αυξανα*—to increase, to grow large—and so, too, the Sanskrit, from which the Greek is derived.—I am, yours &c., AUDI ALTERAM PARTEM.

October 22, 1883.

EXCHANGE COLUMN.

I will exchange THE BRITISH JOURNAL OF PHOTOGRAPHY for *Photo. News*, posted on Mondays.—Address, W. WALKER, 156, Noel-street North, Nottingham.

I will exchange one dozen each of Bennett's dry plates, half- and whole-plate size, for a solar enlarging lantern.—Address, J. COLLIS, Miskin-street, Cathayes, Cardiff.

Wanted, in exchange for Lancaster's *carte* lens and camera, a quarter-plate apparatus, *Le Méritoire*, by same maker.—Address, FOX AND KERSHAW, Whitaker-street, Batley, Yorks.

Wanted, a half-plate tourist camera, with good triplet lens, in exchange for a 10 × 8 camera, nearly new, latest improvements, extending bellows front, for copying, &c., lowest value £5 10s.—Address, W. H. BRYANT, 1, Castle-terrace, Bruce Castle-road, Tottenham.

Splendid dark lens for plates up to 15 × 12 in exchange for approved cabinet or promenade portrait lens; is on high wheels, light running, and convenient. Photo. of lens, packed and in use, will be sent to correspondents enclosing stamped envelope.—Address, in first place, OPERATOR, c/o J. E. J. Bunn, Photographer, Brading, Isle of Wight.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

C. Johnson, Dundee.—*Photograph, entitled—Our Baby.*

E. Eccles, Bury.—*Two Photographs of Rev. John Adcock.*

A. G. Massey, Belfast.—*Groups of Sir Stafford Northcote and Party.*

Adam Pearson, Newcastle-on-Tyne.—*Photograph, entitled—The Obstructionist.*

ERRATA.—A typographical error occurred in our last number in the title of the newly-published instructions in connection with the registration of paintings, drawings, and photographs. These were described as issued under the "*new* Copyright Act, 25 and 26 Vic., c. 68." The Act 25 and 26 Victoria is the Act of 1862.——In the same number, page 616, first column, line 13 from top, for "Wenhom" *read* "Wenham."

J. S.—Your diagram shows the lenses arranged in their proper position.

JAMES ANNELLEY.—We cannot answer the question. Why not write direct to Mr. F. York for the information?

A. W. BEER.—We are much obliged for the suggestion, but regret we cannot avail ourselves of it at present.

A. J. P.—This correspondent does not give his name and address. Agreeably with our often-expressed condition, in such cases, we must decline to answer his queries.

B. S. KING.—Yes. What is there in the forthcoming act to prevent you patenting an invention of this class, provided it be original? Clearly you are labouring under a misconception in the matter.

GUY.—The best information we can give you on the subject is that contained in our ALMANACS for the present and last year. If you read carefully the articles to be there found you ought to succeed.

S. J. B.—We have not seen any work on the subject; but we believe some of those who give instructions publish a pamphlet. Whether you can procure a copy without taking lessons we are unable to say.

S. H.—If you had read the Journal for last week you would have seen the regulations for registration. If you send the photograph to our office, together with a postal order for one shilling and sixpence, we will effect the registration for you.

I. W. PRICE.—The best information on the subject is that contained in the series of articles on photo-mechanical printing, which appeared in our volumes for 1878-79, by Mr. Thomas Bolas, F.C.S. You cannot do better than refer to them.

WM. SEDGWICK.—If the gelatine films are too brittle, when stripped from the glass, it may in future be avoided by the addition of a little glycerine to the gelatine solution. A very small quantity will suffice. If much be added the films will become moist and limp in damp weather.

MANCUNIUM.—Both the lenses you have are exceedingly useful instruments. If you part with either we should say the wide-angle lens is that you can best dispose with. Wide-angle lenses should not be used except where confined space will not permit of lenses of longer focus being employed.

SOUTHEND.—1. The quickest process of making lantern slides is to print by superposition on gelatine plates.—2. Yes. Rub the back of the print with fine glass paper.—3. About two inches and three-quarters to three-inches sight. The slides themselves should be three and a-quarter inche ssquare.

G. SCHROEDER.—If you can prove the great misrepresentation you say in the profits you certainly have your remedy against the person who sold the business. We are sorry we cannot assist you. The only advice we can give is for you to consult a respectable solicitor, detailing to him all the circumstances of the case.

AMATEUR WORKMAN.—Take ordinary brown, hard varnish and add lamp-black until a trial proves that sufficient has been added to give a perfectly black coating when dry. Possibly two or three coats will be required to render the work of the character you desire. Sometimes a small proportion of indigo added will improve the black.

T. H. HOLMES.—The picture is one by the old Talbotype process, and has certainly kept its colour well. It never was a rich purple tone, but much the same as it is now. You should preserve the print as a curiosity, as there are few such perfect specimens in existence at the present time. The picture has been returned as requested.

WILLIAM MELLING (Preston).—The advertisement to which you have drawn our attention was received and paid for in the usual course of business at our Publishing Office. We cannot—and do not—guarantee the *bonâ fides* of every advertiser in our pages. We exceedingly regret the position in which you are placed, but cannot see how we can aid you.

J. J. H.—1. No. The chloride of lime of the oil shops is a hypochlorite of lime. Chloride of calcium must be employed for the purpose.—2. Yes. The holes should be stopped up.—3. The sensitiveness will not be affected.—4. Of no importance.—5. From your description we can only imagine that the spots are iron rust from some portion of your boiling arrangement.

STEPHEN RAWSON.—We are unaware whether there are manufacturers of dry plates in New Zealand; but we do know that large numbers of plates are now being exported from this country to New Zealand. We certainly should advise you to learn to manufacture your own before leaving England; then you will be in a more independent position with regard to your supplies.

OXONIAN.—The spots are clearly due to the make of the paper itself, and not to the coating. If you closely examine the sheets you will see that the specks go right through, and show as much on the back as on the front. It is certainly the worst sample of paper bearing that water-mark we have ever seen. Possibly this particular batch was sold as "retrée," which is that which is rejected at the mill as being imperfect, and is then put into the market at a lower price.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday next, the 31st inst., the subject for discussion will be—*On the Reproduction of Negatives.*

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—We beg to remind all interested in this excellent Association that on Friday next, the 2nd November, the receipts for admission to the Exhibition of the Photographic Society of Great Britain, Pall Mall, will be handed over to the Treasurer of the Photographers' Benevolent Association in aid of the very praiseworthy objects it has been established to promote. We hope there will be an overflowing attendance.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual technical exhibition meeting of the South London Photographic Society will be held in the Large Room of the Society of Arts, John-street, Adelphi, on Thursday evening next, November 1st, at eight p.m. Several gentlemen have already promised valuable contributions, and it is hoped the members and friends of the Society will, as on former occasions, exert themselves to make the meeting a great success. The electric light apparatus of the Society of Arts has been kindly placed at the disposal of the committee, should it be required. The meeting for *members* will commence at half-past seven p.m., for the nomination of officers for the ensuing year.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1226. Vol. XXX.—NOVEMBER 2, 1883.

CLOUD NEGATIVES AND THEIR USE.

In continuation of the two articles published a few weeks back on the subject of cloud negatives and their preparation, it now only remains to complete the series by describing the method of utilising the negatives so obtained. In doing so we shall presume the reader to be almost, if not quite, without experience in the details of double printing, and therefore we may be excused for entering into particulars with which the more advanced operator is perfectly familiar.

In the first place, the landscape negatives to which clouds are to be added will be of various kinds, and will require various treatments. Thus, some may print naturally with perfectly-white skies, while with others the very reverse will be the case. Again: many negatives will be found to present an almost unbroken sky-line, which offers very little difficulty in masking; in others, again, trees and foliage will be found traced against the clear sky, which, peeping through the interlaced branches, renders it almost impossible to successfully mask such subjects. When, however, as in the first class of negatives mentioned, the sky prints naturally white this encroachment of foliage is of little consequence; and in other cases it is generally possible, by judicious selection of the cloud negative, to get over the difficulty in masking.

The primary object is in all instances to produce a print of the landscape with a white, or nearly white, sky; for which purpose some method of shading or masking the sky portion of the negative is necessary in the majority of cases. With a tolerably unbroken sky line there is, as we have said, comparatively little difficulty in effecting this. The negative is held against the light, while with a pencil the sky-line is traced upon a piece of white paper, which, in turn, is employed as the guide by which to cut a mask in cardboard or other opaque material. The mask should be made to overlap the landscape portion of the picture about one-sixteenth of an-inch, otherwise, upon printing, a dark line will follow the outline of the picture. A softer result may be obtained by employing a double mask, consisting of one thickness of tracing paper and one of thin card or brown paper, the former alone overlapping the landscape, while the opaque material is cut to the precise outline. Some operators prefer to block out the sky by means of black varnish applied to the back of the negative; and this is a very convenient plan, though the softening of the line of junction is not so easily effected.

However the mask may be produced, it is important that it be applied in such a manner as to show no sharp line of separation between sky and landscape, nor to permit any encroachment of the one upon the other. By mounting the mask upon the reverse side of the negative, the thickness of the glass intervening, the two portions are, as it were, vignetted one into the other; and, if the operation be properly performed, not the slightest harshness of result will be visible. It may be advisable to interpose an extra thickness of glass between the mask and the negative in order to secure greater softness in the junction, in which case the overlap of the mask must be slightly greater than a sixteenth.

It is needless to say that in any case the printing must be performed in the shade and with the greatest care; in fact, all the precautions usually observed in vignetting should be adopted. A very useful plan for lessening the trouble is to use a revolving table upon which to place the printing-frames. This can be effected by suspending a board by its four corners by means of a few strands of twisted worsted, or, better still, by attaching it to an ordinary roasting jack. When once set going the arrangement will continue to revolve in alternate directions for a very long time, and the printing-frames may be left in the full assurance that the masking will be as soft and free from abruptness as it is possible to attain by any means.

It is at this portion of the printing operation that the chief difficulties are encountered; for, when the landscape with white sky has been successfully produced, the subsequent introduction of clouds from a separate negative is comparatively easy. It is, therefore, worth the expenditure of as much care as possible at this stage. So far we have dealt only with the simple operation of masking an unbroken sky-line; if we turn, however, to a picture in which the branches of a tree cut the sky our difficulties are greatly increased. Nothing produces so bad an effect as to block out the sky *surrounding* a mass of foliage, while the portion which is seen through the interstices is allowed to remain many shades darker. Yet how often even in our public exhibitions is this noticeable!

In such cases it is practically impossible to block out the sky completely by following every outline of the foliage; but if the tint, as rendered by the negative, be not very pronounced we may often by a little "dodging" produce a satisfactory result. Thus, by selecting a cloud negative which enables us to project our foliage against a shaded portion of the sky instead of against white clouds, we render the anomaly less palpable; and if the rough outline of the trees be carefully masked the different portions of the sky may be so graded that an experienced eye can scarcely detect the "dodging."

It not unfrequently happens that a slight augmentation of the density of the sky of a negative will make it print sufficiently near to white to enable the clouds to be afterwards introduced. In order to supply the necessary reinforcement the following expedient is frequently useful. Instead of an opaque mask we use one made as follows:—Make a very deep print from the negative, and, after toning and fixing, make from this a paper negative. The sky portion of the latter, including the encroaching foliage it is desired to treat, is then cut off and attached to the reverse of the glass negative by way of a mask, allowing the same to overlap as previously described. If some little care be taken to cause the auxiliary negative to "register" correctly, it will be evident that the practical effect of this is to intensify the sky by masking just those portions it is desired to keep white. Of course the landscape half of the negative will require shading during a portion of the printing, in order to equalise the action of the light. Perhaps a better plan consists in attaching the paper negative, *uncut*, to the glass, removing, by means of iodine and cyanide of potassium, the landscape portion of the image. This obviates the necessity for shading during printing, as the retarding action of the paper is exerted equally over the whole plate.

A satisfactory print of the landscape with clear sky having been obtained, it only remains to print-in the clouds—an operation which

is far more easily accomplished than the preceding operations. We have nothing to do here with the selection of suitable cloud negatives, the importance of which is pointed out in a former article; nor with the exercise of necessary judgment as regards the depth to which they are printed as compared with the landscape. We have to deal merely with the plain operation of printing-in the clouds. This consists in placing the landscape print in contact with the cloud negative in a printing-frame, the landscape portion of the print being masked as the sky portion is at the earlier stage, though an equal amount of care is not necessary. In most cases it will suffice to interpose between the negative and print an opaque mask cut to the outline of the landscape portion of the picture, but leaving a narrow border—say a sixteenth of an inch—of the latter visible outside the mask.

The clouds may be printed on to this narrow margin, or on to any dark portions that project into the sky, without producing any effect. Indeed, the masking at this stage is so comparatively easy that many operators effect it by means of a duster or pocket-handkerchief laid on the glass of the printing-frame and pulled roughly to the outline of the landscape portion of the picture. The printing of the clouds is, as a rule, so light as to produce no visible difference in any of the darker portions of the print; indeed, it is only where high lights or very delicate half-tones exist that there is any necessity for masking at this stage.

The description of these operations may make them appear difficult and troublesome to the novice, but in themselves they really are not so. It is true there is no royal road to success in this any more than in other matters, and the beginner at cloud printing must not be disappointed if he do not succeed to his entire satisfaction all at once. Skill, care, and, above all, judgment are required. These being duly exercised the results will amply repay the amateur who is desirous of turning out artistic work.

ON THE ULTIMATE DISPOSAL OF PORTRAIT NEGATIVES.

When a portrait photographer retires from business how should he dispose of his negatives? This question—no new one be it understood—again suggested itself to our mind the other day, on a friend facetiously remarking—"I wonder how a pawnbroker manages when he wishes to retire from business, supposing no one willing to take over his pledges. He must not sell them before the stipulated time, and this never arrives so long as the interest is continued to be paid. Neither can he compel his customers to redeem the property. Does he return the pledges gratuitously?" This remark reminded us that, like a pawnbroker with his pledges, a photographer may be somewhat inconveniently placed—at least morally—with regard to the disposal of his stock of negatives, in the event of his relinquishing business.

There is no question that the negative is the property of the photographer and no one else, except under special agreement made at the time it is taken. But has he the right of disposing of it in any manner he may choose? Legally, this is very doubtful; morally, he certainly has not, as he virtually holds it in trust for the use of the sitter alone. It is customary to have, on all receipts given on payment for a portrait, an intimation that the negative will be preserved, and that copies can be had at any time. The same is also frequently stated on the backs of the cards upon which they are mounted.

Now, here is a distinct undertaking to supply prints, whenever called upon to do so. And, if the receipt, after being given, have an agreement stamp affixed, it at once becomes a legal document. It is clear that if the negative be destroyed, or otherwise disposed of, this agreement cannot be complied with; and it is possible that damages could be recovered for its non-fulfilment, as in the case of the breach of any other form of legal agreement, though, so far as we are aware, this question has never been legally contested. In former times it was usual to state on the receipt that the negative would be retained for a certain period, during which copies could be obtained, and after the stipulated time had expired the negative would be destroyed; but this custom no longer prevails, and the promise is tacitly given that the negative will be preserved indefinitely.

Tons of negatives are now in existence from which impressions will never be required, yet their owners are reluctant to destroy them, owing to the fear that if they do duplicates of some will eventually be wanted. However, it may be assumed when portrait negatives—of ladies especially—have been in existence for some ten or twelve years, and the costumes, consequently, have become antiquated, the chances of further prints being required are very remote indeed.

Formerly, when the period the negative was to be kept expired it was cleaned off and the glass used again. Now that most photographers purchase their plates ready prepared old negatives cannot be so disposed of; for dry-plate manufacturers will not take the trouble to clean and coat old glass. Many artists who have a large stock of old negatives on patent plate sincerely wish they would, in consequence of the inferior quality of much of the glass now employed. Hence many artists of old standing find themselves encumbered with a large stock of negatives, which, under the circumstances, they look upon somewhat in the light of a white elephant.

It is not so much in the preservation of the negatives that we are at present interested, but in their disposal in the event of the photographer retiring from business or meeting with misfortune, and his stock having to be disposed of under (say) a compulsory sale. Here is a case, by way of illustration, that came under our notice some years back:—A photographer, with a small but select *clientèle*, either became bankrupt or his stock-in-trade was seized under a bill of sale; but, be that as it may, the stock was sold off by public auction—the negatives, for the most part of large size, being included in the sale. These were purchased, for a merely nominal sum, by some one who realised a good profit on the transaction by printing them, and selling the impressions largely, both in London and the provinces, to third- and fourth-rate photographers for specimens—this, of course, to the sitters' great annoyance. On another occasion we know that a large number of old negatives of private individuals, similarly disposed of, were used for obtaining prints by a charlatan, who undertook to supply "a photograph of your future husband or wife" in return for so many stamps. Another portion of the same stock was utilised for supplying a negative and toy printing materials in a box for a trifling sum.

Now, it is quite clear that anyone purchasing a stock of negatives under circumstances such as those mentioned above is quite within his right in utilising them in any way he may think fit—unfortunately for the sitters, who, at present, have no copyright in their own faces. Perhaps a new Copyright Act may remedy this. Frequently when negatives are sold as old glass the faces have been previously scratched through, so they thus become valueless for printing purposes. This should always be done in justice to the prototypes. When, however, an artist sells the goodwill of his business, the negatives are always included in the purchase, and will, therefore, be carefully preserved as a source of future income. But, in the event of the business not being sold, and the photographer wishes to retire from it, what is he to do with the stock of negatives? He is under an obligation to preserve them for the future use of sitters, so that he ought not to destroy them, and he has no moral right to dispose of them in any way that could possibly cause them annoyance.

Many years back, when M. C. Silvy retired from business, after the "*carte* mania" was over, he advertised in the daily papers that all his negatives were for sale, and that his late sitters could purchase them—if we remember rightly—for half-a-guinea each. In this manner a large number were disposed of, many persons purchasing their negatives, not because they had any use for them, but simply to avoid their falling into other hands.

In two or three other instances which have come under our cognisance a far more satisfactory plan than that of M. Silvy was pursued. The artist in these cases forwarded a polite circular to all his clients, intimating his intention to retire from business, and that the negatives of themselves could be purchased for a very trifling sum—something like two shillings, or half-a-crown for the two positions—so that future copies could be printed by any other photo-

grapher, when required. Or, if a dozen copies—at a reduced tariff —were ordered the negative would be presented free of charge. The circular also intimated that in the event of no answer being received in the course of a month from date the negative would be destroyed. This method of disposal proved very satisfactory to the sitter, as well as profitable to the photographers who adopted it, as a large number of orders for copies were secured, and a still larger number of negatives were purchased, as the price was so small. Furthermore: the transaction was free from any suspicion of levying black mail, which would always be objectionable, if not actually disreputable.

STUDIO BUILDING.—RIGHTS OF LIGHT.

Before continuing our remarks upon this subject it may be as well to point out that, though in legal proceedings there is frequently joined with light a claim to "air," so that the pleadings generally are for "light and air," we may safely ignore that phase of the subject; for, in the first case, a photographer's main needs are with light, and not with air; and, secondly, a right to air can practically only be enforced when the incoming air is vitiated to an extent that would be injurious to health.

In our last issue we showed how the popular impression that a man could be punished for putting windows into a building where previously none had existed was entirely erroneous; we explained how the real question was the right to have an unobstructed light, which a moment's consideration will show is an entirely different contention.

Now, the question as to whether a man has a right to have an uninterrupted light through his windows is plainly and broadly set out in a statute which was enacted early in this century, technically cited as 2 and 3 William IV., c. 71, s. 3—a statute which did not put an end to previous principles of rights of light, but was explanatory of, and in addition to, them. We give all the words of the Act necessary:—"That when the access and use of light to and for any dwelling-house, workshop, or other building shall have been actually enjoyed therewith for the full period of twenty years without interruption, the right thereto shall be deemed absolute and indefeasible." This, too, is "notwithstanding any local usage or custom to the contrary." Hence, it would seem plain enough that anyone purchasing premises which have windows whose lights have not been interrupted for twenty years may be quite safe in building a studio with a similar aspect to that enjoyed by such windows.

There are, however, several disputed points bearing upon this particular phase that render it less simple than appears on the surface. Thus, a very common impression prevails—and not amongst laymen only, for cases built upon it have been taken into court—that any building erected in the vicinity of a window so as not to rise to a greater height than would form an angle of forty-five degrees with the horizon, will not be looked upon as an obstruction in the eye of the law. The point, we say, has been raised in the law courts, but fruitlessly, for it has been definitely laid down that no such limit can been made—that all questions of obstruction must be judged upon their individual merits. The impression has doubtless arisen through the misreading of a by-law of the Metropolitan Board of Works, which, in laying down certain rules referring respectively to the heights of buildings and the widths of streets, would seem to favour such a view.

We are not aware of many instances where photographers have sued for restitution of rights of light injured or interfered with through neighbouring illegal obstructions; but a long, costly, and celebrated trial was upon the rights of a sculptor to have his "ancient" light unobstructed. It was commenced in September, 1875, and the plaintiff was Mr. William Theed, sculptor, the defendants being Messrs. Debenham, silk mercers, of Wigmore-street, who erected premises that did not obstruct more than forty-five degrees of light, and on that and other grounds defended their erection. Mr. Theed, by witnesses and his own evidence, showed that a "low light" was necessary for the carrying on of his profession, and that his premises had previously enjoyed such a light. He gained his case, and was granted an injunction with all "the costs of the suit." The Vice-Chancellor said:—"He has proved a statutory right to the enjoyment of his light undiminished. * * * * If they (the defendants) build up to the height which Mr. Eales mentions in his deposition, the light will be greatly diminished. In my opinion they have no more right to take away the light which the plaintiff has been enjoying than they have a right to take away the front wall of his house."

This is sufficiently clear and decided, and there is little likelihood now of any such contention being started again in a *bonâ fide* lawsuit; though it is ever to be borne in mind that an unscrupulous rich man can hope to persist in an illegal course owing to the injured one not having means to sustain the heavy costs of maintaining his rights in such matters as these, and this or any other grounds would equally serve his purpose—we all know how the lamb made the mud flow up the stream where the wolf was drinking.

We may now pass on to another point, the legal bearings of which are capable of very injuriously affecting a photographer's interests. We have a case in view where this happened to a serious extent.

In the desire to possess a free and open light a photographer has often built a studio in the suburbs of a town where no buildings exist to interrupt his light, and notably is this the case at seaside resorts. Now, our readers must know that in doing this they should make special agreement about their lights not being affected by any possible subsequent building operations. If this be not done, and a special clause be not inserted in the purchase deed, the photographer, when he has established a good connection and finds the locality growing around him, may be startled some day to discover a building in course of erection, so close to his own premises as to utterly ruin his studio light when the structure was completed. This is a very hard case, and as we have said we know of one instance where at a seaside studio great expense was entailed through this want of rights. It does not matter if even the land were sold with an understanding that it was to be used for building purposes; unless a right to the lights of a building afterwards to be erected is granted and specified in the deed, there is no remedy against their being all blocked up by neighbouring tenements if the latter are built within twenty years of the former. The only alternative remedy is the purchase of the land that may be built upon.

We will conclude our remarks for this week with the removal of another very prevalent but erroneous impression that has been caused by old decisions in the law courts, and which, if admitted to be correct, would render all photographic building operations nugatory. It is commonly stated, and at one time the law held, that though a window has existed for a period of twenty years, or by express grant has a right of free light, this carries no right to any light through an enlargement thereof; and, further, that if a window be so enlarged an adjoining neighbour may erect an obstruction to prevent light coming even to the old window, if there be no other mode of obstructing the enlarged portion.

This impression prevailed largely, and still does, though modern rulings are entirely against it. In the year 1865 a great case was tried, and brought through the various courts up to the House of Lords (Tapling *v.* Jones); this point was well argued, but the judges were completely against the old rulings. We think the following short extract from the Lord Chancellor's words shows plainly the law then laid down and the principles on which it is based:—"Suppose, then, that the owner of a dwelling-house with such a window, that has an absolute and indefeasible right to a certain access of light, opens two other windows, one on each side of the old window, does this indefeasible right become thereby defeasible? By opening the new windows he does no injury or wrong in the eye of the law to his neighbour, who is at liberty to build up against them, so far as he possesses the right of building on his land; but it must be remembered that he possesses no right of building so as to obstruct the ancient window; for to that extent his right of building is gone by the indefeasible right which the statute has conferred."

THE PHOTOGRAPHIC EXHIBITION.

[Fourth Notice.]

Mr. Lyddell Sawyer exhibits half-a-dozen studies much in the style of Mr. H. P. Robinson, the best being, we think, the one we

have chosen for illustration—*Pay Toll First* (No. 6). The sketch shows admirably the composition and general character of a very effective picture. In *The Same Old Story* (No. 5) we have a very

No. 6—*Pay Toll First*. By LYDDELL SAWYER.

"hackneyed" subject — not badly rendered, however, when the photographer's difficulties are taken into account. *The Rivals* (No. 4) is scarcely up to the mark, and in *Maiden Fair, Oh! Have a Care*, &c., &c. (No. 7), we have represented a gentleman who, we should say, is not much in the habit of carrying a loaded gun or he would not treat it so carelessly. But perhaps it is not *loaded*.

Mr. Matthew Whiting's *Sea Views, Dover* (No. 92), are nearly equal in merit to the pictures of *Yachts* which secured him a medal last year, the conception and execution being alike excellent. The same artist's *Henley Regatta* (No. 93) is also a noticeable exhibit.

No. 97—*I'se Coming*. By ROBERT SLINGSBY.

Mr. R. Slingsby, who is this year one of the judges, is necessarily "out of the running," though some of his work might, under other circumstances, have fairly had a chance of recognition. The first quintett in the catalogue are rustic scenes, the best being *I'se Coming* (No. 97), of which we append a sketch. *Getting under Weigh* (No. 433) is a very effective beach study in a class of compositions to which we have no recollection of having seen Mr. Slingsby's name attached previously.

In *Spaniel* (No. 102), by Mr. Edward Darke, we have one of the most attractive and, at the same time, natural representations of animal life that we have seen produced by means of photography. Printed, as far as we can judge, in platinotype, the effect is that of an engraving in mezzotint, while the attitude of the sleeping dog is so natural that it at once arrests attention.

Mr. W. P. Marsh exhibits instantaneous views of *Goodwood Races, 1883* (No. 104), which, if we mistake not, have been already mentioned in our columns. *High Tide at Bognor* (No. 198) is an extraordinary picture—not so much of "high tide" as of "high sea," the waves breaking to a height of twenty feet or more over the pier. This is an effect which must have entailed a considerable amount of trouble in securing it. No 424, by the same artist, is a picture of similar character.

Lieutenant C. E. Gladstone, R.N., has a number of excellent landscape and architectural studies in Ireland and Spain, printed in platinotype. Two pictures of *Old Weir Bridge, Killarney* (Nos. 177-8), are amongst the best of the Irish, while No. 154 is the best of the Spanish.

Colonel Stuart Wortley's *St. Wanna Praying for a Wreck* (No. 161) is a very fine study of rock and sea. We are not acquainted with the story of St. Wanna, but we presume it is one of the legends of the Cornish coast, and that Saint Wanna is the saint of the "wreckers." *A Study at Niagara* (No. 162) is also a fine picture, and goes far to disprove the verdict recently given by a photographic visitor to the falls—that "Niagara is a 'fraud.'"

Mr. George Shaw exhibits two frames of very fine portrait

No. 163—*Portrait Study*. By GEORGE SHAW.

studies, of promenade size (Nos. 163-4), one of which we have selected for illustration.

Mr. William Adcock, whose enthusiasm in amateur portraiture and *genre* subjects is unbounded, has this year ventured upon a larger size of picture than he has previously exhibited. His *Jack Holland* (No. 354) is a very fine portrait printed in platinotype, and his *Chairmender* (No. 165), which we have chosen for illustration, is a very good study of industrial life naturally treated.

Messrs. Valentine and Sons content themselves this year with a single exhibit—a frame of *Snow Scenes* (No. 175). These are, if not

the very best pictures of the class we have seen, at anyrate nearly approach that standard, and in anticipation of the coming winter

No. 165—*A Chair Mender.* By William Adcock.

we would recommend a study of these views by any of our readers who may contemplate attempting this class of work.

Photographic chemicals are rather in requisition in some recently-published processes. "Hypo." dissolved in water—strength, ten per cent.—poured into sulphuric acid, cleared, and used as a pickle for zinc, gives a brilliant, light-green coating. Chrome alum and fresh hypo. in equal parts added to the above solution tend to the production of a brown.

None but residents in the metropolis know what London fog is like. Photographers are well aware of the dreadful filtration the sun's rays undergo before reaching their *ateliers*, high up in the air as so many of them are, though we are not aware that the amount of this actinic loss has ever been exactly figured; but some estimate can be formed by data given by Professors Roscoe and Balfour Stewart, according to whom the annual value of the sun's heat at Kew is greater than that in London, in the proportion of 100 to 58.

Comet Pons promises to furnish an interesting problem to physicists, to solve which photography will, if possible, be called into play. Many observers have noticed a remarkable fluctuation in its brightness, which it is difficult to account for on any other principle than that the comet has a light of its own. For example: the comet on September 24th, instead of showing a brightness equal to 11·12 magnitude, appeared equal to 8 magnitude, and it, therefore, had a brightness thirty or forty times that which theory indicated, according to M. Bigourdan. As soon as it gets in any way sufficiently bright we may be sure that photographs of its spectrum will be anxiously attempted.

We need not fear for the success of the results, when we have an observer such as Mr. Common, of Ealing, amongst us, whose wonderful photograph of the *Nebula in Orion* has aroused such widespread interest and admiration, and which has been worthily rewarded with a medal at the Photographic Exhibition in Pall Mall.

A correspondent of the *Athenæum*, Mr. C. B. Strutt, of 34 East-street, Red Lion-square, writes that he is preparing an account of historical chairs, and, being aware of the existence of many chairs in private hands, he would be glad to receive drawings or photographs of any such. His collection, we should imagine, would be scarcely complete without a few examples of photographic chairs—those most extraordinary monstrosities of the cabinetmaker's and upholsterer's art. In all seriousness, there must be numerous pictures of old chairs taken by amateurs that would be useful to this gentleman, and we therefore give all publicity to his request.

In a communication to the Paris Academy of Sciences, M. Marey showed how, by combining the indications of the dynamometer with those from instantaneous photographs, certain interesting comparisons might be made, and the two methods combined would form the subject of future experiments.

A new form of electric light—a semi-incandescence lamp—has been exhibited, giving the brilliancy of an arc light. Two carbon rods, slightly inclined to one another, are brought down on to a small prism of chalk, and separated from one another by a small rod of the same material. The current passes through the chalk rod and makes it incandescent, the light given being stated to be as brilliant as the arc light, while it is more steady.

Mr. Frank Geraldy has published a very complete set of statistics upon the relative cost of gas and electricity for lighting; and he conclusively shows that on a large scale the latter is incontestably cheaper so far as the actual installation is concerned, while for candle power it is immeasurably cheaper.

A considerable amount of mental exercise has lately been called forth on the vexed question of photography *versus* fine art, and now it promises to diverge into, or, perhaps, to be intensified by, a new feature which has lately been imported into what might be termed another branch of the same question—What is a photographic studio? Captain Shaw reported last Friday a big fire at the "photographic studio of the South Kensington Museum" last Wednesday week, describing it as a timber building, 36 × 15 feet, seriously damaged, and its contents nearly destroyed. The very day after the report was published, an evidently inspired paragraph states the damage would be covered by a five-pound note, and the "studio" sinks into a "shed." Evidently the feathers of authority have been ruffled; but why in this abode of fine art may not poor photography, banished to the "waste ground" at the back of the temporary post-office, possess a "studio?"

THE APPARATUS AT THE PHOTOGRAPHIC EXHIBITION.

[Third Notice.]

The various exhibits of Mr. George Smith, of the Sciopticon Company, are noticeable on account of the ingenuity displayed in obtaining fresh advantages as regards compactness, rigidity, and simplicity of construction. His improved brattice stand, while presenting the same general features of that of last year—being, like it, a handy five-feet alpenstock when closed, and when open a rigid stand sufficient for any camera of moderate dimensions—yet displays some improvements in the details of construction. The tie-rods which brace the split legs together are simpler in their nature, rendering it easier to be set up, and conferring firmness sufficient to enable the camera to be carried about on the stand—a feature appreciated by every nomadic photographer.

Mr. Smith also exhibits two portable cameras of a novel type, by which every facility is afforded for long- or short-focus lenses, and with either of which any form of shutter may be employed. The tail-board is made in three pieces, wrapping round the camera when closed like the cover of a book. The body of the camera is divided into two parts, covering up the bellows between them, and these two parts are connected with the base-board by means of brass side plates with return ends, and so can run from end to end of the tail-board. An observable feature of these side plates is their unusual lightness; but, as will be seen, this is one of their chief merits. The return ends which clip the camera body on to the base-board run in grooves made for the purpose on either side. The base-board is a fraction wider than the camera — only a shaving, but sufficient to cause the side plates to grip it quite firmly for ordinary purposes without any other fastenings. A fastening, however, is provided, and it is

very simple, consisting of a milled head on either side, connected by a wire passing through the bottom of the camera. The right-hand milled head is fastened to the wire, the left-hand one being screwed on loosely. If this be slackened the front half of the camera body slides freely along the base-board; a turn of the screw fastens it rigidly. The same principle is applied to the rear end of the camera, except that the wire in that case is a pinion. The right-hand milled head is a fixture and works the pinion; the left one fixes it securely. When posed for use on the stand the body of the camera is in place on the centre division, and the two base-boards drop down—one in front and one behind. A "stiffener," which slides in the rear one, is pushed forward and, by a concealed stop, is checked when it is exactly opposite the screw hole by which the camera is attached to the stand. By this the base-board is stiffened. The anterior half of the camera is now slided forward to suit the lens employed, while the rear end is operated on by the focussing-rack. A light framework, having in it a suitable aperture, can be adapted to the front base-board, so as to cut off all extraneous light from the plate when the focus of the lens is such as not to necessitate the camera being extended in front. Mr. Smith's new camera has not only a rising and falling front but also a swing-back; this being obtained through the agency of his universal joint, which permits a swing to the back in any direction, the normal position of this being vertical when the joint is not brought into requisition. The range of a half-plate camera is sixteen inches, its weight being under two and three-quarter pounds. There is a nice little camera for lantern pictures among Mr. Smith's exhibits. It bears the name of the "Sciopticon camera" and is constructed on the principles just described. It weighs only seventeen ounces, and has a focal range of over twelve inches. Taking the configuration of Mr. Smith's cameras as a whole, coupled with their lightness and thinness when folded up, we are inclined to believe that in the perfect tourist camera of the future, whenever the advent of that instrument occurs, will necessarily be found some of the features here described.

Messrs. Dring and Fage exhibit two specimens of Professor Stebbing's camera. As this has been described in these pages very recently (see our issue of September 28th last) it is unnecessary here to repeat the description.

Mr. H. Moorse exhibits three well-made, portable cameras with bellows bodies, also two tripod stands, which are adjustable as regards height, the legs being sliding. For rigidity and lightness these cannot be surpassed. He also exhibits an efficient drop shutter.

In a recent number we published the specification of a patent obtained by Mr. Thomas Samuels for a new form of camera back for permitting an unlimited number of dry plates to be brought into the field and changed without a tent. Two examples of this invention are exhibited. The principle of changing is suggestive of that of an ingenious invention known as Cooke's camera, which was introduced about sixteen years ago, but did not attain much popularity. In the recent invention the shortcomings of the former one appear to be quite provided for.

With the mere mention of the electric retouching apparatus of Messrs. Geesbergen and Geruzet, of Brussels—which consists of a battery with which the retouching pencil is connected and receives a tremulous motion—and a case containing a complete set of the standard screws for flanges lately adopted by the Photographic Society of Great Britain, made by Messrs. Ross and Co., we bring to a termination our notice of the apparatus displayed in the present Exhibition.

HOW TO MAKE AND PRESERVE A NEGATIVE SILVER NITRATE BATH.

As the natural outcome of the investigations which I have elaborately and carefully made on the causes operating to derange the good working of a negative silver bath, there arise the problems of how, primarily, to mix up one on true photo-chemical principles—one, in short, best suited for the work to be done; and then how to preserve such a bath in good working order for a maximum length of time.

Suppose, now, we wish to mix up a new silver bath of the strength (say) of thirty-five of grains silver nitrate to the fluid ounce of distilled water, the preliminary care must be taken to secure pure silver nitrate and also pure distilled water. The former can now be easily obtained in the crystalline form. Fused nitrate should not be trusted to for this purpose, inasmuch as it is often contaminated with silver *nitrite*, which is a lower compound than the *nitrate*, and thus possesses the undesirable propensity of producing fogged negatives. This *nitrite* is formed in the course of fusing the nitrate when the heat necessary for the purpose is brought high enough to expel oxygen from the nitric acid and convert it into the nitrous compound. This, briefly, is the reaction that takes place under such circumstances, and is manifested by the evolution of deep orange fumes, having an exceedingly pungent odour. Indeed, it is very difficult to avoid this altogether; therefore I consider it better to use, for bath purposes, the triple crystallised form, which can now be readily enough obtained at the stores of most photographic chemists.

As to distilled water: a great deal of that sold as such is water condensed from steam engines, or it may be *aqua pumpæ*. Neither of these should be used for making a negative silver bath, inasmuch as the former is sure to be contaminated, to some extent at least, with the greasy matter used in lubricating the engine. Now, this at once introduces organic matter into the bath, and will certainly prove to be the commencement of a "sea of troubles."

With respect to ordinary spring or river waters: these are generally too much impregnated with lime or other mineral salts, and very frequently with dissolved organic matter. Obviously such water should not be used for the silver bath. Rain water, again, is generally collected from the roofs of houses, and these are just those places where sparrows, &c., do most love to congregate. Now, rain water dissolves out of the droppings of these birds a considerable amount of lime salts or ammoniacal compounds. It is needless to say that such substances are very injurious in a negative silver bath. Moreover, rain water, in its passage through the air while falling, takes up many of the impurities existing there, notably in the neighbourhood of large towns.

The only distilled water that may be considered absolutely pure and, therefore, best fitted for our photographic purpose, is that condensed from stills constructed so as that the contents, and also the vapour, come in contact only with glass, or some one of those metals—silver, for instance—from which it can receive no contamination.

If I appear to be somewhat too precise on the above points—namely, the absolute purity of the chemicals employed—it is because I feel convinced, from long experience, that such appliances and care are the only means of laying the foundation for a perfect photographic tool, and one which, with due care, may be made to act efficiently for a very protracted period.

Suppose, now, we wish to mix up a negative silver bath of thirty fluid ounces and of the strength of thirty-five grains of silver nitrate to the ounce of water. Weigh out 1050 grains of pure silver nitrate and dissolve this in the requisite quantity—namely, thirty ounces—of water. When dissolved add to the solution about six or eight grains of iodide of potassium or other soluble iodide previously dissolved in about an ounce of distilled water. Glass vessels only should be used for these purposes. Stir or shake up for a few minutes and filter into a stock bottle. The first portion that passes through may not be quite clear. In that case, as soon as it is seen that the liquid is passing through colourless, return back into the filter that portion which has already passed and finish the operation. The solution should be perfectly neutral to test-paper. Now acidulate with dilute nitric acid (one to four of water) until a piece of blue litmus paper turns *slightly* red after having been immersed for a few seconds. This silver bath will now be in the most perfect order for negative work with ordinary bromo-iodised collodion. But to preserve it in that condition for a protracted period involves great care and considerable technical knowledge of its requirements. To this subject I purpose devoting another article in next week's Journal. GEORGE DAWSON, M.A.

THE ACTION OF LIGHT ON A SENSITIVE FILM.
No. II.

I NOW propose to point out several more most important points in favour of my theory as to the action of light on a sensitive film.

1. Silver bromide alone can be reduced by alkaline pyro. without exposure to light. This proves that neither gelatine or collodion can have any chemical combination with the particles through exposure to light, and that the latter has simply a physical action on the particles, which action, I have no doubt, bursts the cells of the vehicle containing them.

2. We know that sensitiveness in collodion is inversely proportional to the quantity of pyroxyline employed; that is, that as the pyroxyline diminishes so the sensitiveness increases. I think this proves the question beyond doubt, because as the amount of pyroxyline is reduced, the protecting cells would be thinner round the particles of silver bromide.

3. We know that we can prepare an emulsion in a bright white light, and that by boiling, &c., we can change the appearance of it by transmitted light from the red to the blue-grey stage—the same as if it had been prepared in the dark room. Of course in the former case the emulsion would be useless for photographic purposes; but it proves that the change of colour is given by the gelatine, because the light had already acted on the silver bromide before the boiling commenced, and the latter could not then be rendered more sensitive to light by boiling.

4. I now think that the apparent increase in the size of the particles by boiling is caused in this way. We know that if a vessel containing an emulsion be allowed to stand in boiling water for a length of time the particles will sink to the bottom. At first each particle will be completely surrounded by a film of gelatine, as in *fig.* 1; but after boiling some time the heat would decompose or

FIG. 1.

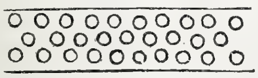


FIG. 2.

SECTION OF FILM.

weaken the gelatine, and the weight of the particles would cause them to sink and club together, as in *fig.* 2, and the mass of particles would be covered by a single film, each particle being in close contact with others. If light affect either one of the particles the film covering it would burst and allow the developer to reduce them all to a metallic state. This would fully explain why a slow plate is generally brighter and better than a rapid one. In the one case each individual particle is only reduced when acted upon by light; in the other, if one of a mass of particles be acted upon the whole of them will be reduced. This will also explain why a collodion or slow gelatine film is better for magic-lantern transparencies than a rapid one, namely, because the lines would be thinner and more perfect.

And now let us see how this theory will bear on practical emulsion making, because theories are not of much use if something practical cannot come of them. I believe in this case it will aid us a great deal, because it thoroughly explains points that before were a perfect mystery to us. It proves, first, that the only thing necessary to get the most sensitive emulsion is to have the protecting cells as thin and weak as possible; and probably if we decompose the gelatine by boiling or ammonia before adding the potassium bromide or silver nitrate (with ammonia we might allow the gelatine to swell in ammonia and water, and then rinse in two or three waters to prevent any chemical action between the ammonia and potassium bromide) we shall work with more certainty.

I think, probably, now that we know what is required (that is if this theory be correct), we shall be able to find a new vehicle that will act better than either collodion or gelatine; if not, we must try to so alter the constitution of them—by boiling, &c., in the case of gelatine, and by solvents with collodion—that if we want a plate of a certain rapidity all we will have to do will be to have a vehicle of a certain strength (which might be a marketable article), add the washed silver bromide, then the bulk of the gelatine or thick collodion to act as the sponge-like support to hold the particles and their thin casing in suspension, and then coat the plates.

It also proves that we must not let the particles group together (as explained above) if we wish to get the best results. To prevent this I believe the emulsion must be kept in one continual motion the whole time of boiling, so as to prevent the particles sinking and grouping together. I will go into this question in my next article.

HERBERT S. STARNES.

A NEW PHOTO-ENGRAVING PROCESS.

OUR contemporary, *La Nature*, in response to repeated inquries for a good process in this direction, describes a new process of photo-engraving, the invention of Major de La Noë, of the Engineers, and states that a personal acquaintance with the results of the process justifies the editor in recommending it. It is, further, actually in use at the magazine of the fortifications.

For a long time, our contemporary states, processes for direct printing upon zinc have been known, and that generally employed is very simple. A sheet of zinc is well cleaned and polished, and then receives a thin coat of bitumen by pouring a four-per-cent. solution in benzole upon its face. When dry a negative of the subject to be reproduced is placed upon it, and the whole exposed to light for varying lengths of time according to its strength, and then developed with essence of turpentine. Under the transparent parts of the negative the bitumen becomes insoluble; but when the deposit on the negative covers the film it remains soluble.

After a copious washing with water from a rose the zinc plate carries a drawing the strokes in which are formed of insoluble bitumen. Immediately after this the whole surface of the zinc is quickly covered with a one-per-cent. solution of nitric acid in water, when it is forthwith rinsed with water and sponged. The surface so prepared retains its properties for an indefinite time. When a proof is required the surface is sponged, inked with care, and a trial proof struck off. When the ink bites well all over it is gummed and the regular printing proceeded with, when a large number of prints may be obtained. If the shadows are cloudy they are brought to the required purity by gently strikong them with a boss of flannel impregnated with a paste of flour of emery and water.

Sometimes, after a certain number of proofs, the strokes which are in high relief become crushed; even at first they are not always as fine as could be wished. It was at this stage that Major de La Noë invented his process of map engraving, which is, so to speak, the reverse of the old method. Instead of a negative his process requires a transparency, so that such subjects as plans upon tracing-paper can be utilised at once to produce the print upon the zinc plate. Thus a simplification of processes is brought about, and time and money saved.

The print obtained upon the zinc, instead of giving an image whose lines are in black upon metallic shadows, gives, on the contrary, metallic lines upon shadows of bitumen. The mode of working is as follows:—The thin plate of zinc is well scraped and polished with carbon, and then, by brushing with a mixture of flour of emery and water, or levigated Spanish white, receives an even coating of bitumen by pouring over it a four-per-cent solution of bitumen in benzole. After complete desiccation it is placed under a negative and exposed to light. This easily acts through the white parts of the drawing and renders the bitumen insoluble, so that when the plate is washed with the turpentine those parts only dissolve that have been protected from the light by the lines of the drawing, which appears on the zinc as metallic lines upon the yellow ground of bitumen. The plate, well washed with water, is then plunged for a short time (from about thirty to forty-five seconds) in a weak solution of nitric acid (five per cent.); at once withdrawn, the plate is washed with water, and so cleaned with a brush charged with turpentine to remove every trace of the bitumen, and thus render the metal quite bare.

There is thus produced an actual sunken engraving, but so light that it could only be printed with the greatest difficulty, after the style of copperplate printing; besides, the zinc would not offer the necessary resistance for this printing. Further: this mode of pulling off prints would be too long and too costly for the class of work under consideration. It is necessary, then, to return to lithographic work, which cannot be utilised in the condition in which the plate is at this stage; for if the lines are not deep enough for copperplate printing they are too deep for "litho." work. The roller would pass over these engraved lines without leaving anything behind. This difficulty has been met by M. de la Noë in the happiest and most simple manner. This is the most important point of his process.

To obtain a lithographic print it will be necessary to fill up the sunken lines, bringing them up almost to the level of the general surface and filling them with a substance that has an affinity for lithographic ink. This the inventor easily manages by covering the plate of zinc anew with a four-per-cent. solution of bitumen. This thin varnish fills the hollows of the lines, but equally it covers all the surface, so that it becomes necessary to free this surface and leave bare metal, the bitumen remaining in the sunken lines.

This second operation can be performed in two ways:—When the varnish is dry the whole is exposed to a strong light, and the bitumen passes to the insoluble condition; but by polishing with carbon all that is on the surface of metal is removed, leaving the engraving completely stopped up. Or, also (and this is the preferable mode), a hand-roller, charged with printing ink, is passed over the zinc, fully inking, so as to make a black tablet, except the slightly-depressed lines, which appear in a golden tint upon a background. After prolonged exposure to light it is washed with turpentine, which cleans the whole of this black surface. A slight polishing with emery flour renders it quite pure, and ensures complete sharpness in all the lines.

After damping with a sponge it is inked. The drawing in bitumen is charged with lithographic ink with facility, and when the trial proofs have shown the image to be all right, after gumming and allowing to dry the prints can be produced in any required number without fear of rubbing or crushing. The drawing, in fact, in place of being in slight relief, as it were, on the surface, is, on the contrary, encased by the metallic sides of the engraving.

If some retouching be necessary in large spaces of black they are quickly done with a little autographic ink, either with a pen or paint brush. If during the printing-off any alteration is produced or the shadows become greasy, all that is needed is to clean the plate afresh; indeed, the whole operation of inking can be done anew.

AMONG THE MOUNTAINS WITH A CAMERA.

[A communication to the Liverpool Amateur Photographic Association.]

After reading with great interest the charmingly-written paper, entitled, *Notes by a Peripatetic Photographer*, lately read before this Association, I feel great diffidence in approaching the same subject, armed, as I am, with far less literary skill than the author of that paper—the Hon. Secretary of the Association.

The 1st of August saw me this year once again driving to the station in a knickerbocker suit and grey felt hat, with a lot of luggage, which, notwithstanding rigid economy in the contents of my little portmanteau, always involves me in considerable expense for excess weight when travelling alone, and will continue to do so as long as the films of a hundred gelatine plates want nearly thirty pounds of glass to carry them.

When once I start for Switzerland nothing induces me to stop on the way. The advertisement—"London and Bâle in 19½ hours"—appeals to me irresistibly, and either by that or some other through route I always go as straight as I can. And, oh! the delightful sensation of waking up after a succession of uncomfortable dozes in the night train—say from Paris to Lausanne—and feeling that now, after having looked forward to it for more than ten months, you really *are* going to Switzerland! You see the grey morning light appear as the train speeds on through the crisp, cold air, and you reach Pontarlier on the Swiss frontier, and turn out with your sponge and have a good wash at the fountain on the open platform, and a bowl of *café au lait* in the refreshment room; and then, as the train winds down through the valleys of the Jura towards the Lake of Geneva, you catch your first distant sight of Mont Blanc, gleaming thirty miles away in the early sunlight. Then, arriving at Lausanne, you leave your luggage in the station and run down to the baths at Ouchy and take a "header" into the lovely blue waters of the lake.

With these delights to look forward to, Paris has no attractions for me, and I get through it, or by it, as quickly as possible. The examination of luggage at Vallorbes, near Pontarlier, is of a very perfunctory description. Not a quarter of the luggage is even taken out of the van; but I generally find that my basket of apparatus, being rather long and narrow, attracts attention and gets pulled out. I sometimes have to open it—not always even that—and a few words of explanation are sufficient to ensure the cabalistic chalk mark which passes it into Switzerland.

My destination this year was the Montanvert Hotel, above Chamonix, and, after spending three days with some friends at their charming country house near Geneva, we took our places early one morning on the *diligence*. After an eight hours' drive we pulled up among the crowd of hotel porters in the main street of Chamonix. We reached the large new hotel on the Montanvert by dinner-time, and joined the rest of the large party which had been made up in London during the winter months. The Montanvert is a superb place to stay at. Nine-tenths of the tourists who come up in crowds during the day to look at the Mer de Glace, and perhaps to cross it ("polyglots," we used to call them), go down again to Chamonix; while those who know where real comfort, combined with the finest mountain air and scenery is to be found, stop at the Montanvert.

"What shall we do tomorrow?" was, of course, the first question discussed. The weather was lovely, and the wealth of excursions to choose from the only difficulty. The Jardin was ultimately fixed on as a good and not too exacting an expedition to start with. Early next morning a party of nearly twenty (counting guides and porters) started for that desolate patch of rock in the midst of ice and snow, scantily covered with grass and a few Alpine flowers, known as the "Jardin." Of course the camera went, too; and now began that very unpleasant process—getting into training.

I can recommend as a most effectual beginning a walk to the Jardin with a twenty-pound knapsack on your back. Mine contains a Hare's 7½ × 5 camera, four double slides, and a case containing four lenses. These are Dallmeyer's eleven-inch rapid rectilinear and seven-inch single landscape lens, and two Ross's portable symmetricals of eight inches and five inches focus. The two former screw into the same flange, and a single adapter, of course, does for the other two. The tripod is one of Mawdsley's, with sliding legs, this arrangement being essential for mountain work. The legs go in a waterproof case, which is carried on the top of the knapsack, and the metal triangle is secured by passing one of the straps of the knapsack through it before buckling.

To attempt to describe scenery is futile, as we all know; so I must leave it to the photographs which accompany this paper to indicate, so far as they may, the kind of views one gets during expeditions among the higher Alps. No. 75 is the familiar view of the Mer de Glace, taken from my bedroom window at the Montanvert Hotel. No. 76 is one of the views on the way to the Jardin. I have not any of or from the Jardin itself, as we were much too busy opening tins of potted meat and making claret cup, when once we got there, to think about photography. No. 77 is a view similar to No. 76, but taken from another point on the way back.

A few days later, having got into good training, I went with a friend on a more serious expedition. This was the ascent of the Moine—a rocky peak of about 11,200 feet, the base of which is close to the Jardin. [Panorama No. 70, right-hand section.] When on a regular climbing expedition I arrange my apparatus somewhat differently. The camera goes in a waterproof canvas case by itself, and either the guide or porter carries it, while I take the plates and lenses in another similar case, together with the tripod. These are all arranged in knapsack form, hanging low down in the small of the back. With this arrangement I generally take a changing-box with twelve plates instead of the four double slides. By this means I can carry more plates, with a better distribution of weight. We had a glorious day for the Moine, and I exposed two plates on the way up (Nos. 80 and 81), six on the top (Nos. 82 to 86, and a group), and one more on the way down (No. 87). On the way up we were overtaken by three friends and their two guides while I was taking the two first views, and we kept together the rest of the way.

It might, perhaps, be supposed that at the height of 11,000 feet and upwards, on an isolated peak surrounded by ice and snow, that one would feel very cold; but that depends entirely on the weather. If a storm should come on, with wind and driving snow and mist, the sooner you can get down again the better, or you will certainly get frozen, to say nothing of the chances of losing your way and getting killed; but in fine summer weather you may bask for hours in calm sunshine on the top of almost any mountain. We were nearly two hours on the top of the Moine, and between photographing, singing songs, and eating, the time went all too quickly. The views all round are superb, but they require judgment in the use of one's lenses to get the best effects. My camera extends to seventeen inches, and I often use the front lens of the eight-inch Ross's symmetrical (equivalent to a sixteen-inch single lens) with good effect where a distant mountain is the chief point of interest, which would look dwarfed if taken with a short-focus lens. [See Nos. 48, 82, 73, 124, and 125.]

Many excursions among the Alps, involving the ascent of high peaks, are too long to be undertaken in a single day, even starting at one in the morning, and it is necessary to sleep out. Frequently one can make use of one of the mountain huts built by the Swiss Alpine Club, but sometimes one must be contented with a cavern, or even an overhanging rock. [See No. 19] This is really sleeping out, and in fine weather is very enjoyable. One starts from the hotel in time to reach the bivouac before nightfall, and an extra porter must be taken to carry the rugs and the wood for the fire and a large pot to make the soup in.

No. 88 is the view, taken one evening at six p.m. from the rocks we selected for our *gîte* before the ascent of Mont Mallet. My friend H—— and I, with our guide and two porters, had come up the glacier (seen in the foreground), and climbed up some steep and broken rocks, among which we found a sort of platform and some holes and crevices among the piled-up granite boulders, which, by a considerable stretch of imagination, we thought were convertible into kitchen, supper-table, and bedrooms respectively. While the guides busied themselves in making a fire and melting some snow I set up the camera, with considerable difficulty finding three firm rocks within range of the camera legs and another to stand on; and, having selected by means of the view-meter the Dallmeyer seven-inch single lens, I focussed the magnificent precipices of the Grandes Jorasses immediately facing us on the opposite side of the glacier—more than a mile away. After putting in the smallest stop (about $\frac{f}{35}$) and a Wratten and Wainwright's "ordinary" plate I gave four seconds' exposure.

It was nearly six p.m. and the sun was getting low, so this comparatively long exposure, as the result shows, was none too much. My companion—who had constituted himself *chef* in the culinary department—now announced that the soup was ready; so I packed up the camera and helped to lay the table for supper and set out the glass and plate. This did not take long, for the plate consisted of two iron spoons and our pocket knives, and the glass of two tin mugs and an india-rubber cup. Words fail to describe the goodness of that soup, which H—— had concocted with extravagant quantities of Liebig and Brand, or of the fragrant Gruyère and succulent sardine which followed it.

After supper—which we finished with a brew of mulled wine—we sat round the fire telling stories and watching the lovely red sunset tints on the snow fading into cold grey, and did not go to bed till the stars were out and the moon had risen over the crags of the Grandes Jorasses. Going to bed consisted in wrapping blankets round us, and tucking our legs down a slanting gap under a big slab of rock as far as they would go. There was just room for H—— and myself, and the three guides stowed themselves away elsewhere. We slept (or pretended to do so) till about midnight, when I was roused by feeling a little cold spot on my face. Soon came another, and then several more, and I looked up to find the stars all gone and rain beginning to fall. Afterwards we heard rumblings of distant thunder, and the rain began to come down

earnest. The knapsacks and photographic things were all lying)out, so I wriggled out of the hole, and, scrambling at some risk over ie rocks in the dark, I found the guides had already put them under ielter. I got back into my cranny, the slope of which I soon dis›vered was more favourable to the collection of rain water than for ie construction of a bed. We philosophically made up our minds to wetting and a dismal trudge down to the hotel in the morning ; but radually the storm blew over, and by the first gleams of daybreak ie rain had stopped ; so, although we were wet and miserable and the ky still threatening, we decided not to give in but to go for our moun›in. The guides got a fire lit somehow, and we made a brew of hocolate and managed to eat some bread and cheese, and then we got eady to start.

I was very doubtful about taking the camera, as the weather looked o uncertain ; but, remembering my rule never to leave it behind on ccount of the weather only, I decided to take it, and at 4.30 a.m. we eft our bivouac and clambered down the rocks on to the glacier again. need not describe in detail our climb up Mont Mallet. To those who iave not been "on a rope" among the High Alps such a description vould be almost meaningless, and it would be certainly out of place in photographic journal. Suffice it to say that we duly reached the top 13,000 feet high) at 10.30 a.m.; the weather, to our great satisfaction, iad cleared up entirely and the day was perfect.

Mont Mallet stands up between the Grandes Jorasses and the Dent lu Géant, and commands superb views, the most striking being those of the peaks just named. Turning westwards we see the grand mass of Mont Blanc, five miles away (Nos. 90 and 91), with the dark spire of the Dent du Géant immediately in front of it, and comparatively near at iand (900 yards) ; while facing round to the east one sees the precipices of the Grandes Jorasses (No. 89) from above instead of from below, as on the previous day. The latter view was taken with the Dallmeyer seven-inch lens, and the two former ones with Ross's eight-inch sym›netrical, the exposure being in each case, with the smallest stop, ibout one and a-half second.

Having packed up the camera, we amused ourselves by watching with the telescope another party of our friends from the Montanvert, who were just then on the top of the Aiguille du Midi—one of the iigh rock peaks close to Mont Blanc, and nearly four miles away from us across the Glacier du Géant [see panorama No. 70, left-hand section]. The air is so clear at these heights that it is very difficult to estimate listance and size, and it is the chief fault of small photographs of the Alps that they give so little idea of the vast scale of these mountains and glaciers, owing to the absence of atmospheric haze. Down in the valleys there is generally more haze, so there this fault is not so con›spicuous. Our descent to the Montanvert calls for no particular remark, except that on reaching the foot of the Glacier du Géant we fell in with our friends from the Aiguille du Midi, and with them threaded the now-familiar crevasses of the Mer de Glace, reaching the hotel in time for dinner at seven o'clock.

The next three days the weather was rather uncertain, and I took the opportunity of developing the plates I had exposed. My bed›room could be converted into a dark room during the day by closing the outside shutters, pinning up a large, thick, shawl over the window with carpet pins, and stuffing brown paper, socks, comforter, towels, or anything handy into the somewhat widely-gaping cracks round the doors. This is generally such a troublesome job that I seldom develope during the day ; but it requires much self-denial to leave a genial party after dinner to immure oneself in one's bedroom, when everybody turns out to drink their coffee and smoke and chat outside the hotel in the brilliant starlight, and discuss plans with their guides, especially if those plans involve, as they generally do in fine weather, breakfasting at 1.30 or 2 a.m. next morning. In bad weather, however, it is an easier matter, and there is no question that it is much more convenient to develope at night.

I clear the bedroom table, and set it against the wall underneath a peg or nail, on which I hang the jug (*such* a little one !) full of water, ind put a syphon in the jug; then on the table I spread a piece of waterproof sheeting, and set out the basin and three *papier-maché* lishes and three square six-ounce bottles, containing respectively ten›per-cent. solutions of pyro. (the Platinotype Company's sulpho-pyro›gallol solution), ammonia, and potassium bromide. The bottles are itted with dropping-tubes, the upper ends of which are closed with ndia-rubber teats, the little holes in the teats being stopped up by a ›ouch of india-rubber solution. The alum and hypo. I carry in tins, ind make solutions in empty wine bottles as required. I use Shew's folding lantern and a little oil lamp with a screw cap for travelling. This is a great convenience, and far better than any candle or nightlight. I strongly recommend a good *large* lantern, as it keeps cool and does not smoke. I have a row of four little lanterns of various patterns on a shelf somewhere, all discarded. In mixing my developer I follow no particular formula, but I generally start with about half the full dose of ammonia, and put the rest in by degrees after about three minutes, the whole development taking generally six or seven minutes. The plates go into the alum and hypo. successively, rinsing them slowly with about half-a-pint of water before each, and after the hypo. into a zinc washing-box. The boxes sold for this purpose are bulky and heavy, so I got a plain, zinc box made, about 8 by 6 by 2 inches, and stick into it some strips of wide gutta-percha grooving. It will thus hold six›teen plates, back to back, in this small space, and, putting the box under a tap or in a stream for a few hours, the plates get thoroughly washed.

Mishaps will happen sometimes in all the stages of one's work ; but the penalty one pays in the loss of a good picture is a great safeguard against carelessness of the same kind happening again. This year, in fact, I have no follies to record—such as exposing a plate twice on different views, as I once did on the top of the Schreckhorn, or leaving the cap off the lens when drawing the shutter. As regards the former mistake I have adopted the simple "dodge" of having two buttons to each shutter ; after exposure only one of these is turned, and one sees at a glance which plate has been exposed.

Much has been said against changing-boxes, chiefly on the ground of their delicate construction and the liability of the plates to stick in the grooves. Now, I have used one of Hare's changing-boxes for the last four seasons, and I always take it in preference to double slides when out on a big expedition. It will bear more knocking about and is lighter in proportion to the plates carried. It is true the plates may stick. Once, on the top of the Dom (the highest mountain in Switzer›land), after I had exposed two plates the third stuck halfway, and no amount of shaking would induce it to go into the slide. The wind was bitterly cold, the guides were in a hurry to start down again, and two splendid views were waiting to be taken. I hammered the bottom of the box with my ice-axe till I thought every plate would be smashed—and the dents in the wood are a witness to this day of the rough treat›ment it got—and at length, to my great relief, the too-corpulent No. 3 fell back again and the slide was released. That was three years ago, and since then the same thing has never happened, except once or twice in the dark room ; for I now invariably fill the box *through the slide*, and am always certain, therefore, that the plates, if they go in at all, will pass readily. The other end of the box has not been opened for months—in fact, I have lost the key.

After a delightful fortnight spent at Montanvert, during which period records accumulated in my note-book of four mountains climbed and over thirty negatives taken, I went, with my brother and a friend and two guides, to Saas-Fée, going across country by way of the Col de Chardonnet to Martiquy, and thence up the Rhone valley by train. [See Nos. 99, 100, 101, and 102.] We sent our luggage, including the "plate›basket," round by Geneva, which took just a week, while we went in heavy marching order, carrying knapsacks and photographic things, in›cluding about thirty plates. We were now in fine training, with faces like mahogany and muscles like iron, and we arrived at the hotel at Fée late at night on August 23, fresh and eager to attack a new district with ice-axe and camera. The hotel was crammed, and only with the greatest difficulty had rooms been kept for us by the powerful influence of kind relations who had been staying there some time.

Fée is a most picturesque place, and artists abound there. As a climbing centre, however, it is by no means so good as the Montanvert, and the only mountain views I got were from the top of the Nadelhorn on a very cloudy day. I tried my hand, however, at views down in the valley, with indifferent success. I find them far more difficult than the more equally-illuminated snow and rock scenes. In Nos. 103 to 108 and 110 I endeavoured to give a longer exposure to the foreground by using a flap shutter or shading the lens by hand. In No. 110 this was obviously overdone, the foreground being too light.

On the other side of the great range of the Mischabelhörner (seen in several of these photographs) lies the valley of Zermatt—Zermatt, be›loved of mountaineers, and *the* capital of Switzerland ! I could not go home without spending a few days there, especially as there were cer›tain views I was very anxious to secure; so on September 4th I crossed the Alphubeljoch—this time alone with my two guides—and arrived at Mad. Seiler's hospitable hotel just as a heavy downpour of rain began. This was not cheerful, especially as it turned to snow in the night, being wet and dismal all next day. On the 6th, however, the wind went round north, and next morning we started at three a.m. for the snow *arête* of the Rothhorn—a magnificent point of view. We climbed the steep slopes behind the hotel with a lantern in thick fog and dark›ness, and could not tell how the day would turn out, until about 5.30, when we began to see the forms of snowy peaks far above us through the thinning mist. We soon emerged into brilliant, clear air, the blue sky above us and rolling seas of white cloud down in the valley below. The day was safe, and the results of the expedition are seen in the photographs Nos. 117 to 126.

Next day we went up the Wellenkuppe, and secured a few more of the splendid views around, among which No. 127 shows no signs of the icy blast which met us as we overtopped the snow cap of the moun›tain, in the teeth of which I set up the camera. We could only stay just long enough to take the view, and then hurried back again under shelter on the south side. My plates were now all used up, and I ought to have come straight home ; but the weather was set fair, and for mere climbing's sake I went up two more mountains on suc›cessive days before starting homewards down the valley.

Mountaineering by itself is one of the very best forms of exercise and recreation, and one brings home a stock of health and energy for the rest of the year. Combined with photography it becomes a most delightful and fascinating pursuit. W. F. Donkin.

CONVENTION CAMEOS.

There were several good things—terse, epigrammatic, witty, or droll, and too good to be forgotten—said at the Milwaukee Convention, the proceedings at which great assemblage of American photographers were reported in full in our contemporary, the *Photographic Times* (New York), from whose columns we have made the extracts appended below. To avoid any misconception we also add the page from which each "cameo" is extracted:—

Gentlemen, can you not devise some means to stop the disgraceful low prices, and the increasing number of Cheap Johns who are daily bringing the blush of shame to our cheeks?—J. P. Blessing, page 382.

* * *

The popular idea, as we all know, is that the climate is clearer, which is about as valid a way of accounting for differences in the quality of portraiture as the equally-popular excuse of old-time daguerreotypers of too much or too little electricity in the air.—J. T. Taylor, page 384.

* * *

Dr. Vogel is the only man that ever could make collodion and gelatine love one another. He has done this thing, and he is the only man that I know who has.—The President, page 388.

[We may inform this gentleman that the method of performing this feat was first indicated in the pages of The British Journal of Photography some time before Dr. Vogel published his method.—Eds.]

* * *

Now we dissolve the sulphite of soda with three-quarters of an ounce of bromide of ammonium, one ounce of bromide of potassium, and two ounces of pyrogallic acid in thirty-two ounces of pure water. I add sulphuric acid, 120 minims; concentrated liquid ammonia, which is known as 26° Beaume, of a specific gravity of 0·900, three fluid ounces; and make the solution forty ounces, in all, by adding water. You can develope about a dozen plates with that developer. I have developed as many as two dozen plates from the same solution, using it until the diluted solution turned cloudy and dark; when so, you ought to throw it away.—Mr. Cramer (St. Louis), page 393.

* * *

A Member: Can you get a finish to that mat surface paper?

Mr. Clemons: Yes, you get the finish to that mat surface paper by making a good print, putting a glass over it, and hanging it on the wall.—Page 389.

* * *

There have been hundreds of thousands of plates returned that the parties had no business to return; they were simply returned because photographers are not as well posted in the dry-plate process as they are in the wet-plate process.—Mr. Hall, page 399.

* * *

I would say that if the manufacturers of dry plates would put their emulsion on one side, and get that smooth, they might sell them for less money.—Mr. Farr, *ibid.*

* * *

All want good-looking pictures. There is hardly anyone but you can make a good-looking picture of if you study the points. In order to do it you must study faces wherever you see them.—The President, page 410.

* * *

The toning bath is the silver bath. If you get your paper silvered properly you will get good tones. If the paper is not right all the toning from Boston to Milwaukee will not do it any good.—Mr. Dixon, page 414.

* * *

When I entered the firm of which I am at present a member I informed one of the veterans of photography that he had thrown at least 3,000 or 4,000 dollars down the sink in the last three or four years by buying gold instead of making it. It cost him ten or eleven dollars for what he could have obtained for five dollars.—The President, page 414.

* * *

A Member: I would ask what would be the cost of getting ready or preparing to make plates for our own use—what would be the average cost? Can anyone give us an idea of it?

Mr. Gentile: You first find out how many failures the party is going to make, and in that way you may get at the cost.—Page 420.

AN AUTUMN RAMBLE IN SHROPSHIRE.

[A communication to the Liverpool Amateur Photographic Association.

I feel that an apology is due from me to the members of our Association present at our meeting for my temerity in again reading a paper on a subject of no photographic novelty, and of but little photographic interest. I am, however, anxious to make others acquainted with the best mode of working the new enamel paper prepared by Messrs. Goodall and Stevens; and yet I do not like to waste their valuable time during the somewhat lengthy exposure necessitated for our enlargement with the lantern. The few remarks I am about to make will just about occupy the time to be given to this exposure, and may have some interest for those of us who are anxious to know of "other fields and pastures new" for a day's photographic ramble, when the weather and the light once more render work in the field both feasible and enjoyable.

Early in the month of October a professional call summoned me to the neighbourhood of Shrewsbury. The weather was and had been for several days exceedingly unfavourable for anything but a snug fireside, and yet I was unwilling to miss a possible photographic opportuni Accordingly I was accompanied by an old friend, in the shape o quarter-plate camera and six double dark slides, filled with "M chester" plates.

My photographic starting-place was at Condover—a short four mil walk from Shrewsbury; and nothing of photographic interest tempt me to unlimber my paraphernalia until I reached the village itself. T church has but recently passed through the restorer's hands, and too "spick and span" to tempt the exposure of a plate upon it. B in the north chapel, in the interior, there is a subject of great intere in a group of monuments, ancient and modern. The most beautif of these is a recumbent figure of a mother and baby, by Roubillac. Tl light was too bad to enable me to obtain a good picture of this subjec but the print gives a faint idea of the grouping of the cluster of tomb The baby nestling at the mother's side; the lovely face of the dea Lady Cholmondeley; the alabaster figure of the Knight kneeli sword in hand behind; and to the left an elaborate monument of tl Jacobian period crowded with quaintly-clad kneeling figures—all th made me resolve to pay another visit to Condover with a larger camer and under more favourable auspices of light and weather.

Behind the church a door opens in the wall into the gardens Condover Hall—a superb Elizabethan mansion terraced in front lik Haddon Hall, and surrounded by a garden of the old fashion with the little trout stream, the Cound, babbling along in the front, an in the distance the fine range of Wenlock Edge, with the very respect able mountain peak of Caer Caradoc rearing itself proudly agains the sky.

The wind was blowing a small hurricane; but I attempted a pictur of two of the *façade*s of the hall. At the entrance of the village i Condover Grange—one of the most picturesque timbered houses I hav ever seen. The greater portion of it was built in the reign of Edwar III.; and when I saw the splendid old dining-room, with its huge fire place and chimney and ingle seats of antique fashion, I regretted mucl that I was obliged to defer the exposure of any more plates till anothe visit, and hurry off to Acton Burnell.

Just outside the village of Condover, the river Cound supplies many a tempting scene of "wood and water, sweetly intermingling." The gothic, rustic bridge over the stream made up, with its surroundings, as perfect a picture as could be imagined; but it is now, alas! a thing of the past, and has given place to a hideous iron structure. It was time, however, that the old bridge (which was only for foot passengers) gave place to something better; for the river is frequently in spate after heavy rain, and in the spring a horse and driver were drowned in attempting to cross the ford.

A pleasant ramble of four miles brought me to Acton Burnell, which I was anxious to see on account of its half-ruined church and the splendid old castle in the grounds of the Park. The church and churchyard are in a disgraceful state of decay and neglect, and for that very reason form a good subject for the camera; but, as an English churchman, I felt ashamed on passing through a gate hard by to find myself in a churchyard belonging to the Roman Catholics kept in the most perfect order. Here I found another most tempting subject before me. In the background are the ivy-clad towers of the picturesque old castle; while the front of the picture is filled by a graveyard crucifix, most artistically and beautifully wrought. My little photograph does, I am glad to say, give a fair idea of this striking scene, although there was a drizzling rain falling when it was taken, and the hour was close upon four o'clock on a dull and wet autumn day.

The castle behind is of the thirteenth century, and the windows are filled with rich geometrical tracery. Some historic interest attaches to the building, for Edward I. held his parliament here in 1283. I hurried off, after securing four negatives in Acton Burnell, to get over the two miles to Pitchford before the light had altogether departed.

At Pitchford the rain was still falling and the light had almost taken its departure; but the hall seemed to me such a splendid old place that, whether or no, I was determined to expose a plate upon it, and, remembering the circumstances of the exposure, I was amazed on developing my pictures next day to see a very respectable little negative of it making its appearance. The hall is one of the finest of old-timbered domestic buildings of Shropshire, dating from 1550. It, too, has an historic interest of its own, for the Queen with her mother stayed in it for some days in 1832. I would gladly have explored the rooms and surroundings of the hall; but darkness and storm were gathering around me, and I had my train to catch in Shrewsbury, and six miles of walking to do in order to catch it.

The village of Pitchford takes it name from a singular bitumenous spring hard by—I suppose the only spring of this kind in the North of Europe. While trudging wearily along after my sixteen miles' walk, a kindly collector of curiosities came trundling along, with a very frisky and lively pony in his cart. He most kindly pulled up at the sight of a heavily-laden and weary parson plodding along in the wet, and gave me a lift into Shrewsbury. I found him a most pleasant companion, and full of antiquarian lore. I recounted to him the story of my day's doings, and also told him of our photographic visits to the Shropshire Abbeys of Lillieshall, Wenlock, and Buildwas. This elicited from him the somewhat important information that at Moreton Corbet, not very far from the scene of the battle of Shrewsbury, I should find—in a

turesque old ruin there—as fine a subject for the camera as anyng I had yet seen in Shropshire.

shall, therefore, have much pleasure in proposing, if possible, to nbine Acton Burnell Castle, and Moreton Corbet as a suitable field the next excursion of our Society. H. J. PALMER, M.A.

TUDIES OF AND EXPERIMENTS WITH GELATINE EMULSION.*

THIRD SECTION.

NWHOLESOMENESS OF WORKING IN THE DARK ROOM.—Photographers 10 take pictures on dry plates and develope these, &c., work under far tter sanitary conditions than they did in the time of collodion dry ites, when the fumes of ether rendered photography impossible to rsons with weak chests. On the other hand, those persons who prere emulsion, and coat plates with it, have to work under very favourable circumstances, which might undermine the health.

Something has also been said about a gradual poisoning, which has en observed in England, caused by the absorption of alkaline pyrollic solution by the skin. I do not doubt the existence of this disease, t no similar case occurring in this country is known to me. An itant effect may certainly be exercised upon the temper and nerves the red light—at least I was told so as an excuse for the rudeness of plate-maker. But a much more serious matter is the vitiation of the mosphere by the breathing of human beings and the burning of a ndle in the confined and generally quite unventilated apartment. My tention was called to this by frequently observing how, after working several hours in the dark room, breathing became difficult, notwithnding my dark room has a ventilator, though a somewhat defective e.

In order to find out whether too much carbonic acid had really cumulated, after working in the room for an hour and a-half, I tested e air for carbonic acid by Pettenkofer's method, and found 1·4 part acid per thousand parts of air. Now, if we consider that good air ould only have 0·4 per cent., and that one per cent. is already conlered unhealthy, a proportion of 1·4 per cent. at the end of an hour d a-half is dreadful.

My dark room contains some twenty to thirty cubic metres of air. ther dark rooms are often two or three times as large, but then more rsons frequently work in them. If one consider that even yet ammonia often present in the dark room, and interferes very much with the eathing organs, and that not seldom the directly poisonous smoke of wick is added thereto, one will admit that when a dark room is badly ntilated, working in it under such circumstances, may be deadly to eakly persons. If a chimney flue (or a fire burning in the room) be sed as a ventilator, the necessary change of air of at least twenty-one ıbic metres of air per head per hour will generally take place if the perture for the escape of the air has a diameter of twenty centietres.

Cause of Yellow Spots Occurring when Intensifying with Chloride of Tercury.—Complaint has been made that large, yellow spots freiently appear when gelatine plates are being treated, after fixation, ith chloride of mercury and ammonia or some other method of merric intensification. Attempts at carrying out the washing, after king, as thoroughly as possible do not always prevent this fault, the use of which lies elsewhere.

When bromide of silver is dissolving in hyposulphite of soda, the fficulty to dissolve sulphate of silver oxide and soda forms in the latine film. If the plate be drawn out of the fixing-bath immeately after the film appears transparent, and the bromide of silver to removed, a good deal of this salt remains behind, which is remarkble for the exceeding difficulty with which it is washed out, and hich is coloured by the mercuric salts. If the plate, however, be ft as long again in the fixing-bath as is required to make the omide of silver disappear, the negative will not only in itself be ore permanent, but will also take on no stains in the mercuric tensifier.

The Carbonate of Silver and Ammonia Method Again.—Without present expressing myself further respecting the practical value or orthlessness of the methods tried by me of mixing equal parts of trate of silver and carbonate of ammonia, I shall remark that the cess of carbonate of ammonia plays a part in the strength and in the nsitiveness.

Solutions of one part of nitrate of silver and two parts of carbonate ammonia give greater sensitiveness, when digested for the same time, an equal quantities of the same salts. Further: nitrate of ammonia ts as an accelerator in all the processes.

It, therefore, makes a great difference whether one dissolves pure carnate of silver in caustic ammonia or mixes nitrate of silver with rbonate of ammonia, because, in the latter case (beside the normal uble salt), an excess of carbonate of ammonia and nitrate of ammonia sides, co-operates. Quite apart from an undissolved sediment of carnate of silver causing a loss of silver, and that therefore my process simpler, it is also actually different from Dr. Székely's method, as Dr. Székely himself does not doubt. On the other hand, lately, in the *Photographisches Wochenblatt* (page 216), the two methods have been identified, though they are not identical in fact.

—*Correspondenz.* J. M. EDER, M.D.

* Continued from page 392.

WHERE TO GO WITH THE CAMERA.

THE SCOTCH HIGHLANDS.

THIS heading might seem to include almost the larger portion of Scotland, but in this particular case it applies chiefly to those parts immediately on the borders of Lochs Tay, Awe, Etive, and Fyne.

It was with a great sigh of relief, heaved up from depths unfathomable, that one evening in the early part of August I turned my back upon the modern Babylon for three long weeks, though, alas! too short for my taste, and wended my way northwards by the night train.

This I had always intended to be more especially a photographing tour; and for portability's sake, if I may use the word, I took a Lancaster's half-plate *Meritoire* camera—this being one of the lightestmade I have come across, the whole apparatus, including three dark slides, not weighing above four and a-half pounds. The lenses I took were a wide-angle, a Lancaster's "instantaneous" with shutter attached, a single view lens, and also a cabinet portrait lens—the latter of which I found very useful in taking instantaneous mountain and cloud effects.

Upon arriving at Edinburgh I was joined by an eccentric friend, who, although not a photographer, never seemed to have the slightest objection to being "taken" in all my views; his eccentricity coming out very much stronger at these times than at any other. For instance: if I wished to "photo." a waterfall or bit of lake scenery he would immediately don nature's garments, plant himself up to the waist in the water, and hint in a very mild and persuasive manner that he would make a perfect study as a water god.

After having spent a very enjoyable day in "Auld Reekie" we started early the next morning for Lochearnhead, *viâ* Callander. A slight hitch was caused in the start by my eccentric friend not turning up until the train was actually moving away from the platform; and then, upon my gently chiding him for his lateness, he informed me in a very hurt tone of voice that, what with the crowd at the ticket office, his knapsack getting caught between two people, and his stick getting carried off by a third, it was a wonder he had arrived at all.

Upon alighting at Lochearnhead station we shouldered our knapsacks again and started off on the walk, the day being just one of the most perfect that it has ever been my good fortune to fall in with. Our way led up through Glen Ogle (the so-called Kyber Pass of Scotland) to Killin, on Loch Tay.

I did not see much that would make a picture until some three miles up the glen, and then, upon turning round, a glorious view was obtained of Loch Earn, and Ben Voirlich behind it; this was immediately transferred to the glass. We then repacked the camera, and wended our way for some considerable time alongside the Highland Railway until we reached a small mountain lake, called the "Larichay Loch." Here another very pretty view was obtained.

In both the above cases I found that my "wide-angle" was the appropriate lens to use. While here, the day having become very hot, we debated whether we should take a swim; but eventually the idea was abandoned, which turned out to be very lucky, for, having mounted a "brae" behind where we were standing, we discovered that Killin station was only about twenty yards off. Here, from the platform of the station as a foreground, a very fine view of the Ben Lawers range and Glen Dochart was obtained.

Having come to the conclusion by this time that we had had enough of walking we mounted the coach, which took us safely to Killin Hotel, in spite of the drivellings of an old man who tried to frighten the passengers by telling some tale of how it had been upset a few days before and done much damage. Upon inquiries, however, it turned out to have been the coach only that was injured.

Some very good instantaneous effects were obtained on Loch Tay, both with the plain drop-shutter as well as Lancaster's shutter. One in particular was good of the steamer "Lady of the Lake" (I believe) at full steam, broadside on; it came out perfectly sharp. Two days were given to Loch Awe, where we put up at that most excellent of hotels—the new Loch Awe Hotel. A fine bird's-eye view of almost the whole loch looking towards Ford was secured from the terrace of this hotel.

The ruins of Kilchurn Castle were not forgotten. A very fine view of them was obtained from one of the islands of the loch, the grouping of the mountains around and the giant Ben Lui in the background being especially fine and effective. Several instantaneous views of the loch were also obtained with more or less success, the trees and the distant view of the Braes of Balquhidder on the east side tending greatly to enhance the beauty of the backgrounds. The walk from here through the Passes of Brander and Awe afford a fertile field at almost every step for the photographer—so much so that it becomes a difficult question what to choose.

At the distance of about two miles from Taynuilt (where, by-the-bye, there is an excellent hotel) an effective view was taken of the immense

mass of Ben Cruachan, the snow here still lying in the sheltered parts and "corries" of the mountain. This brought us to the end of our fourth day, the weather all the time being most perfect. The only inconvenience we suffered from was the flies and the heat, the latter being at times intense.

Getting up early next morning we both had a very enjoyable bathe in Loch Etive, and then commenced the work of the day, the single-view lens coming into use the whole of the day, the aperture I worked at being $\frac{f}{32}$, the exposures varying from one second in open landscapes to eight minutes and upwards for woodland scenes. One exception, however, I did make: I substituted my portrait lens for a water and cloud effect, using my drop-shutter with an elastic band and a diaphragm working at $\frac{f}{7}$. This was altogether one of the most successful effects on the tour.

I must not forget to mention an anecdote I heard with reference to the slow and deliberate way in which the trains ply on this wonderful Highland Railway. I happened to say to the "eccentric one"—"How very slow we seem to go; I wonder whether they stop where-ever they like on the way." He replied—"Certainly; they have been known to stop and pick up picnicing parties, and, also, once a belated traveller stopped them whilst he obtained a light for his pipe from the stoker!" My friend in this latter case, I fear, to put it mildly, was drawing the "long bow," or must have heard it second-hand from the "Cockneys."

Most of the return journey was made by boat, this precluding us from securing as many views as we might have wished; still, some remarkably-good instantaneous "shots" were made with the revolving shutter. I consider the above-named shutter to be a very fair one indeed, especially if it could be made to fit on to a rapid doublet or rectilinear lens—the aperture on its own lens being barely large enough to allow of a perfectly-exposed negative. It, to my mind, would be one of the most perfect, besides taking up much less space in one's case than the other various forms of instantaneous shutter.

I saw many a lovely bit on our steam down Loch Fyne, round the Kyles of Bute, and along past Rothesay (that queen of Highland watering-places), which will well repay another and a longer stay at some future date.

It was with deep regret that we turned our faces once more towards Glasgow and the Lowlands. The "eccentric one" was almost overcome to the verge of tears at parting from his beloved Highlands, which, I think, somewhat raised him in the opinion of the passengers on board, upon several of whom he had been trying to play, unseen, some of his so-called practical jokes.

During the above tour I took no developer, but changed my plates and reloaded every evening in my bedroom before retiring to rest. I was rather anxious about the result of this, as I found it almost next to impossible to shut out every ray of light. It was, therefore, with a feeling of great relief that upon development everyone of them, without exception, showed not the least signs of fog, and were as clear as if only just exposed. *Apropos* of development: it may be a hint to some of your readers to state that I found it much handier to use the pyro. dry, and two small bottles of very strong solutions of bromide of ammonium and fifty-per-cent solution of liq. ammo., these taking up much less room than the ordinary ten-per-cent solutions.

I trust that at some future date I may be able to give an account of my wanderings with the camera along the banks of the Tweed, and up away into the heart of those beautiful border hills—the Cheviots; though, unfortunately for me, these wanderings were not enlivened by my pleasant but eccentric companion, whom I was fain to leave in Edinburgh in harness again. ROBT. DAVIES.

A FEW NOTES OF A TOUR FROM MAINE TO CALIFORNIA.*

WE reached Las Vegas, and made a hurried visit to the celebrated Hot Springs, five miles distant. There are upwards of twenty of them, their temperature ranging from 110 to 140 degrees. Here I first saw what are called the mud baths, and certainly they did not look inviting. Thousands visit them for their medicinal qualities. We drove back to Las Vegas by a different route, and then continued our journey to Santa Fè, passing through a wild region, getting now and again a peep of Starvation Peak—a huge, flat, rugged cliff, where, according to native tradition, the Indians besieged about 140 Mexicans until they died of starvation. The Pueblo tribe of Indians made us repeated visits, robed in savage simplicity, and offered for sale their rude productions—torquoise and other stones, which they gather from the hills. One feels almost tempted to invest in the unearthed gods and pottery of the ancient Aztecs. On reaching Santa Fè we encountered for the first time the strongly-marked Spanish character in bearing, language, and costume. The history of Santa Fè is not only curious but interesting and instructive. The city of the Holy Faith stands on both sides of the Santa Fè Creek. Nearly all the houses are built of adobe, or sun-dried brick; the streets are very picturesque. There is not such a thing as a spoke-wheeled car in the city; the wheels are solid, and drawn by oxen. The dress of both sexes is very picturesque; the toggery of the Indians is very fantastic. Everything indicates how firmly they resist all modern changes. Three-fourths of the inhabitants are Spaniards, Mexicans, and Indians. They have one very interesting industry, namely, the manufacture of gold and silver jewellery. The traveller who passes through Santa without having his purse considerably lightened must have a strong wi his own.

Through Arizona.—On leaving Santa Fè we passed through many Spanish settlements to Denning, the southern terminus of the Aitchi Topeka, and Santa Fè R. R. On the Southern Pacific R. R. we pa through Arizona, which is covered with pre-historic ruins of an elabo character, indicating a civilisation which had vanished long before great discoverer Columbus placed foot on the Western Continent. spent a day at Tueson, the largest town in the territory, in order to more leisurely some of the wonders of Arizona than we could from windows of the cars. Yuma is an interesting old town; it is on the ba of the Colorado river, which divides Arizona from California. It is ab ninety miles above the gulf. We felt no desire to tarry here, the tl mometer ranging from 92° to 160°. We were all on the tip-toe of expec tion of entering the City of the Angels and Oranges. It has a populat of about 18,000, and is situated on the southern slope of the Sierra Ma and Santa Susanna range. We came in contact with groves of lemon a pomegranate orchards in every direction. One orchard in the centre the city consists of 100 acres. This is the centre of the tropical fruit-growi district of California. I suppose no place in the world produces sucl variety of fruit in so many seasons of the year as California. We drove round, breathing the balmy air. The temperature varies little from to 72°. On leaving Los Angeles the train ascends the San Fernan Mountains, and passes them by the mammoth tunnel, which is ab 7,000 feet in length. After passing through a beautiful rich ag cultural country we reached Madeira, the station from which we took t stage for the Yosemite. This journey was the most fatiguing that encountered. The first day's ride into the valley was sixty-six miles, a the second twenty-four miles. The valley is six miles long, and half a mi to a mile broad. It is enclosed in frowning granite walls, rising sometim to the enormous height of 3,000 to 6,000 feet. Here and there are strea of water forming cataracts of unsurpassed loveliness. The views that have the pleasure of showing you will give you a better idea of th wonderful valley than any word-painting I could indulge in. If the eye b delighted with looking up to the mighty crags, it is equally so by tl flower carpet beneath our feet; it is perfectly dazzling, and the air fragrant with perfume. The noble warder of the Valley, El Capita though not so high as some of its neighbours, from its vertical side plummet-line could be dropped. The principal falls in the valley are tl Bridal Veil Fall, 950 feet; Vernal Fall, 856 feet; Lower Yosemite Fal 609 feet; Ribbon Fall, 3,300 feet; and the Yosemite Fall, 2,034 feet. Th great Niagara Falls are only 163 feet high. I cannot detain you by givin anthing like a description of the mighty wonders of the Yosemite Valley They must be seen to be appreciated.

On our return journey we went through the Mariposa Grove of bi trees. This grove of giants now belongs to the State. The grove itself about two miles square. No one can have the least conception of thes mighty monarchs, when I tell you the Grizzly Giant is ninety-four feet i circumference, although the vandal's hand has been at it. The first branc is about two hundred feet from the ground, and is six feet in diamete Another giant has had an archway cut through it. Our stage, with si horses, passed through this gigantic archway. We reached Madeira, an the iron horse sped on to San Francisco. The journey occupied about eigh hours. We took up our residence at the Palace Hotel, a magnificen house, which cost three and a-half million dollars. The site on which i stands was a great sandbank ten years ago. The proprietor told me tha when he came to the city about twenty years ago the population was 10,00 now it is over 300,000. San Francisco excites the wonder of everyone. It rapidity of growth has outdistanced every other city, surpassing eve Chicago. It stands, like New York, on the extremity of a peninsula extending to the bay. Excepting Alexandria, it is, perhaps, the mos cosmopolitan city in the world. There are Asiatic, German, Frencl Spanish, Italian, Mexican, and Chinese quarters—all which can be en countered in a forenoon stroll. The Chinese quarter consists of severa solid blocks said to be inhabited by about 60,000 Celestials, who a clustered together like bees in a hive, having scarcely breathing room They have subterranean opium and gambling dens, filthy in the extrem Here they sit around greasy tables in a smoky atmosphere, smoking an gambling night and day. They sleep on shelves with wooden pillars stowed away like bundles in a pawnbroker's shop. The Chinese theatre are sights to be seen. The stifling atmosphere, however, is almost un bearable. The whole audience, including women, smokes, the place onl lit up with greasy oil lamps. The entertainment is accompanied by th clanging of cymbals, the deafening sound of the gong, and other sorts o ear-splitting sounds. We visited this place of amusement on a Saturda night, occupying seats on the stage. The play had begun a fortnigh before, and we were informed that it would take three weeks more befor they got to the end of it. In visiting the temples one sees the joss-stic smoking in front of their popular deities. If the guide be anythin loquacious he entertains you by giving a narrative of their virtues and vices One, for example, was very fond of whisky, another indulged in costl dinners, and so on. In visiting the opium dens an American clip migh with advantage be applied to the nose before entering. The privat residences of San Francisco are very fine; many of them are palatia Some of the finest are built on Nob Hill; these are easily accessible b means of the cable street tramways. Those who have not seen this mod of street travelling, and enjoyed its smooth, comfortable, and noiseles means of conveyance, cannot have any idea of the great revolution the are destined to effect in the future. Some of the grades I travelled ove were as steep as our Arthur-street. Your feelings were not lacerated b the pulling, dragging, tearing of, and swearing at, the poor horses; th ascent was as easily accomplished as if it had been a sleigh on ice. I such means were adopted to overtake the steep streets of our New Tow and Leith-walk, it would be a great boon to the citizens of Edinburgh.

(To be concluded in our next.) J. G. TUNNY.

* Continued from page 647.

RECENT PATENTS.

PATENT APPLIED FOR.

›. 5,062.—"Improvements in 'Perspectographs,' or Instruments for roducing Pictures, Plans, Drawings, or the like." GEORGE MACAULAY IKSHANK; a communication from Hermann Ritter, Frankfort, archi- —*Dated October* 24, 1883.

GRANTS OF PROVISIONAL PROTECTION.

›. 4,705.—"Improvements in the Art of obtaining definite Photographs ; Used in the Production of Typographic Blocks and Photolithography." 3ROWN, R. W. BARNES, and J. BELL.—*Dated October* 3, 1883.

›. 4,735.—"Improvements in Methods of producing Printing Blocks neans of Photography." W. B. WOODBURY.—*Dated October* 5, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

of Meeting.	Name of Society.	Place of Meeting.
›mber 5....	W. Riding of Yorkshire (A. M.)	Godwin-street, Bradford.
„ 6....	Sheffield	Freemasons' Hall, Surrey-street.
„ 6....	Halifax	*Courier* Office, Regent-street.
„ 7....	Edinburgh (Annual Meeting)	Hall, 5, St. Andrew-square.
„ 7....	Benevolent	181, Aldersgate-street.
„ 8....	London and Provincial	Masons' Hall, Basinghall-street.
„ 8....	Manchester	Mechanics' Institution.
„ 9....	Ireland	Royal College of Science, Dublin.

IDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

the meeting of this Society, held on the 25th ultimo, the chair was pied by Mr. W. Ackland, F.C.S.

r. J. BARKER, referring to the spots formerly so common on gelatine es, inquired whether any member had been much troubled with them y, and whether any certain remedy had been found.

r. T. BOLAS said that, if a film which gave spots were watched whilst ng, it would be found that there was first a gathering or accumulation nulsion to a point, then this appeared to burst or become suddenly ersed, leaving the thin spot where it had been.

r. W. E. DEBENHAM said that there were two kinds of spots. The spots referred to by the last speaker, which occurred with the hardest apparently the most perfect gelatines; and those spots which pre- ed a matt surface and generally gave a slightly more intense image e they existed. The latter kind he called "freckles," and thought they were more likely to occur with a gelatine that had somewhat lost tting power, from treatment during emulsification or otherwise. The er kind had only occurred with him when the gelatine had not been ibly affected during emulsification. The only instance that he had for a long time past was with a chloride emulsion, in which the emulsify- process was carried to much less degree than with the ordinary emulsion.

r. BOLAS said that hard gelatine gave transparent spots. The problem to remove this tendency without destroying the setting power of the tine.

r. F. W. HART had observed liquid spots to form in set gelatine with ngoid growth in each. He inquired whether emulsion makers had d that carbolic acid prevented the formation of spots.

. STIEFEL (from America) said that during the last month he had found and increasing difficulty in making emulsion. The cause upon in- gation proved to be that he had been filling up his stock bromide e from a new supply which contained forty per cent. of nitrates. He ved that the mixture was a purely accidental one made by the mistake me one employed in the drug-house which had supplied the article, that it was not likely to recur. In Germany, from whence he had lately ed, very good plates were made by the cold emulsification process; they were not what would be considered quick in England. The sure in a nice light would be four or five seconds; and a plate fifteen s as quick as collodion was thought to be very rapid.

. A. COWAN demonstrated the exposure and development of a gelatino- ide plate as a transparency. The ordinary gaslight of the room, if d down low, might be safely used for development, and the exposure l be very uniformly given by magnesium wire. He found that one of this, burned at a distance of eighteen inches from the negative, gave roper exposure for a usual negative.

. BOLAS inquired whether Mr. Cowan had tried these transparencies aking enlargements from.

. COWAN replied that he had, and that the result was beautiful.

. DEBENHAM said that at the last meeting Mr. Cowan had shown the variety of tones obtainable with chloride plates by variations of the oping solution. When the chloride process was first introduced in a icable form by Dr. Eder, he had spoken of the variety of colour nable with the one developing solution, by merely varying the time of ure and development. He (Mr. Debenham) showed transparencies ustration of both statements. One, developed with a mixture of two of the magnesium and one of the ferrous-citro oxalate, was very warm ie; a second, in which the proportions were reversed, was decidedly in colour; whilst a third, which had been developed in the same ire as the second but had had shorter exposure and longer develop- , was much cooler still.

. A. J. BROWN had experimented with Dr. Eder's formula, and shown ansparencies at a meeting of the Association soon after it was intro- l, with the same result as Mr. Debenham.

Messrs. E. Twiss and H. S. Starnes were elected members of the Association.

It was announced that Mr. J. Traill Taylor would deliver his lecture *On Lenses* on Thursday, the 8th November, and that experienced workmen would be present to demonstrate the processes of lens grinding and polishing. It was also stated that, in addition to the lectures already announced, Mr. T. Bolas, F.C.S., had promised a lecture, which it was understood is to be given in March next. The intervening dates were all arranged for.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE October meeting of the above Association was held on Thursday evening, the 25th ult.,—the President, Mr. B. Boothroyd, in the chair.

The minutes of the September meeting having been read and confirmed, Messrs. A. W. Cornish, R. W. Hill, W. Punshon, W. Paris, and J. Dickenson were elected members of the Association.

Mr. J. H. T. ELLERBECK asked for information as to the rule of the Society with regard to the appointment of honorary members.

The Hon. SECRETARY read the rule as follows:—"Honorary members shall be nominated by the Council, but their election must be with the consent of the members present at the meeting. Honorary members shall be entitled to attend the meetings, but not to serve on the Council or vote on any question whatever."

The CHAIRMAN alluded with much feeling to the heavy loss sustained by the Society during the past month by the death of one of its oldest members, Mr. W. H. Wilson; and also by that of Mr. G. F. Chantrell, who, though but recently elected, had been on terms of intimacy and friendship with many a member of the Association. He (the Chairman) next announced that the Council would decide upon the presentation print for the current year during the ensuing month. Members having negatives suitable for enlarging for this purpose were requested to send them to Mr. J. H. T. Ellerbeck, 54, Bold-street, on or before the 15th of November next. The Chairman then called attention to some fine enamels and some instantaneous pictures kindly sent for exhibition by Mr. A. L. Henderson, of London, and expressed the thanks and appreciation of the members for these exhibits. He (the Chairman) then referred to a letter which he had received from M. Letellier, of Paris, appealing for a subscription to the proposed monument at Chalons-sur-Saone to the memory of Daguerre.

Mr. ELLERBECK proposed that the Society should present a donation to the funds of this memorial, the amount of such donation to be decided by the Council.

Mr. J. L. CORKHILL seconded the resolution, and it was carried unanimously.

The HON. SECRETARY said that Mr. W. F. Donkin was unhappily unable to be present in person, but had sent a most interesting and valuable paper, which he would proceed to read. [See page 658.] Mr. Donkin's paper was illustrated by the whole of his splendid series of photographs of the Alps, and among them were some magnificent enlargements by the Autotype and Woodbury Companies. The picture of the marvellous Peak of the Dent du Géant was especially admired.

The CHAIRMAN proposed a cordial vote of thanks to Mr. Donkin—not only for his capital paper, but also for his great kindness in affording the Society the treat of the sight of his truly wonderful pictures.

So great was the applause and enthusiasm in response to the Chairman's proposal that it was not thought necessary to put the resolution formally before the meeting.

The Rev. H. J. PALMER gave a demonstration illustrating the mode of enlarging with the lantern on Messrs. Goodall and Stevens' new enamelled collodio-bromide paper. The negative chosen for the purpose was one taken by Mr. Palmer in his summer tour abroad, and consisted of a view of the Cathedral of Chartres, with the River Eure and some quaint old houses in the foreground. After exposure of ten minutes in the sciopticon lantern, with Dallmeyer's lantern lens and a small stop, the development was accomplished by the light of a Scovill lamp, and the result was a very beautiful and brilliant picture, having all the appearance of a silver print on doubly-albumenised paper. In answer to questions on the subject, he (the Rev. H. J. Palmer) said that his developer consisted of the saturated solution of oxalate of potash three parts, and one part of a saturated solution of sulphate of iron. After fixing in the usual way he recommended flowing over with a solution of alum and citric acid, and then a very thorough washing with many changes of water. Mr. Palmer passed round two views of Antwerp Cathedral to illustrate the exceeding beauty of pictures enlarged upon this new enamelled paper. One of these pictures had been enlarged upon ordinary gelatino-bromide paper, and the other upon Messrs. Goodall and Stevens' enamel, the latter being greatly superior to the former.

During the exposure of the enlargement, Mr. Palmer read a paper on *An Autumn Ramble in Shropshire* [see page 660], and showed a number of pictures taken on the occasion and under the circumstances detailed.

Mr. Ellerbeck exhibited the presentation prints of the South London Photographic Society.

After a hearty vote of thanks to Mr. Palmer for his useful and successful demonstration, and also for his paper, the meeting—which was the most crowded ordinary gathering which had ever assembled under the auspices of the Liverpool Amateur Photographic Association—adjourned to the last Thursday in November.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE annual meeting of this Society was held at the Manchester Technical Schools, on Thursday, the 11th ult.,—Mr. John W. Leigh, President, in the chair.

The minutes of the previous meeting were read and passed. The Annual Report was then read, followed by the Balance Sheet, of which a copy was given to each member.

ANNUAL REPORT.

THIS is the twenty-eighth annual meeting of this Society, and your Council have great pleasure in congratulating you upon the great success of the year now ebbing away.

If we have not added quite so many new members as we did in the previous year, we have fewer resignations to record. Our present numerical strength is 113 against 104 last year.

It is very satisfactory to find the average attendance at our meetings has increased to 51 this year, against 46½ last year; and, although we cannot boast of an advance in the number of papers read before the Society, we are able with pleasure to reflect upon the general interest that has pervaded our gatherings.

One of the principal events of the year was a most successful exhibition, in November last, of the work of our members, and illustrated the great progress which has been made amongst us, showing how much art can lend itself to the pleasures of holiday rambles.

At our December meeting a lantern exhibition was given, at which over 300 slides, produced from the negatives of our members, were thrown upon the large screen. In this fascinating branch of photography great strides in progress were manifest, and the exhibition closed with a large collection of slides by York, Woodbury, and others.

Next, we had a sale by auction of the apparatus of members. This was more successful than ever contemplated.

Mr. G. J. Johnson read a most interesting paper on *Photomicrography*, He exhibited the apparatus he had devised for this special work, and also a series of slides of microscopic objects.

Amongst other matters, instantaneous shutters and pictures taken by their aid have been exhibited and discussed.

Mr. Openshaw gave a very interesting demonstration of the platinotype manipulation.

Mr. John Schofield gave us an account of how he made his gelatino-bromide enlargements, and showed us the apparatus he used.

Mr. A. Coventry exhibited his new drying-box, and gave some highly appreciated hints on the manufacture of gelatino-bromide plates. Whilst Messrs. Smith, Greatorex, McKellen, and many others have always had plenty of novelties in apparatus to exhibit, Messrs. Leigh, Coote, Pollitt, and others have come forward with abundant results of their labours in other ways.

Before concluding this retrospective survey of our proceedings we must acknowledge the success of our outdoor meetings. Of the whole twelve meetings arranged only one has fallen through. Most of the others have been well attended, and in every case proved enjoyable to those present.

Now, last but not least, we have a word or two to say upon our financial status. Perhaps not in the annals of this Society has there been such a balance in its favour; for, notwithstanding the calls that have been made upon our exchequer, and the number of outstanding subscriptions, we have a larger balance than ever.

And now, in resigning our respective offices, we must again congratulate you upon the sound basis, not only of the financial and general working, but the harmonious feeling which seems to characterise the whole of our proceedings.

Dr. BAHIN, in moving that the report be accepted, complimented the Council on their able management and the very satisfactory manner in which they had worked during the past year.

The Rev. H. V. MACDONA seconded the motion, which was unanimously carried.

The next business was the election of officers for the ensuing year, resulting as follows:—*President:* Mr. J. Pollitt.—*Vice-Presidents:* The Rev. Canon Beechy, Messrs. Alfred Brothers, E. Openshaw, John Warburton, John Schofield, and Dr. Bahin.—*Council:* Messrs. S. D. McKellen, Jos. Greatorex, R. Atherton, W. Broughton, J. T. Chapman, John Chadwick, Thomas Sefton, S. F. Flowers, A. Coventry, and John Kershaw.—*Hon. Treasurer:* W. G. Coote.—*Hon. Secretary:* W. J. Chadwick.

Whilst the voting papers were being arranged, the Chairman called attention to the albums and portfolios of the Society, and particularly to the new question box. These proved objects of great interest to many new members who had not seen them before.

The CHAIRMAN acknowledged the receipt of a packet of complimentary tickets from the President of the Photographic Society of Great Britain, to view the Exhibition now open in Pall Mall, and these were distributed to those members who thought they might be able to avail themselves of the opportunity.

Mr. S. D. MCKELLEN called attention to a few splendid pictures—*Views in Derbyshire*—he had taken recently by means of a Suter lens. The negatives were whole-plate, taken with an 8¼-inches focus lens, and they were remarkable for the splendid definition right to the very corners. In reply to a question, he (Mr. McKellen) said he found the lens very rapid, but in the present case he had used a small stop.

Mr. W. Broughton exhibited, on behalf of his friend Mr. Bent, a series of lantern pictures from his own negatives, taken in South Africa, and they were very much admired.

Mr. J. Kershaw exhibited a remarkable little picture—a boy blowing soap-bubbles. This, he said, was taken in the studio on a not very bright day.

Mr. A. BROTHERS proposed that the Council take into consideration the possibility of holding an exhibition of photographs in the Royal Institution at the close of the present exhibition of paintings.

The Rev. H. V. MACDONA seconded this motion. He endeavoured to show the advantages of giving prizes, and gave some of his experience in connection with dog shows, &c., &c.

The following gentlemen were duly elected members of the Society:—John Huison, H. O. Hutchinson, John Marsden, Isaac S. Moss, W. S. Fidler, Thomas Emmett, J. A. Chadwick, Otto Muth, Frank Edwards, T. Scott, J. W. Kenworthy, and A. C. Farnsworth.

After a pleasant and busy evening the meeting was adjourned.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE second general meeting of this Association was held in the Religi Institution Rooms, on Tuesday, the 23rd ult.,—Mr. Councillor Robert in the chair.

The minutes of the previous meeting were read and approved of. Secretary also read letters from Messrs. Parker and Dickie, acknowledg the receipt of their awards, and thanking the donors for the same.

The CHAIRMAN then proposed that a small committee be appointed select a photograph to be engraved for the presentation print. He nan three gentlemen, Messrs. John Parker, Andrew McTear, and Tho Annan, who were accordingly appointed.

The question-box was then opened and the following questions w found:—1. "Has the winner of the medal for the transparency competit complied with the rules by sending in a written description of the meth by which they were prepared (for the use of the members of the Societ And, if so, why has it not been distributed among them?"

Mr. J. PARKER said that he was not aware that was one of the rules, he would be very glad to give a description of his process.

2. "Has any member used the collodio-chloride printing paper, mentioned in this week's Journal, and with what results?" None of members present had tried it, but

Mr. THOMAS ANNAN said that Mr. Bruce, of Dunse, had used it many years with great success.

The Treasurer then read his report for the session 1882-3, which show that the income (including balance from last session of £9 17s. 8d.) been £35. 0s. 2d. The expenditure was £19 4s. 11d., leaving a balance hand of £15 15s. 3d.

The CHAIRMAN, in a few words—in which he thanked the Treasurer (Bell) for the conscientious manner in which he had fulfilled the duties treasurership during the fifteen years he had held that office—moved adoption of the report.

This was seconded by Mr. HUME, and ageed to.

The CHAIRMAN then called on Mr. Norman Macbeth, R.S.A., to r his paper entitled *Skyshade to Secure a Foreground and Clouds on the S Negative.* [This paper has already been published and need not now commented upon.]

A number of very fine pictures by Mr. Parker, illustrating the action the shade, were then handed round.

Mr. PARKER said that in doing these views he had used Wratten Wainwright's slow plates, and also that while using the shade the expos required to be about twice as long.

Mr. A. MCTEAR said that he considered the combination of cloud landscape in one negative to be a great stride in landscape photograp He had seen Mr. Sam. Bough, R.S.A., in painting some of his pictu paint the sky first, and then in painting the picture he adapted the light of the foreground to suit the cloud.

Several other members spoke, and expressed their satisfaction with shade.

Mr. LANG asked how he could procure such a shade as Mr. Macbeth'

Mr. MACBETH said he would leave his shade with the Secretary, so any of the members might use it as a pattern.

The CHAIRMAN then called on Mr. Macbeth to read his second pape *A Ferrous Oxalate Developer.* [This paper will also be published.]

Mr. MACBETH then exhibited several negatives by this developer, wh seemed highly satisfactory. He also exhibited a number of interesting pri

Mr. PARKER asked Mr. Macbeth to explain why the prints were so in tone.

Mr. MACBETH replied that no toning bath had been used in the prep tion of these prints. He disliked the ordinary tone of photographs much, because they were so cold and blue and photographic-looking. much preferred the beautiful rich brown he obtained by merely wash the print with water, and then fixing in the hypo. bath for not more t five minutes.

Mr. T. ANNAN asked whether he used an old fixing-bath, as very sepia tones could be obtained by so doing.

Mr. MACBETH said he always prepared a new bath when the old began to colour.

One of the prints Mr. Macbeth showed was rather a curiosity. plate was exposed and developed in the usual manner; but, instead being a negative, it turned out a positive—perfect in every respect. subject was a sandy beach on which a number of children were playing

Mr. LANG said it might be the result of hypo. getting into the oxa developer.

Mr. MACBETH said that could not be in this case, as he had devel another plate at the same time. He expressed his desire to know experience of the members in regard to oxalate developers.

Mr. LANG said he had used Captain Abney's ferro-citro-oxalate devel with great success. It was too slow for professional photographers. He developed a plate for an hour and a-half and at the end got a good nega

The CHAIRMAN then proposed votes of thanks to Mr. Macbeth for papers, and to Mr. Parker for his readiness in giving his discovery to Society and to the public generally. These were heartily accorded.

Mr. MCTEAR then proposed a vote of thanks to the Treasurer for the scientious manner in which he had fulfilled his duty, as shown by his re

This was also passed enthusiastically, and the meeting was adjourne

Correspondence.

PHOTOGRAPHY AN ART.

To the EDITORS.

GENTLEMEN,—It seems to me that the correspondence on this subject is "much ado about nothing." Photographers are hurt because

not dubbed "artists." They forget that to be artists they must e training, which, unfortunately, few have. Photography is not cannot be an art, but the photographer may be and frequently is rtist in the highest meaning of the word.

inety-nine out of every hundred of the brethren of the brush are e copyists in colour. Ninety-nine per cent. of the brethren of the ack art" are but copyists of nature, but with greater power of re-luction. If the daubs offered by artists were offered by the thousand hotographs are they would be a glut in the market. It is only the n price and the limitation of quantity that in so many cases forms ir value, whereas silver prints sell by the tens of thousands—the rence being that, while photography is not an art, the photograph y be the work of an artist. J. H. T. Ellerbeck.

iverpool, *October* 29, 1883.

IS PHOTOGRAPHY ART?

To the Editors.

Gentlemen,—I think that Mr. W. H. Stillman has rendered good vice in helping to clear away the mist and confusion that still rounds this long-debated subject.

can see no reason why a photographer should style himself "artist" more than a shoemaker or a tailor. Photography is a mechanical pure and simple, and professors must show their claim to be called rtists" by the quality of their work. In my judgment there is just much difference between the arts of photography and the creative l constructive power of the painter, sculptor, poet, and musician as re is difference between reason and instinct. These have rare gifts nature, differing in degrees of power to express their conceptions, sequently there are but few masters.—I am, yours, &c.,

Brighton, October 29, 1883. W. Hall.

"THE EXHIBITION AWARDS."

To the Editors.

Gentlemen,—Kindly allow me to make a few remarks on the Rev. V. Macdona's letter in the same spirit in which he has written his.

There were 194 exhibitors (excluding a few collective frames, such as School of Military Engineering, &c.), and fifteen medals were arded; that is, one for every thirteen (roughly) exhibitors. Surely s seems quite enough. Immediately the number is much increased honour of gaining a medal is gone.

[would, for my part, rather see things made more rigid; in other rds, I should like it to be considered an honour to get a picture ng. The gallery is small, and if the Hanging Committee were eful to weed all doubtful works the remainder could all be well ng, and not "skied" and "earthed." This year—and especially t year—there were many works that were very poor.

As to the number of medals: I think those now given quite sufficient. t there is another rule which would be of great advantage; that is, t nothing whatever should be permitted to be placed upon the front the frames—except, perhaps, the name of the picture—and that the lges should not be supplied with a catalogue of the names of ex-bitors until after the awards had been made. In fact, each picture uld stand on its own merits, not being supported by a hint one way the other.

It seems a step backwards that there were no artists this year ongst the judges.

Mr. Macdona says there were 590 disappointed aspirants. I, for one, claim that title, the possibility of gaining a medal never entering head.—I am, yours, &c., An Amateur.

October 31, 1883.

"A MISTY MORNING ON THE WEAR."

To the Editors.

Gentlemen,—I was much amused today, on reading your notice of s year's Exhibition in Pall Mall, by your remarks concerning my ture, *A May Morning on the Wear*, and my last year's exhibit, *A isty Morning on the Wear*.

If it be an "open secret" that the latter was "an accident—a fogged gative"—how do you account for the trees in the immediate fore-und (between which and the camera there could not be much mist, ing to their close proximity) being so strongly delineated, and the re receding the objects in the picture the more obscure they become? it were an accident, it seems rather an odd thing that I waited on the nk of the river a full hour before I saw the desired atmospheric ect. Three other photographers who were there at the same time, t who had put up their cameras as not being able to do anything, d one of whom saw my *Misty Morning* developed, thought I was just sting my plates.

As a matter of fact, I did expose another plate, but a gust of wind t the foliage in motion at the time and spoiled it. I took no other gative on the Wear last year and the *May Morning* was not taken til May of this year, so the wise heads who will not give me credit anything beyond "an accident" are certainly out of it this time. perhaps made a mistake in taking another picture from the same spot; but my friends admired the view, and I thought I should like to see the effect on a clear day.

Any one can see that they have been taken at distinctly different times; for, on comparing the two photographs, some of the little twigs on the trees and the foliage take quite different forms, which altogether precludes the possibility of their having been done in the same season. Most absurd and ridiculous guesses have been advanced as to the way in which the picture was produced, and I have certainly had the credit of all kinds of ingenious devices attributed to me for obtaining the effect of mist, all of which were wide of the mark, unless it was believed to be a pure, simple photograph without touch or dodge, which it really was. The judges at the last year's Exhibition did not see sufficient merit in it to award it a medal, but it has been gratifying to me to find that at all the other Exhibitions to which I have sent it it has met a better fate.

I am sorry to trouble you with such a long letter, but I shall be obliged if you will kindly insert it in your Journal, as I find that the misapprehensions regarding the picture require correcting; and so apologising for the space I am encroaching upon,—I am, yours, &c.,

Darlington, October 27, 1883. W. McLeish.

[Our remarks were based upon information received from one of the three photographers present when the picture was taken. Perhaps "fogged negative" is scarcely the correct term to apply, as we understand the effect was produced by heat haze at or about noon. We willingly publish the above explanation.—Eds.]

THE RECENT COPYRIGHT CASE.

To the Editors.

Gentlemen,—As in my last letter I declined to interrupt "Audi Alteram Partem's" ecstatic enjoyment arising from the contemplation of his own "sublime and lofty ideality," so I must decline also to interfere when he is wallowing with such evident delight in the vulgar occupation of "mud-throwing."

Abuse is not argument, and the ridiculous and silly remarks in his latest production prove nothing except that there is no fear of *his* being a loser by the "surreptitious filching of other men's brains." Any of your readers who will take the trouble to read through the whole of the correspondence will, I think, agree with me at least on this point.—I am, yours, &c. John H. Jackson.

New Wortley, Leeds, October 26, 1883.

To the Editors.

Gentlemen,—I certainly think the plaintiffs in the recent case suffered a grevious wrong; but I am compelled, nevertheless, to protest against the intemperate manner in which "Audi Alteram Partem" is discussing this case. I freely acknowledge his zeal on behalf of what I hold to be morally right, but I cannot say so much for his discretion, which bespeaks a young advocate.

Surely nothing could be weaker than the paragraph in his last letter:—"I grant there are 'producers' * * * who, to meet a demand, will reproduce their subjects, and in *such a manner as to lose all the beauty the originals possessed*, and I have seen these 'smears' duly affixed, with the name of the house attached," &c.

But what can be thought of a writer who can advance this for argument, and then rush in and impugn, *ex cathedrâ*, the legal judgment given by an English judge upon the technical merits of the case? I can only consider the case upon its merits injured by such advocacy.

Upon the general question of proprietory rights in photographs there cannot be a doubt that there is very often an "unearned increment" in the proprietorship of popular photographs. I am compelled to admit that while a large—I believe an increasing—number buy photographs from their artistic merits, by far the greater number purchase on account of the popularity of the picture, however obtained, quite irrespective of its artistic merits.

But I have neither time nor inclination to enter into this. My sole reason for writing was, in the absence of any other protestant, to protest against the "too much zeal" that "Audi Alteram Partem" has introduced into the discussion.—I am, yours, &c., J. Bate.

October 30, 1883.

A CORRECTION.

To the Editors.

Gentlemen,—The articles named in your report of the technical meeting of the Photographic Society of Great Britain—a new double dark slide, bellows extension front or lengthening body for camera, new portmanteau stand, and new model camera—were exhibited by us, and *not* by Mr. Geo. Smith, as stated.—We are, yours, &c.,

88, *Newman-street, W., October* 31, 1883. J. F. Shew and Co.

To the Editors.

Gentlemen,—An error appears in your report of the technical meeting of the Photographic Society of Great Britain in your issue of last week, my exhibits being mixed up with those of Messrs. J. F. Shew and Co. The substitution of "Mr. Shew" for "Mr. Smith" in the passage which reads now—"Mr. Smith showed a double dark slide

and a bellows extender for the camera front, which appears remarkably rigid," will put it right.—I am, yours, &c., GEORGE SMITH.

20, *Colebrooke-row, N., October* 30, 1883.

[We regret the error made in the report, which reached the printer at the last moment before going to press.—EDS.]

EXHIBITION OF THE NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

To the EDITORS.

GENTLEMEN,—Kindly allow me, through your Journal, to remind intending contributors to our forthcoming Exhibition, that the *notices* of exhibits should be sent in by the 12th November. Pictures will be received at the Central Exchange Art Gallery up to 9 p.m. on the 20th November. The Exhibition will be opened on Friday evening, the 23rd November, and remain open until the 8th December.

I shall be glad to supply further particulars and forms to anyone desiring them.—I am, yours, &c., J. PIKE, *Hon. Sec.*

43, *Northcote-street, Westgate-road,*
Newcastle-on-Tyne, October 30, 1883.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

William Pankhurst Marsh, Norfolk Cottage, Bognor.—*Three Instantaneous Photographs of High Tide at Bognor.*

Alfred Freke, 12, Duke-street, Cardiff.—*Photograph of Lord and Lady Windsor, also Photograph of St. Fagan's Castle.*

*** We have several articles in type held over for want of space, and for which we shall make room at the earliest opportunity.

EXCHANGES.—In our next.

WARD.—It is simply a lithograph got up in imitation of a photograph.

JOHN HODGE.—If you forward your address the exchange will be inserted.

GEO. LOWDON.—We fear you will not be successful in procuring "licht-druck" paper in England. See reply No. 1 to "A. J. P."

ALPHA.—Yes. The case appears to stand very much in the position as described to you. We fear that we can be of no assistance in the matter.

A. CHARGOIS.—All the makers you name supply excellent plates, but whether they have any specially prepared for hot climates we are unable to say. Better write to them direct.

AN AMATEUR.—You do not say the kind of enamelling on which you desire information. Do you mean photographs burnt-in on ceramic ware, or simply glazing photographs with gelatine?

JOHN C. EARNSHAW.—We do not know of any one who supplies "sensitive gelatine emulsion." You might write to some of the dry-plate manufacturers and ask if they will supply you with some.

WHERE TO GO WITH THE CAMERA.—We have inserted today the last article under that head for the present year, and we beg to thank our numerous contributors for their very interesting communications.

OLD IRELAND.—As you are such a novice in lantern matters we recommend you to have a blow-through jet at first, so as to avoid an accident. When you have gained some practical experience in the use of that you might get a mixed jet.

MARINE DRAUGHTSMAN.—According to our standing rule your previous letter, as it did not contain a name and address, was consigned to the waste-paper basket. If you will kindly repeat your query, we shall be happy to afford you every assistance.

B. O. Z.—Why not send the pictures by parcels post? They will probably not be delivered quite so quickly, but the extra delay will not be much. Get your artist to pack them in waterproof paper, after he has coloured them, as a protection against moisture.

AJAX.—Either form of jet can be used in dissolving. If you employ the mixed jets in the triple lanterns you will, of course, get a better light than you now do with the "blow-through." For dissolving, one form of jet is as good as the other. Thanks for the promised article.

LANTERNIST.—If the india-rubber has so much "perished" your better plan will be to get new. It will be cheaper in the end, for if you repair the leaks now existing fresh ones will doubtless occur, which will entail a great waste of gas, thus proving more costly than new tubing.

WILL. TAYLOR.—No wonder you cannot get even illumination, seeing that you are attempting to enlarge six and a-half inch by four and a-quarter inch negatives with a "stereographic lens." If, in place of such a short-focus instrument, you substitute one which is capable of taking a good half-plate negative sharp up to the corners you will, no doubt, be successful. If the negative be evenly illuminated, and the enlarged image be not, it is clear that the enlarging lens is at fault. This will be a guide to you in selecting a suitable lens for the amplification in future.

A. J. P.—1. We are not aware that "lichtdruck" paper is an article of commerce in this country, although it is in Germany, where the process is more largely practised than it is in England. However, if you procure hard, enamelled paper, such as is employed in chromo-lithography, it will probably answer quite as well. Messrs. Spicer Brothers, Bridge-street, Blackfriars, E.C., will, no doubt, supply what will be suitable.—2. Probably the collodion you have been employing is of too horny a character; try the admixture of some of a more porous kind. From your vague description we are unable to account for the yellow spots.

J. B. BARRETT.—Your best plan, we surmise, will be to obtain a situa[tion] as operator in some good house where you will have an oportunity of [ac]quiring a knowledge of the business department. We are, of cou[rse,] assuming that your abilities are equal to the appointment of a fi[rst-]class operator.

J. MANNING.—Any of the well-known "white-fire" compositions of [a] pyrotechnist will answer quite well. You will require a lantern—provi[ded] with a chimney to conduct the products of combustion away—in which [to] burn the composition; also suitable reflectors for diffusing and soften[ing] the light on the sitters.

J. Q.—There has been nothing reliable published on the process since [the] date to which you refer. Probably Mr. Woodbury can supply you w[ith] a su table paper for the process. If he cannot, we are very doubt[ful] if you will be able to procure it in England. Mr. Woodbury can possi[bly] supply you with the presses also.

RECEIVED.—W. J. Stillman; H. Norwood Atkins. Thanks. In our ne[xt.]

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—T[he] Annual General Meeting of this Club will take place on Wednesd[ay] evening next, the 7th inst., when the election of officers for t[he] ensuing year and other business will be transacted.

THE LANTERN EXHIBITIONS OF THE PHOTOGRAPHIC SOCIETY [OF] GREAT BRITAIN.—These meetings, which are held in the Exhibiti[on] room on Monday evenings, are rapidly increasing in popularity. [On] Monday last, when views by Dr. Morton and Mr. W. England were e[x]hibited, no fewer than 475 persons were present, the number of th[ose] who witnessed last week's exhibition being 462.

A PORTRAIT IN COURT.—Mr. Henry Johnson, photographer, [of] Dovecot-terrace, Green-lanes, Woodgreen, sued Mr. W. White, print[er,] Bridge-chambers, Blackfriars, at the City of London Court on Saturd[ay] last, to recover the sum of £1 10s. for copying a *carte-de-visite*. T[he] solicitor who appeared for the defendant said his client declined to p[ay] the money because the enlarged copy of the *carte* was not at all like t[he] gentleman. Amid considerable amusement the portrait was handed u[p] to the Bench, and the defendant was called into the witness-box [in] order that his Honour might have the opportunity of comparison. H[is] Honour: I don't sit here as a judge of art, but I would like to kno[w] when the *carte* was taken. Plaintiff: It was taken about five yea[rs] ago. You will understand that I was not employed to take the phot[o]graph, but to reproduce the *carte*. His Honour: I think you have do[ne] your work very well. Plaintiff: My instructions were to make t[he] eyes dark blue and the whiskers not too grey. Defendant's solicito[r:] I have a boy in court who knows the defendant very well, and wh[en] the portrait was sent home he could not recognise it. His Honou[r:] That may be; but recollect that five years had elapsed. Defendan[t's] solicitor: Then your Honour holds that the portrait is a good rep[ro]duction of the *carte*? His Honour: Yes; there will consequently [be] judgment for the plaintiff with costs.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1227. Vol. XXX.—NOVEMBER 9, 1883.

PHOTOMICROGRAPHY.

Before noticing some of the forms of apparatus used in a vertical position we may as well specify some of the varieties and methods in use that belong to the category of those already described. Through the kindness of Dr. Clifford Mercer, of Syracuse, N.Y., we have before us photographs of the plan he employs, which differs largely from the general methods; but the description will be largely taken from Dr. Beale's *How to Work with the Microscope*, where the apparatus is figured. The ordinary microscope is discarded. A long base-board, or, preferably, a frame with a large circular front, is supported on four stout legs at a convenient height. The camera is of the long double-box sliding form. The body-tube is attached by a kind of double flange to the front of the camera, and projects freely from it; but behind, and between it and the camera, is a light-tight arrangement for a sliding pierced shutter, to admit or cut off the light to the sensitised plate. The centre of the circular front or table corresponds with a *perpendicular axis*, about which a flat bar that projects over the edge of the table can rotate, and about which axis also can rotate the object-holder and camera. The edge of the circular front is divided into degrees. The bar supports on a vertical stem the mirror, which is provided for equatorial movement, and at a little distance from it, towards the camera, supports—likewise on a stem—a conical tube, holding at the large end the ammonio-sulphate of copper cell and the condensing lens, and at the small end a convex or concave lens, adjustable for the purpose of obtaining convergent, parallel, or divergent light. These are fixed in heights on their stems, which are also adjustable, so that their axes shall exactly coincide with the optic axis of the microscope tube; and by the rotation of the bar on the central pin they can be carried round so as to give oblique light either to the right or to the left, and, when brought nearer to the camera, to throw light upon the upper surface of an object.

The stage or object-holder consists of a wide tube with *open sides*, which fits on the front end of the outer microscope tube, without interfering with the rack motion which moves the inner tube to which the objective is attached. At the mirror end the stage consists of two flat rings, between which the object slide is held by clips, which bring the covered surface of the slide to rest against the ring towards the objective, the cover-glass entering the ring. The object is thus made to coincide with the surface of this ring, or open diaphragm, and with the centre pin of the rotating bar—the perpendicular axis really passing through the object. This is of great importance in taking stereoscopic photomicrographs, the angle of inclination of the object being given by a screw on each side pushing perpendicularly against the condenser surface of the outer ring. The light is kept at the same obliquity by the bar being turned, right or left, through the same angle as that through which the object is turned. By the arrangement of the distance between the large and small lenses in the conical condenser the inner cone of rays can be rendered parallel, and the less converging heat rays of the outer cone of the large lens made divergent.

In order to keep the rotating bar in the meridian the circular portion of the frame is in two parts, the one resting upon the other. The projecting end of the bar can be fixed to the under part of the frame, which is firmly supported on three legs, while the upper part, together with the camera, can be turned about the same perpendicular axis already noticed, thus obtaining light of any required degree of obliquity. For making the fine adjustment a lever rod clamped to the milled head of the coarse adjustment projects upwards, and is connected to a long rod that lies on the top of the camera. The focussing-screen is covered with a film of milk or thin starch, and when dry—on the middle horizontal line three or four half-inch spots—have the film completely removed. The plate is put in the sensitive plate-holder with the door and slide open. The focus is first taken on the film. A block behind the plate-holder holds a tube with an eyepiece and low-power objective. The block is moved equally across the frame, and, after getting the focus of the film, is moved to the bright spot for the final focussing. The shutter for the exposure rests on a block beneath it. If the block be withdrawn a little the shutter falls until it strikes a cushioned stop at the end of the block, the light traversing the shutter; but when the block is wholly withdrawn the shutter falls until stopped by a projecting shoulder at its upper part. The plate-holder is twice the ordinary length, and constructed for taking stereoscopic pictures.

We may remark that this plan has certain conveniences, though to be of effectual use it would require to be well made. The tail bar plays the part of the sub-stage rotating bar in the present form of first-class microscopes. In using artificial light the lamp can be fixed to the bar, as also a pierced screen. No doubt there are arrangements made for any sub-stage apparatus—as polarisers and achromatic condensers—though not described.

In a communication to the Manchester Photographic Society, February 5, 1862 (see this Journal, February 15, 1862), Mr. G. Parry stated the method he used. To the front of the camera was adapted a conical connecting brass-piece, on to which is screwed a tube carrying at one end the objective, and at the camera end inside another achromatic lens of longer focus. Outside this tube slides another which carries the object, and which can be moved by a rough or fine adjustment screw working in a nut soldered to the outer tube. This tube at the outer end has soldered to it a perforated plate of brass, and a similar plate is held to it with the object slide between by india-rubber bands. A diaphragm is placed inside the inner tube at the conjugate foci of the objective and large lens, and one or more are placed in the camera body. The condenser is a small plano-convex of one and a-half inch focus placed at about one inch from the object and four or five from the Argand gas burner or paraffine lamp, though light from a white cloud with the concave mirror was preferred. The power found most useful under this method was a Parke's one inch and a Ross' stereoscopic lens of four and a-half inches focus.

Referring to the pages of this Journal of November 15, 1858, we find the method adopted by Mr. Traer, who worked in the open air. The optical portions of the apparatus—namely, objective, stage, mirror, and adjustment—were attached to the camera front, the mirror being larger than the usual size. The camera was placed on a firm table, with its long axis in the direction of the sun's rays, so

that the sun was behind his back; and to avoid having a bright spot in the field, which is often an annoyance when working in sunlight, the rays from the concave mirror were made to come to a focus and cross just before entering the objective. As a sub-stage achromatic condenser the power next below the one in use was employed. With objectives under the quarter inch the plane mirror was used. Care was taken to have the apparatus well protected from the sun's rays by the focussing-cloth. Professor Kain—*vide The Amer. Month. Mic. Jour.*, April 1, 1882—speaking of this sun spot, says he found a bright spot in the centre of the field if he used the apparatus without the eyepiece, but he avoided it by lining the body tube with dead-black paper and retaining the eyepiece. He states it to be due to irradiation from the interior of the body tube of the microscope. We think there may sometimes be other causes, as reflection from a surface of one of the component lenses of the objective. In the next number of the same journal is an article by the editor on *Photographing with the Microscope*, May, page 88, 1882. Some have employed a reflector set at the angle of total reflection at the ocular end of the microscope tube, the image being thrown down on the sensitised plate beneath.

Dr. P. Miquel, of the Montsouris Observatory, Paris, who for some years has been engaged in the study of the living organisms found in the atmosphere at all hours and in all conditions, has lately, for the purpose of photographing the bacteria under culture, had an adaptation made to his microscope tube, which, while the camera remains in the horizontal position, enables him to watch the objects on the slide and select the appropriate objects in the field of view and immediately proceed to photograph them. It is exceedingly difficult to watch such small objects at the focussing-screen, or to select from a crowded mass of such minute bodies any changes they may be undergoing; therefore he has had constructed, by M. Nachet, a double tube attached at right angles to the body tube, close behind the objective. The lower end of the inner tube carries a small total internal-reflecting prism, and the upper end an ocular; so that when in proper position the images of the objects on the stage are seen through the eyepiece, and, when the selection has been determined on, the prism can be racked up the tube and out of its position, while the final focussing can be made at the focussing-screen. The prism in the above plan requires to be placed very near to the posterior surface of the objective to secure the entire field, otherwise the prism must be of some size to secure a good, full field of the objects. Every attention should be paid to the proper adjustment of the prism, or the same objects as seen will not be thrown centrally upon the focussing-screen. The base-board carries the reflector, lamp, pierced screen, and conical condenser, whilst the microscope is clamped and supported in such a way as to avoid vibration as much as possible. Dr. Miquel remarks to us that there is always considerable difficulty in obtaining good photo-micrographs of these minute organisms, to which we can abundantly testify, when using high powers. If unstained and in fluid they become, as it were, drowned in the light; and if stained blue, which is so commonly done for differentiating purposes, they do not stop the light sufficiently. We have found the brown and red stain, also iodine, yield the best photographs; but the colour has to be most carefully washed off from the thin cover-glass without disturbing the microbes, otherwise the field is rendered partly non-actinic and the time of exposure prolonged.

PAPER NEGATIVES FOR VARIOUS PURPOSES.

In our article last week upon *Cloud Negatives and Their Use* we alluded to the production of paper negatives to be used for the purpose of masking difficult subjects, and, in response to several inquiries for further particulars, we shall this week enter more minutely into the details of their preparation. We are the more ready to do this because such paper negatives, which are easily prepared, may be utilised for a variety of purposes in connection both with portrait and landscape work.

The first description of this simple process for producing paper negatives was given some years ago by Mr. William Brooks, in a paper read before the South London Photographic Society. This was in connection with a method of masking negatives in order to improve their printing qualities, either by giving greater general density or by a species of local intensification, effected by destroying or removing the image from the second negative in those parts which are satisfactorily rendered in the original. Thus, in a landscape negative the foreground of which prints too quickly for the distance, harmony is secured by using an auxiliary paper negative as a mask, and removing by means of iodine and cyanide of potassium those portions of the image which print too slowly. Clearly, it would not be worth while to adopt this somewhat roundabout plan with every negative taken in the course of a season; but where an artistic result not otherwise attainable can be thus secured the game may be found to be "worth the candle."

In modifying portrait negatives, especially large ones, this method is also peculiarly useful, as it affords exceptional facilities for retouching—either with the pencil or with water colour—both on the paper negative and also on the intermediate paper positive, thus giving a double power. It, moreover, gives in the final print a remarkably-soft effect—very similar in character to the so-called "Denier effects," which were, in fact, said to be obtained by producing a second negative image on the reverse side of the glass.

As regards the preparation of the paper negative little more need be said than has already been in connection with the production of cloud negatives on paper. The ordinary albumenised paper is employed, and this may be either the commercial "ready-sensitised" preparation, or may be floated by the operator himself. In order to secure the greatest possible printing vigour, the positive should be made many shades darker than is necessary with an ordinary print, especially if, as may be done if desired, the toning operation be dispensed with. Much greater vigour is obtained, as we pointed out in connection with cloud negatives, by placing the *back* of the paper in contact with the negative when the image is formed in the paper, the albumen surface exhibiting only the faintest trace of an impression and the back surface but little more. Upon viewing the print as a transparency, however, a very powerful and well-detailed picture is seen, but presenting a little more grain or texture than would be the case if the albumen side of the paper had been in contact with the negative. This extra grain is, however, of no consequence, for two reasons:—1. When the paper negative is to be used as a mask the interposition of the glass of the negative between the two images entirely destroys or diffuses the grain. 2. In reproducing the paper negative from the positive the two grains appear to neutralise one another, or, at anyrate, to produce a softened effect, which is far from unpleasing.

It now becomes a question as to whether it is necessary to resort to toning either the intermediate positive or the final negative. Reviewing the whole of the conditions, we are inclined to think that except on the score of permanency the practice is unnecessary, and we imagine that for most of the purposes to which this process of paper negative making will be applied the question of permanency —so far, at least, as the change of colour of the image is concerned— will not cause a great amount of anxiety. But it should be borne in mind that the untoned image is reduced to a far greater degree in the fixing bath than one that has been toned.

The production of the paper negative is effected in precisely the same manner as the positive; but if the original negative exhibit any imperfections in the way of spots which can be touched out in the positive this should be done. To one who can use the pencil and brush deftly a great deal may be done upon the intermediate positive as well as upon the second negative in the way of introducing "effects;" but this, of course, requires skill. We have, indeed, seen prints of moderately-large size (10 × 8, if we recollect rightly) made from reproduced paper negatives which were infinitely superior to those from the originals.

The negative or positive having been completed—so far as printing, fixing, and washing is concerned—is pressed between folds of blotting-paper until nearly dry; it is then finished off with a hot iron to make it perfectly smooth and flat, after which the retouching should be performed. Now is the time to consider whether any portion of the image requires removing—that is, supposing the negative to be required for masking purposes. If such be the case, the portions to

be removed should be brushed over with a ten- or fifteen-grain solution of cyanide of potassium to which a few grains of iodine have been added, taking care not to fill the brush too full or the solution will run where not required. A strong solution of chloride of copper also answers well for the same purpose, and has the advantage of being less poisonous. This may be made by dissolving separately, in the smallest quantity of hot water possible, one part of sulphate of copper and two parts of common salt and mixing the two solutions.

Before proceeding to the next stage it is well to try the effect of the negative, as after oiling or waxing it is impossible to do any further in the way of modification. This having been satisfactorily attended to, the negative is rendered translucent by any of the methods described in connection with cloud negatives; or it may be desirable to render only certain portions translucent, in which case a solution of Canada balsam in turpentine or ether should be brushed over the parts required.

In some descriptions of this process it has been recommended, in order to affix the paper negative smoothly to the glass one, to damp it and then attach it at the edges with glue, so that when dry it may be strained tight. But the damping causes the paper to expand, and so the accurate register between the two images is destroyed. If the paper be properly ironed it will suffice perfectly to merely attach it *dry* by the edges, using a squeegee or similar means to lay it down smoothly after the correct register has been obtained. The combined negative is then ready for the printing-frame.

We have dwelt chiefly upon the application of the paper negative to masking purposes; but there are many occasions upon which it will be found extremely useful *per se*, and as a substitute for, or even an improvement upon, the original glass one. But for these applications we must leave our readers to find their own occasion.

A PLEA FOR THE SWING BACK.

It was with a feeling of something like surprise that the majority of those present at the Technical Exhibition of the South London Photographic Society, on the evening of Thursday last week, heard Mr. F. York express dissatisfaction with the use of swing-back cameras, coupled with the statement that in his own practice he employed a rigid camera for architectural work. This he carefully levelled, and then by means of the sliding front he brought the lens sufficiently high—up to the very top of the camera, if need be—to have the whole of the subject included. He invariably employed a lens which embraced an angle of view sufficiently wide to permit of this being done without cutting off the corners. As it was contrary to the intention of these technical exhibitions that formal discussions should be indulged in, an opportunity for discussing the subject and its merits, which several members seemed prepared to do, was not afforded; but Mr. C. Trueman Wood, Secretary of the Society of Arts, announced his intention of bringing it forward at the next monthly meeting of the Society.

The method adopted by Mr. York, however suitable for a certain class of subjects, is, in our opinion, not the best under all circumstances, and we shall adduce reasons on behalf of this position. First of all, we premise that in architectural photography it is imperative that the back of the camera, or sensitive plate, be placed in an absolutely vertical position when a view of the building is being taken, otherwise the edifice will not appear square, but (in the event of the camera being pointed upwards) with its sides leaning towards the centre, or, more correctly, directed towards a point above the centre. This invariably occurs quite irrespective of the lens; and these perpendiculars would converge all the same if there were no lens at all employed, the picture in such a case being formed by the rays admitted by a pinhole.

At this stage it may be useful to the younger photographers to indicate an instructive experiment:—With a lens of any class in a camera—one of short focus being preferred—direct the camera to either a building or anything square (an ordinary window will suffice) or having vertical sides, in such a manner as that the image nearly fills the ground glass. Hold the camera with both hands, and observe that when it is level the sides of the image are parallel with the sides of the ground-glass frame. Now point the camera a little upwards, when immediately the image loses its rectangular form, and the sides, instead of being parallel as before, now converge, this convergence being of a more or less marked character in proportion to the degree of tilting. Conversely to this, if the camera be pointed in a downward direction the nature of the distortion will be altered: instead of the perpendiculars converging as before they will now diverge. This experiment is so simple and teaches so much that the young photographer should embrace the earliest opportunity of trying it.

In photographing a building, therefore, the first thing to be done is to level the camera. If it be found that the upper portion of the building is excluded from being represented on the ground glass it may be got in, in a more or less complete manner, by raising the lens without disturbing the camera. But if the lens be intended to cover only little more than the plate that is being employed, the upper corners of the negative will be cut off by the encroachment of a circle of blackness. In all cases in which an extensive use of the powers conferred by the sliding front is to be made, it is necessary that a lens be employed which is capable of giving a field of delineation so large as to form a circle that shall embrace the plate operated upon when one of its sides is placed upon the centre of such circle, or nearly so. The limit of the capability of raising the front of the camera depends upon the difference between the dimensions of the plate and the circle of light included by the lens. Mr. York's practice amounts to this: in the taking of architectural subjects, under the conditions referred to, he employs a wide-angle lens—only he does not use it as such.

But this raising of the camera front cannot be practised when the lens employed by the photographer suffices for only little more than covering the plate employed; the dark circle to which allusion has been made quite precludes this being done. In such a case the swing back provides an efficient remedy for all shortcomings. The best way to employ this adjunct is, first of all, to place the camera level, then observe to what extent the upper portion of the building is left out, raise the lens until it just begins to show darkness at the lower corners of the ground glass, and stop this raising just a trifle short of this point. Next, tilt the camera until the whole of the edifice has been delineated upon the ground glass in a satisfactory manner, and swing the back until it is brought into a perfectly vertical position. The focussing must now be seen to, and as the swinging of the back causes the plate to be placed obliquely to the axis of the lens, a small stop must be employed to make all the planes of delineation equally sharp. We may here observe that it has been urged, as an objection against raising the sliding front to any material extent, that, seeing the definition given by a lens is best at the centre, when it is shifted in position by raising the front the upper parts will not be so sharp as when the lens is in its usual place. But the wide-angle combination lenses of the present period are sufficiently well corrected for flatness of field to stand this tax upon their resources; besides, a small stop is necessarily employed in photographing architecture, rapidity of exposure being here of less consequence than perfection of detail. In this respect the definition is not only no worse than when the swing back is employed, but may even be a little better, especially with a large stop.

In landscape photography the swing back is so useful as to be indispensable for the best work. In this, unlike architectural photography, the raising of the front of the lens is of little consequence, as the same effect—that of determining the position of the horizon—is readily attainable by moving the camera in its entirety. But with lenses of any moderate degree of focal length it is impossible to get near foreground objects in focus simultaneously with distant objects, owing to the conjugate focus of the former being longer; hence, to meet this case, it is necessary to have the power of placing the plate at such a degree of obliquity as to have its top, upon which is to be delineated the foreground, at a much greater distance from the lens than the centre. This embraces every requisite condition for having the objects in the near foreground rendered equally sharp with those in the centre of the plate; and it cannot be effected by the sliding of the front of the camera, no

matter in what direction or to what extent. While it is quite true that with small cameras having lenses of short focus the foreground will be practically sharp, even this is only the case when a small stop is employed and a narrow verticle angle included. With large pictures it is impossible to secure foreground sharpness in a rigid camera unless by the employment of a stop much too small for effective practical use. For this reason we would say that a landscape camera without a swing back is incomplete.

Hitherto we have been considering the employment of a camera having only a vertical swing. A horizontal swing, however, is also greatly conducive to the comfort of the landscape photographer when taking a view in which one side is much nearer to the camera than the other; for, by withdrawing farther from the lens that side of the ground glass upon which is delineated the side of the subject nearest to it, an equal degree of definition will be obtained. It is gratifying to find so many cameras in the Exhibition having improved mechanical facilities for effecting this horizontal swinging. This shows that the want of such facilities has been fully recognised by the makers, and is now receiving all the attention it so justly demands.

We have confined our remarks on the uses of the swing back to architectural and landscape work alone. For portraiture and groups the uses and advantages of both the vertical and horizontal swing are fully admitted by all.

A PHOTOZINCOGRAPHIC PROCESS.

Last week we directed attention to a photozincographic process, the invention of a Major de La Noë, of which our contemporary, *La Nature*, speaks with high commendation. On this process we shall now offer a few observations so as to make it the better understood by those who, possibly, have not given much attention to the different photo-mechanical processes.

In the first instance, we may explain that the process is one that is not adapted for half-tone, but only for line subjects, such as the reproduction of maps, plans, and similar work. The first stage of the process is analogous to that of the production of an etched copperplate by the bitumen process, except that zinc is employed in place of copper, and the etching is not carried nearly to such a depth as in the case of copperplates. But the method of obtaining the impressions is totally different from copperplate printing, for it is the same as that of lithography or zincography. The process (in some cases) possesses the advantage of not requiring a negative, as a tracing of the subject on translucent paper may be employed; but in any case a transparency, and not a negative, must be used for producing the photographic image. In our volume for last year [page 607] we gave some practical details of the working of the bitumen process for etched copperplates, to which we cannot do better than refer those readers who may desire to test the process of Major de la Noë, as there they will find some useful hints which, if they are unfamiliar with the bitumen process, will aid them materially in comprehending the working details of the process.

In photozincography, as usually practised in England, the photographic image is first of all obtained on paper in a fatty ink, is then transferred to the zinc, and afterwards the plate is etched. In France, according to *La Nature*, it would appear that a different method is followed, and the image is produced in the first instance direct upon the zinc by the bitumen process. The process is thus described:—A zinc plate, properly surfaced and cleaned, is coated with a dilute solution of bitumen in benzole, and when dry the prepared plate is exposed to light under a negative. After the requisite exposure has been given the image is developed with turpentine in the ordinary manner, which leaves those portions that have been protected from the light as bare metal. The plate is then subjected for a short time to an etching fluid, which attacks those parts that are not protected with bitumen, thus leaving the image in very faint relief. The impressions are then taken off the plate in the manner customary in zincographic printing.

We have thus briefly described this process, so that the modification of Major de La Noë may the better be understood. In this, as in the former process, the surface of the zinc plate is coated with a dilute solution of bitumen; but, instead of being exposed beneath a negative a transparency is used, which, as just mentioned, may be a design on tracing-paper. When a design on tracing-paper is used, a long exposure should always be given in order to ensure thorough insolubility of the bitumen. Many tracing-papers, although very transparent, obstruct a large amount of the actinic rays. After the plate has received sufficient exposure the image, as in the former case, is developed with turpentine, which leaves the lines as bare metal, while the other portions are protected with the bitumen—just the reverse of what occurs when a negative is used as a *cliché*. The plate is then treated with dilute nitric acid (five per cent.) for a very brief period—from a-half to three-quarters of a minute; this etches into all the unprotected portions. It is then washed with water, and, finally, the remainder of the bitumen is cleaned off with benzole. We then get a clean plate with the design in very slight intaglio.

So far the preparation of the plate is precisely the same as that described last year for copper, and the directions then given for the preparation of the bitumen solution and the development of the image will apply equally well in the process now before us up to this point. What is now required with the plate is to confer upon it printing properties similar to those of a lithographic stone. Here it may be explained that what is needed is that the slightly-sunken lines should have the power of holding the ink, while, in the other portions, it is repelled when the inking roller is applied.

This is accomplished in the following ingenious manner:—The plate is coated again with the bitumen solution, dried, and then exposed to the light, until the coating is rendered insoluble, and, of course, all over. It now remains to remove the bitumenous coating from all portions of the plate except the etched lines. There are two ways of accomplishing this—one being by mechanical means, as follows:—A stick of hardwood charcoal is taken, and one end is bevelled by grinding it on a rough stone. With this, moistened with water or oil, the surface of the plate is worked in the same manner as copperplates are surfaced. By this means the whole of the bitumen is removed from the surface of the plate, leaving the metal brightly polished, and the sunken lines still retaining the bitumen. These will now be nearly upon a level with the rest of the plate, unless the etching has been carried too deeply in the first instance.

The plate is now ready to be printed from, precisely as if it were a lithographic stone. The surface is first moistened with water, which is repelled by the bitumenous lines. Then an ordinary lithographic roller, charged with ink, is passed over the surface, when the ink attaches itself to the bitumen, which has a great affinity for it, while it is repelled by the bare metal, which is left unsoiled by the ink. The printing is done at the ordinary lithographic press.

By another plan the surface of the plate is denuded of the bitumen by chemical, instead of mechanical, means. This is done by the following method:—After the plate has received its second coating with the solution of bitumen and has been dried, a roller charged with printing ink is passed over the surface. The ink, of course, only adheres to those parts with which the roller comes in actual contact, consequently the depressed lines are left uninked. The plate is now exposed to light, which acts upon the unprotected bitumen in the lines and renders it insoluble. When it is judged that the exposure has been sufficient to accomplish this the plate is sponged with turpentine, which dissolves the ink, together with the bitumen which has been preserved from the light's action, and the surface of the plate is left quite clean, as it was in the former case after charcoaling.

It is claimed for this process that as the printing lines are slightly intaglio instead of being in relief, as in the ordinary zincographic processes, the plates will wear considerably longer, besides possessing other advantages.

THE PHOTOGRAPHIC EXHIBITION.

[Fifth Notice.]

A very effective picture is *Old Norman Door in Jedburgh Abbey* (No. 107), by Mr. John Jackson, whom we regret to see represented

this year by only two pictures. His second one, an *Interior of St. Mary, Redcliffe, Bristol,* is also a very fine piece of architectural work.

The Woodbury Company have, as usual, a good show of enlargements of very large dimensions, the best of which is a fine portrait of *Mrs. Kendal* (No. 124), from a negative by Messrs. W. and D. Downey. *Portrait of a Lady* (No. 191), smaller in size, is a most charming pose.

Amongst the Autotype Company's numerous exhibits perhaps the one which will attract most general attention is the medal picture from Mr. Mayland's sea view, *There is a Sorrow on the Sea* (No 271). As enlargements, however, there is other equally good work, some of the portraiture being especially fine. Two portraits from negatives, by Mr. H. S. Mendelssohn, of *Viscountess Castlereagh* and *Mrs. Manners* (Nos. 152 and 166), are particularly worthy of

No. 166—*Mrs. Manners.* By The Autotype Company.

notice. The latter of these we have chosen as a good example of posing. *The Countess of Ross* (No. 143) is another specimen of easy and unconventional pose, the "author" of the original negative not being stated. Nos. 203 and 455, portraits of Lord Selborne and the Earl of Salisbury respectively, form handsome pictures of two well-known individuals, while *The Friar's Crag, Derwentwater* (No. 126), and *Stybarrow Crag, Ullswater* (No. 417), both from negatives by A. Pettitt, of Keswick, are splendid representations of our lake scenery.

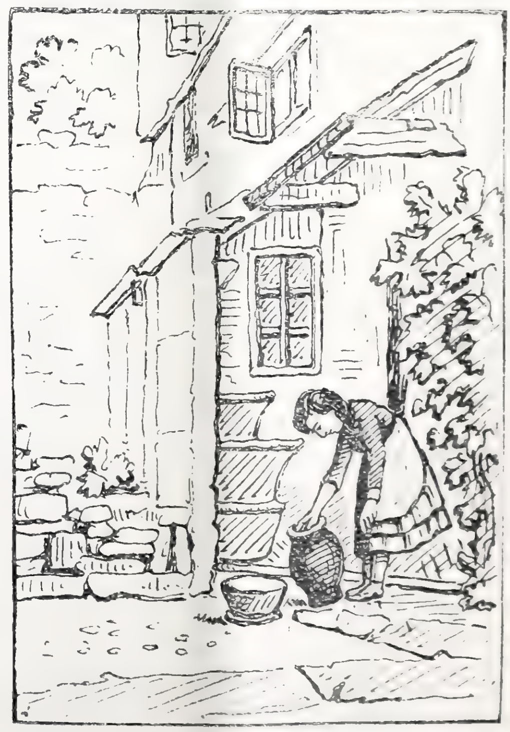
We are glad to be able to congratulate an enthusiastic lady amateur—the Hon. Mrs. Holden Hambrough—on the success attained in her two pictures of *Haddon Hall* (No. 133-4). These are better than any previous work exhibited by this artist, and when we say that their size is 12 × 10 our readers will agree with us that great praise is due to a lady on that score alone, even were the quality far inferior. If there be a fault it is that the tone is slightly too cold.

Mr. Andrew Pringle exhibits a frame of views in New Zealand and California (No. 186), a small portion of the results of his recent trip round the world. *A Misty Morning in Yosemite* presents a bold and well-defined foreground, with the stupendous white granite mountains in the distance, just distinguishable through the mist. That this is real mist is evidenced by its gradually-increasing density as the objects recede from the camera. *Mirror Lake, Yosemite,* shows magnificent reflections of the pine forest and bare mountain-tops which surround the margin of the famous water. *North Dome,*

No. 186—*North Dome, Yosemite.* By Andrew Pringle.

Yosemite, of which we give a sketch, is a glimpse of scenery eminently characteristic of this world-famed district, though the remaining Californian views remind one more of Scottish and Welsh scenery.

Mr. Frank Beasley's two frames (Nos. 187-8) contain, as usual, good work. In the first we prefer the centre picture, *At Clovelly,*



No. 187—*At Clovelly.* By Frank Beasley.

which we have selected for illustration; though the two pictures of *Lynmouth* are also good. *A Devonshire Cottage* and *Preparing for Dinner* in the other frame deserve careful attention. The latter represents a cottage interior with an old woman peeling onions (!) for the midday meal. The accessories—the old case clock, the warming pan, and the various culinary utensils—are in perfect keeping with the central object, the whole forming a remarkably truth-

ful rendering of the quaint cottage interiors one meets with in such out-of-the-way corners of England.

Our next illustration is *Patience* (No. 293), by Norman May, but why "patience" we cannot comprehend. It is a charming study of a milkmaid and a pretty picture, but the disciples of strict truth in

No. 293—*Patience.* By NORMAN MAY.

art might raise objections to a milkmaid attired "in lace and fine linen," and wearing a plurality of rings. *Fairy Tales* (No. 247), by the same artist, is noticeable as being one of the few wet-plate productions in the present Exhibition.

Messrs. B. Scott and Son exhibit several enlargements of mammoth size, all being portrait subjects. *Miss Isabel Bateman* (No. 371) is a very attractive picture, but *Mr. Ferrari as the Marquis de Corneville* (No. 407) is not so successful, though in a group of

No. 440—*Music hath Charms.* By B. SCOTT AND SON.

the *Hon. Mrs. Percy Wyndham and Daughters* (No. 430) there is better quality. Two studies, *Strangers in a Strange Land* (No. 227) and *Music hath Charms* (No. 440), the latter of which we illustrate, are worth examination.

STUDIO BUILDING.—RIGHTS OF LIGHT.

HAVING explained in previous articles the right appertaining to the owner of a building to have as many lights as he pleases in his house, but only to have them unobstructed if they have been in existence for twenty years, we may conclude our remarks by detailing some further points that may arise in studio building, and give some hints about the possibility of losing such rights of light.

We showed how twenty years' enjoyment of light conferred perfect and indefeasible right to build a studio and have its light free from obstruction; but the twenty years must have been free from interruption, and also the right must not have been given up either by negligence or indifference to interruptions.

That such abandonments of rights do frequently occur is undoubted, and anyone purchasing or acquiring property for the purpose of studio building should be most careful in making inquiries in this direction; for it is unquestionable that the best of neighbours are often most unapproachable where questions of infringement or acquirement of rights are concerned. When we come to inquire into particulars that may assist us to form a judgment, we find this portion of the subject less governed by rulings in definite cases and one on which it is less easy to form what may be termed a compact opinion; but, without professing to speak *ex cathedrâ*, we think our readers may fairly rely upon the following remarks.

When an undoubted right to an unobstructed light exists, it may be lost if a neighbour erect an obstruction and be allowed to keep it without objection or steps being taken to remove it. An authority on the subject makes the following remarks upon this point:—"The easiest way for the servient owner to rid himself of that most objectionable position of having to give his neighbour light without fee or reward is to block up the opening for twelve months. Now, should the dominant owner not discover this obstruction for twelve months, his ancient right is lost. It may be asked—Is it likely that an owner can have his windows obstructed for twelve months without his knowledge? But we think, and our readers will easily see, that this might readily happen by the house being empty for that period, and the letting being intrusted to a negligent agent; its being occupied by a tenant too careless to inform the owner, or, as sometimes happens, not being on friendly terms with his landlord, purposely omitting to mention the circumstance; and, lastly, by bribery or collusion (if undiscovered)."

This would seem to be a very plain statement of the case; hence it is strongly to be advised that, if an empty house be purchased for photographic purposes, care be taken that there is no obstruction of existing windows on the side the studio is to be lighted from, as, in case any such obstruction existed, the erection of a glass building higher up on the roof with the same aspect would be at the builder's risk, as his neighbour would have legal power to obstruct the light.

There are, however, in connection with this abandonment of rights so many pitfalls for the unlearned that no steps in connection with it should be taken except under professional advice. When persons voluntarily abandon their own right to light that right ceases, under certain conditions; but what the conditions are is generally left to a jury to decide, so that no fixed rule can possibly be stated. Thus, it has been held that a man may block his own windows up and yet not voluntarily abandon them; though, in a case where a man took down an old tenement with windows and erected a blank wall in place of that formerly pierced with windows, he was held to have given up his right.

The question generally left for discussion is—Has the aggrieved person acquiesced in the obstruction? Our readers will easily guess what loopholes for adverse decisions in either direction are here left. And it may be said that blocking up in a permanent way an old window, or taking down a building, are not of themselves abandonments of right; they are only strong evidence of it. The difficulty with a prospective studio-builder is, if he purchase a building with lights so blocked, has he any rights left?

So far we have not alluded to the other side of the question, which may fitly be considered at this point. The erection of a studio itself may be an obstruction, and then its prospective owner has to discover whether if he so build he may be obstructing some other person's lights, and so be liable to action for damages, or an injunction to

demolish his building. Hence he may be deceived as to apparently blank or windowless walls, and find his mistake out when he has completed his purchase and given out the plans for the new building. We have known cases where the mere throwing out of a printing stage has been objected to; and where, after considerable expense had been incurred, the whole erection had to be taken down. How much more serious, therefore, would it be if the erection of a studio had to be stopped before it was completed, and all had to be taken down!

It will thus be seen that there are two great considerations which should govern the judgment of anyone contemplating building a studio:—First, will any neighbours have power to build anything that would interfere with the successful working of such studio? And, secondly, would such studio when built interfere with any neighbouring lights? In the latter case we may be sure speedy action would be taken against the builder—that is, the owner—of the studio; and if this were done, by praying for an injunction in Chancery, it would depend upon the amount of obstruction and the special circumstances of the case whether the judge would issue an injunction to take down the studio, or order the owner to compensate the person whose light he had obstructed.

In these necessary incomplete remarks we have purposely treated only those broad aspects of a question that is often beset with intricate legal subtleties, and we have left out any consideration of points which ought never to be treated except with the aid of an expert and experienced legal practitioner. But we believe we have indicated sufficient to prevent the unwary photographer from being entrapped by questions of rights of light, either in having his own rights interfered with or in obstructing others; and we trust that our remarks will be regarded in the light of helps to a due understanding of what is right and proper, and not as aids to litigation.

The fourth annual meeting of the Photographic Club, which was held on Wednesday evening last, shows a very satisfactory condition of affairs. The financial position of the Club continues to improve, while, in the matter of attendance, there has been an aggregate increase during the past year of upwards of one hundred and fifty over the previous year. Again the old officers were practically re-elected; for, with the exception of three members of the committee, who resigned, the old list came out of the ballot intact. The following extract from the report of the committee speaks for itself:—"The past year has been characterised by the utmost unanimity amongst both officers and members, the welfare of the Club being the evident desire of all." Thus the Photographic Club—the first photographic body to establish a weekly meeting—has proved the experiment to be a thoroughly successful one, for a term of four years' probation attended by constant and steady improvement is surely a sufficient test.

We are requested to state, in connection with the Bristol International Photographic Exhibition, which takes place next month, that the time for sending in forms of application for space has been extended to Thursday, the 15th inst., exhibits to be sent in by December 1st. We are glad to learn that the entries are coming in freely, and include a large number of foreign exhibitors. Those who intend to take part in the exhibition should, therefore, make their arrangements at once.

We have from time to time expressed our views about the elaborate and beautiful engravings of scientific phenomena where, in the main, photographs were the available material wherewith to produce the engravings. Some engravings of phenomena are evolved from the comparison of a number of eye observations; but the real value of true photographic pictures is shown in a remark in a scientific contemporary, who observes:—"It is shown that the untouched photograph defends the best drawings against the charge of depending too much upon the personal equation of the observer, as over large regions the best drawings are justified by the photograph."

At one period of the history of alkaline gold toning biborate of soda (borax) had a great reputation, and also with phosphate of soda was considered the proper thing to use. As the virtues of acetate became more generally understood most other alkaline salts fell out of use, and the latter named now holds an undoubted prominence over all, with carbonate of soda in second place. It is a fair question for discussion whether some of these neglected salts might not be found to possess special properties rendering them worthy of occasional use. Our own impression with regard to borax, for example, was that it produced a tone with such pronounced blueness as to render it unsuitable for general toning purposes. More especially would this be so at the present time when there is such a preference for brown tone in albumen prints; yet if, by adding it in certain proportions to the acetate or other toning bath, modifications in the colour of the prints could be brought about, it certainly ought to be useful.

This salt has a peculiar history. As first known in this country the crystals had broken angles and points from the rough usage it underwent in transporting it long distances, India being the place whence, under the name of "tincal," it was for a long period imported. When the experiment of extracting the salt from European sources was tried the dealers would not buy the new crystals—they were too well formed; and it is stated that they were in consequence systematically subjected to a treatment—such as rolling in a cask—devised to injure the regular appearance of the crystals.

In Europe their chief source is the volcanic lagoons of Tuscany, which abound in boracic acid—the borax being made by adding soda and crystallising the product. The production of the necessary heat was at first so costly that the manufacture did not pay. Now, however, the natural heat of the subterranean forces is utilised, and borax is made in large paying quantities. Volcanic steam there can be had gratis, and after obtaining a solution of boracic acid by its means it is duly neutralised by soda and placed to evaporate in leaden pans, also heated by the naturally-produced steam which issues from the earth. The boracic acid has about fifteen per cent. of impurities, mostly sulphates. Recently a source of supply on an immense scale has been found in California, which should tend to a lowering of the price, if properly worked.

The photographing of birds, animals in motion, express trains, and so forth, has always given scope for a considerable amount of "tall" writing and talking, though the exact rate at which the object moved has not been clearly defined. We, therefore, believe the following extract from a table drawn up by Mr. James Jackson, Librarian to the Paris Geographical Society, will be found interesting. It presents the different velocities at which the various objects specified move, and is given in metres per second. As the metre is very little over a yard (one-twelfth more), it will be almost exact enough to read it as yards per second; indeed, if so read all through, the ratio of one speed to the other will be quite exact:—

	Metres per second.
A man walking four kilometres an hour	1·11
„ five „	1·4
A ship going nine knots an hour	4·63
„ twelve „	6·17
A wave thirty metres in magnitude with a depth of 300 metres	6·81
A ship going seventeen knots an hour	8·75
A torpedo boat going twenty-one knots an hour	10·8
A racehorse trotting an English mile in two minutes fourteen seconds	12·0
A racehorse galloping 900 metres a minute	15·0
An express train running sixty kilometres an hour	16·67
Flight of a falcon or a carrier pigeon	18·0
A wave in a tempest at sea	21·85
An express train running sixty English miles an hour	26·81
Flight of one of the swiftest birds	88·90
A cannon ball	500·0

Our contemporary, the *Chemical News*, describes a new mode of producing oxygen, which at the same time acts as an actinometer; but whatever its value in the latter direction, and notwithstanding the sanguine views of the discoverer, we are afraid that it is not likely to be of practical service in the former. It consists in placing small bent twigs of poplar, which always contain a supply of the microscopic plants, *Protococcus pluvialis* and *Protococcus palustris*, in a saucer or other vessel of water exposed to the sun's rays. Boiled or distilled water will not answer, nor will the experiment succeed if there be the slightest trace of alkali present. The writer says:—"In these conditions any quantity of oxygen may be produced in a short space of time; *the quantity yielded in any given interval of time depends solely upon the size of the apparatus.*" As to the actinometric power of the arrangement the writer says:—"The oxygen can be received into a gasometer or a graduated tube. In the latter case the apparatus appears capable of being transformed into an excellent actinometer, the number of divisions taken on the graduated tube every day from eight to nine, or twelve to one, giving the exact measure of the actinism for the day in question."

Photography was well represented in the surroundings of the re-interment of the remains of the great Harvey, which, as our readers are now doubtlessly aware, were taken from their old resting-place and re-interred in a marble sarcophagus in the Harvey Chapel above. In a memorial bottle cased with lead—and put also therein—were placed, with other memoranda, several photographic views of the church, and a beautiful photograph of the bust of Harvey. It is to be hoped that they were executed by some process of permanent photography, as, though good silver prints stand well when access of air, &c., is prevented, they could not be expected to have any useful endurance for the purpose and under the conditions in question.

TRANSPARENCIES AT THE PHOTOGRAPHIC EXHIBITION.

There is a fine display of lantern transparencies on the tables in the Exhibition, together with a few others of more imposing dimensions. Among the latter we may class an exquisite collection of flower subjects, by Mr. Henry Stevens, which attracts much attention. Admirable in composition in their entirety, each in its details possesses the most perfect gradation of tone even in the higher lights, this quality being obtained without the deeper shadows suffering. These transparencies, we understand, are printed on gelatino-bromide plates with ordinary pyrogallic development.

A frame of lantern transparencies, by Messrs. England Brothers, possess a charming tone for effective exhibition on an enlarged scale, being of a rich purplish-black. Their views of Swiss scenery, from negatives by Mr. W. England, display great delicacy of gradation in the distances, with ample vigour in the shadows. They also exhibit some good transparencies of statuary.

The collection of Woodbury lantern slides exhibited by the Sciopticon Company have a rich brown tone, resembling those by which the late M. Ferrier created such a *furore* several years ago. The subjects are of a varied description, comprising coral, icebergs, the *Laöcoon* in the Vatican, Welsh women in their characteristic national costumes and tall hats, English landscape scenery, and Scottish lochs. A great advantage of the Woodbury process lies in the fact of one having his transparencies of any tone desired, with the certainty of obtaining transparence in even the deepest shadows.

The transparencies of Mr. Philip H. Fincham comprise subjects in North Wales and on the Thames, together with studies of animals. Although of a slightly colder tone than some of the others displayed, we have no doubt that they will show well when magnified on the screen.

Probably the collection having the most educational tendencies (to photographers at least) of the various transparencies exhibited are those of Mr. Alexander Cowan, who shows a frame of twenty views—all from the same negative, but no two alike in tone. The tones range from a reddish-sepia to a cold-black, passing through every conceivable variety of tone. They are described as being positives on gelatine-chloride plates which have received an exposure of five seconds to diffused daylight, and being developed with sulphate of iron and the various citrates of ammonium, potassium, sodium, and magnesium, either alone or in combination with potassium oxalate.

PRACTICAL FOCUSSING.

So much has been written upon this topic that one can scarcely hope or expect to give other than a *rechauffé* of what has often been served up before; nevertheless, in the multitude of counsellors there is an advantage in that there is a probability that the matter may be approached from every side, or presented in so many different ways that what a reader fails to apprehend in one form of words he may readily do so when put in another.

We all know that there is much latitude and room for judgment in noticing the degree of sharpness each of the various classes of subjects requires. In some a maximum of this quality is everything; whilst in others it is undesirable, and may give place to considerations of more importance. Pure landscape work belongs rather to the former.

Some of the most successful in its uniformity and quality of this kind of photography I have ever seen was produced by a gentleman who scarcely ever focussed at all. When I first became his assistant, fresh from the production of transparencies for the stereoscope, I was much surprised at the *nonchalant* way in which he treated this part of the operation of making a picture; but much more so, and perhaps with a little wounded pride intermingled, when he directed me not to waste time with "that thing" (pointing to a pocket magnifier), but simply look and see if the back was racked out to a certain line on the base-board to which he preferred to trust. This photographer used a series of doublets—then *the* lens for general views—and having once satisfied himself in respect of the focussing, he made his line and saved his eyesight, which, it may be added, was but indifferent. A view meter, consisting of a card to which was fastened a knotted string to regulate the distance it was to be held from the eyes, having an aperture corresponding in its proportions to those of the plate employed, together with a pair of simple sights on the camera, rendered the focussing-screen almost superfluous. On groups, portraits, cattle, and those subjects requiring special care his spectacled eyes were freely employed.

For general scenes, where it is not important that the utmost of defining power should be concentrated on any particular objects, the above plan may be followed without detriment. For other views, such as those of buildings, monuments, trees, &c., the better plan is to insert the stop before proceeding. The best of definition may then be given to the principal portions of the picture, and the secondary ones as much as possible, without fear that the insertion of the diaphragm will materially alter it. That it frequently does so I am fully persuaded, in spite of what theory may say; but as theory is only of value in telling us the truth as respects perfect instruments—of which we have none—we as practical men are still compelled to reckon up a lens in our own practical fashion. I once had a pair (perhaps I should say they were paired) of lenses by one of the first makers, one of which was considerably affected by the insertion of the stop, and when they were used for reproducing slides of the same size as the original negatives the peculiarity proved such a downright nuisance that they were separated and disposed of.

To again come to the point: whilst caring for the principal object or point of the picture, due regard must be paid to its companions in the surrounding ones, and the back manipulated out or in so that the next in order, either lying before or behind the principal, may get the benefit of any surplus of defining power. This care in the distribution of the focus—especially if, for pictorial purposes, the chief objects are out of the centre of the plate and the very smallest stops not employed—can scarcely be effected with an open lens.

A good way to proceed with a group is to estimate the width of ground it is likely to occupy, and place three chairs, or sticks stuck upright, one at the centre and one at each edge. Stop the lens, focus for the centre object, and shift the others till they come into the best focus. This proceeding prevents much fidgetting of the party by its providing for the arrangement of the group at once on the curve most suited to the lens in its stopped condition. During the grouping the effect and position on the plate is better judged with an open lens; but by all means give the final touch after the insertion of the stop.

In all cases of portraiture focus with the lens as it will be at the time of exposure. To what extent the instrument may be depended upon is then seen, and its shortcomings more readily accommodated by changing the position of the camera or by altering the location

of the objects till they are in the plane of good definition. With respect to the best point in a face to select, the eye or brow are those most usually chosen. These are not always safe, especially when enses of short focus are in question; so it is advisable not to make an invariable rule of confining oneself to these or any particular feature, but to judge the face as a whole and note what may be best left to take its chance.

Clouds are not very easy objects to focus; for these, however, the camera need only to be focussed once. To accomplish this easily select some well-marked object about a couple of miles away, focus it as sharply as possible with the full aperture of the lens upon the centre of the screen, and then make a mark upon the camera. Afterwards the screen may be dispensed with in cloud photography, for it is more annoyance than it is worth—the sights upon the camera and the mark supplying its place.

Many objects, such as breaking waves, birds, trains, &c., are only capable of being focussed by proxy, as it were, in dealing with the spot at which they are expected to be when the exposure is made. There is not much difficulty with the first-named when they consist of those that break upon the shore, in that these usually "go" at one spot where the ground-swell meets or passes the sea one, just where the bather runs the risk of being turned the wrong side up, because the lower stratum of water insists on carrying his legs one way, while the upper one is taking his body in the forward and contrary direction. These may be focussed without the stop or with it; there will still be something left to luck.

Interiors of cathedrals, churches, and the like need to be treated in a manner that will ensure equality of definition over the whole. This is best effected by focussing upon a bright distant object, such as a window, and then racking out the camera till it has just the slightest fuzziness. By the employment of doublets, rectilinears, and symmetricals the whole of the interior, right up to the camera, will be in fair focus. Let the stop be in for this proceeding also.

Copies, such as daguerreotypes and glass positives with the picture on the surface of the glass, if reduced may be focussed with the open lens or large size stop. Glass pictures, showing through the glass, back up with printed paper and focus the edges with the stop. Paper prints of the same size, and reduced, are focussed in the same manner as daguerreotypes; but in all cases, when enlarged, insert the stop, and go over the focussing-screen with a good magnifier—not for the sake of getting absolute sharpness, or the grain of the paper will get the better, but to see how much of the grain may be sacrificed without producing woolliness in the picture itself.

Transparencies or reproduced negatives need focussing with much care. It should always be done with the stop in the lens, and the point selected, if the whole be of interest, at about a third from the centre of the focussing-screen. Where the negative is very much enlarged the focussing must always be done with the stop in, and should the small original be faulty in definition a slight scratch must be made in an unimportant but central part of the transparency to focus by, or something will be lost in eyesight as well as in the photograph.

In making the above remarks it has been assumed that the slides and screen of the camera agree in register, and that the lens is not faulty in construction. These points require looking after. Every slide supplied with a camera should be tested, for frequently they do not agree. I recollect an instance of having an important personage to photograph, for which a new camera with a pair of wet slides for double plates was employed. One of these only was tested, and found all right. The following day the affair came off, with a time allowance for only three exposures, out of which only one was any good, the other two being worthless owing to the slide being out of register.

In conclusion: I would advise young photographers to refrain from making use of a magnifier oftener than is absolutely necessary. Very few, if any, of us are possessed of a pair of eyes of equal power, and the use of this adjunct does not usually tend to mending the defect. JOHN HARMER.

HOW TO REMEDY A DISORDERED NEGATIVE BATH, &c.

WHEN a negative nitrate bath, from any cause whatever, ceases to act satisfactorily, the following systematic course of procedure will inevitably lead to the discovery of the source of deterioration. This being found it naturally follows that, when the disease has been properly diagnosed, the remedy, if any, will be clearly indicated by the following symptoms, provided always that a good sample of collodion and a developer properly mixed up are being used. Of course precautions must be taken to avoid contact of the film, when in the sensitive state, with actinic light or injurious fumes, such as those of ammonia or hydrosulphuric acid (sulphuretted hydrogen), &c., otherwise the indications given might prove misleading.

1st. The plate persistently fogs; that is, a greater or less deposit of silver is thrown down all over the film when the developer is applied. This points to one out of two probable faults in the silver bath. Either it is not sufficiently acid or it is overloaded with organic matter held in solution. The former is readily detected with blue litmus paper, which should turn slightly red after having been immersed for two or three seconds in the solution. If this indication of disease be absent, then, assuredly, fogging is due to the presence of an excessive amount of organic matter held in solution without, perhaps, sensible discolouration of the liquid.

In the first case the remedy is obvious, namely, the cautious addition of a little more dilute nitric acid till, on trial of a plate, the fog has ceased to appear. But in the second cause of fogging I have invariably found it the best plan to turn the impure solution into the jar for waste silver, and then mix up a fresh one.

2nd. A silver bath that is too acid gives rise to feeble images which possess more of the positive than the negative character. Such images are usually very difficult to intensify, and cannot by any coaxing be brought up to good printing and well-balanced density. The proofs from such negatives are generally hard in the extreme, possessing no roundness of modelling.

Here, also, the remedy is obvious. Reduce the acidity by adding a little soda bicarbonate and allowing the solution to stand for a short time before filtration. This bath, when again acidulated to the proper extent, will, in all probability, work most satisfactorily. If not, then the cause of its deterioration must be looked for in another direction.

3rd. The pinhole question has already been so fully discussed in my previous communications that it is unnecessary to say more about it here.

4th. A negative bath which is too weak—that is, too poor in silver nitrate—can rarely be made to yield a negative possessing well-balanced detail, from transparent, deep shadows to full opacity in the highest lights. For this reason the silver solution should be frequently tested for strength with a properly-constructed argentometer, and never allowed to become weaker than thirty grains of silver to the ounce of water. In winter or in cold weather thirty-five, or even a few more, grains of silver will make a more effective solution, especially if the collodion be heavily bromo-iodised.

5th. If a well or dipping-trough be used for holding the bath solution it should be made of glass, which will neither communicate nor retain impurities. Glazed earthenware, gutta-percha, or even ebonite, are not to be depended upon—the first because the glaze after a time gets cracked, and thus allows the silver to become contaminated with impurities derived from the interior. Silver nitrate derives organic impurities from both gutta-percha and ebonite, at the same time rendering them brittle and untrustworthy.

6th. The glass trough or silver bath holder should be of large capacity so that it may contain a great excess of solution, inasmuch as the greater the quantity it holds the longer will that bath continue in uniformly-good working order. If it has sensitised a large number of films in the course of the day, a very good plan to adopt, when work is over, is to pour it out into a perfectly-clean, broad, and flat-bottomed glass dish for the night. This dish is covered over with a piece of boarding or other suitable material raised about an inch above the edges, so as to prevent the ingress of dust and at the same time allow a great portion of the ether and alcohol which have been accumulating in it from the day's work to escape. The absence of these defers the approach of the fatal pinhole disease, as their presence is most apt to stimulate it into undesirable activity.

Finally: on the management—or, in this case, I should rather say *mis*management—of the nitrate bath I have frequently observed, even by old operators, a system of conducting operations connected with it which is certain to hasten the advent of the pinhole disaster, besides originating other evils of a different kind. What I refer to is this:—In the first place, the plates are slovenly coated with collodion so that a portion flows over the back of the glass. This, if not at once wiped off, is abraded by the dipper while in the bath, the shreds remaining in the solution. These, after being fully sensitised, are attacked by the silver solution, which, by dissolving the silver iodide and bromide, soon becomes supersaturated with these compounds, and is thus in the most fit condition to deposit crystals of the double salts *in* the film, *alias* to originate pinholes in the plates which are afterwards sensitised in the same solution. But these abraded shreds of collodion do more mischief than merely

hastening the advent of the pinhole disease. They are apt to adhere to the surface of the next film sensitised in the bath, and thus, of course, prevent the image refracted by the lens from falling on those portions of the real film.

Another objectionable plan sometimes adopted by photographers is to leave the plate in the silver bath for a considerably longer time than is necessary for complete sensitising. This not only fosters the disposition to pinholes, from the causes already stated, but is also injurious to the film in other respects, as having a tendency to give rise to a feebler or less plucky image—one sunk in, as it were, below the surface. I need hardly say that the best time for the withdrawal of the plate from the silver bath is just after it is seen that the silver liquid flows down the film in an even and unstreaked sheet when gently withdrawn from the solution. This fact, although generally known, is not always acted on.

I have thus, carefully I trust, traversed the greater portion of the crooked ways of a badly-treated negative silver bath, and endeavoured to make them straight. Should anything which I have omitted on this subject occur to me I shall not fail, health permitting, to lay it before the readers of this Journal, mainly for the benefit of the rising generation of photographers who are likely to be tormented with bath troubles for which they cannot account.

George Dawson, M.A., Ph.D.

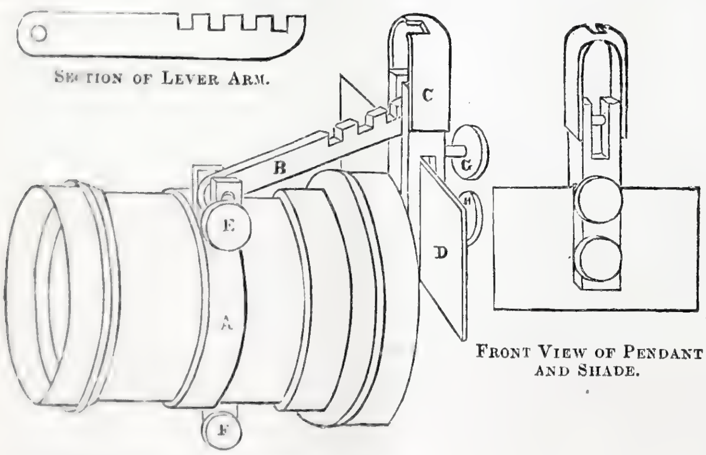
MR. PARKER'S SKY-SHADE.

[A communication to the October Meeting of the Edinburgh Photographic Society.]

The importance of the sky in its varied aspects—its bearing and consistency with the landscape—need hardly be pointed out. There is nothing so apparent in photographs of one exposure as the absence of this element, and we cannot but welcome any appliance which enables us to secure the effects of clouds and landscape, with one exposure, on the same plate. I am aware of one or two sky-shades which have been referred to in the journals, and have read with interest of their purpose and intention; but, not having seen any of their operations and results, I am unable to speak of their merits.

Except from a few medium sensitive plates of gelatine make—such as Fry's or the "Britannia"—we seldom see clouds produced but by double printing; and certainly those that Mr. Valentine and a few others have combined with the landscape must be acknowledged to be truly beautiful. They are very useful in their adaptation to composition and the effects of light and shade on land. But still, as they are liable to be very promiscuously and inconsistently treated, it would be a great advantage if they were true to the landscape effects with which they were associated, not to speak of the labour attending double printing.

Knowing that Mr. J. Parker, ex-President of the Glasgow Photographic Society, made some years ago a very decided improvement on one of the sky-shades which he saw in The British Journal of Photography, I regret very much that I never had my attention particularly called to his device till lately, when he and I were on a



Section of Lever Arm.

Front View of Pendant and Shade.

Sky-shade when Mounted and Set.

photographic excursion. I was greatly delighted by the ease with which it was managed, and by the beautiful sky effects he secured by it on that occasion. Having a strong desire to possess a sky-shade such as his, he very kindly offered to get one made for me. And here permit me to state that I am sure that nothing but his extreme modesty and retiring disposition prevented him from making this improvement known long ere this. Believing that it would interest all true lovers of landscape and sky effects, and be helpful in advancing the interests of science and art, I induced him to allow me to bring it before the notice of the leading societies.

Writing to me on the 19th of July last, when sending the sky-shade which he got made for me, Mr. Parker described at full length its construction and operation. It is composed of three separate parts, viz., *first*, the band, or collar, which is screwed to the body of the lens tube; *second*, the lever arm; and *third*, the pendant.

The first, the band—A in the accompanying diagram—has pinching screws, E and F, at the top and bottom for fixing the lever arm when set.

The second, the lever arm B, has four square cuts on the top edge. The two outer ones are those on which the pendant is placed when the sky is covered by the card, and on which it revolves when pressed back to expose the sky.

The two inner ones are those into which the top of the pendant goes when pressed its full length. Unless it enters these the sky will not be completely exposed.

In making the paper-shade (or mask, as it may be called) for obscuration, gum together the white sides of a piece of black paper. Cut a portion, say one and a-half inch in width, and in length the full diameter of the brass of the front of lens. It must be shaped into the general form of distance as seen in the focussing-glass. When shaped insert it into the pendant, and fix it in a temporary way by the screw G. Then, looking on the ground glass and carefully focussing the subject, raise or lower the lever arm till the mask covers the distant hills and sky. Hills on which one cannot see detail, intervening water and trees relieved against the sky, may also be covered by the shade. When the plates are of a medium sensitiveness—not requiring long exposure—it is immaterial to have the outline of distance well defined; in fact, if the paper be torn somewhat into form, that is quite sufficient to serve the purpose. Of course, in the case of a sea view where the horizon is a straight line no special form is required.

Being satisfied with the extent of view obscured, fix tightly the lever arm by the screw E, and still further pinch the screw H at the bottom of the pendant. When all this has been done lift the pendant a little and slip on the cap of the lens. Insert the slide containing the plate and open it up for exposure. On withdrawing the cap the pendant falls into its place and the action of light begins on the landscape. After due exposure has been given (which must be a little longer than when a shade is not used), press back the loop of the pendant at the top, elevating the black card, so as to uncover the whole sky. Almost at the same moment put on the cap of the lens. The imperceptible interval will be found to have given sufficient exposure for the sky.

The principle of the sky-shade has, of course, long been recognised and acted on. Ross and other makers have for many years sent out lenses fitted with shades, such as the simple flap shutter; but, so far as I am aware, Canon Beechy was the first to suggest a plan of a properly-regulated shade. On November 5, 1875, he communicated a paper on the subject to The British Journal of Photography, along with a sketch of his contrivance, which he designated a "split sky-shade." His drawing represents it as having three pieces, which could be raised separately as desired. His object, however, judging from his paper, was not so much to obscure clouds as to cover a bright object like a white cottage at either side or in the middle of the picture.

This led to the suggestion of a very elaborate sky-shade, by Mr. Baynham Jones, in The British Journal Photographic Almanac for 1876. It seemed to be much too elaborate, however, for practical work, and besides, so far as the sky was concerned, it had no ready means of adjustment, while the sockets round the edge, which were intended to hold the shades, prevented the cap of the lens being used either at the beginning or end of the exposure. Mr. Jones's contrivance, although useful for shading certain parts of a scene, did not serve the purpose which Mr. Parker was aiming at, viz., a development of clouds and landscape in full keeping with each other *on the same plate*. However, Mr. Parker acknowledges that Mr. Jones's efforts suggested his device. All that he claims for himself is the invention of the lever arm and pendant, and also the removal of hindrances to the use of the cap of the lens in the operation.

Mr. Parker has now used his shade more than seven years, and for simplicity and efficiency I do not think it could easily be excelled. I do not feel it necessary to say anything at present as to its working. Mr. Parker has proved its value by many beautiful specimens of cloud and landscape scenery. I strongly recommend its general adoption.

In closing, I may be permitted to remind you how necessary it is to observe and study sky effects. No landscape is complete without an appropriate sky. You will fully realise this if you read what Ruskin says in his *Modern Painters*, where he describes so eloquently, in a section on the characteristics of nature, the open sky, the aspect of the clouds, the mysteries of the clouds, and the splendours of sunset. NORMAN MACBETH, R.S.A.

WHERE TO GO WITH THE CAMERA.*

FOUNTAINS ABBEY AND BOLTON ABBEY.

HAVING just returned from a short visit to Yorkshire I hasten to give you a few impressions of the neighbourhood as a most fascinating field for the explorations of the knight of the camera. I left home on the afternoon of the 29th ult., and took up my quarters at the Crown Hotel, Harrogate; but, finding that splendid house almost deserted (owing to the close of the season), I at once made up my mind to visit some other shelter where my fellow-men "most do congregate" at this period of the year. This I found to be the Hydropathic Establishment—a large and very commodious building situated in High Harrogate. Here I found about ninety of my brothers and sisters going in for what is called the "water cure" for their respective ailments; and, to judge from the mirth and cheerfulness and general brightness of its company, I felt very strongly convinced that there was much to be said for the success of the treatment.

Seeing in the hall one day that mysterious-looking apparatus known as the "photographer's kit," I at once jumped to the conclusion that there must be an owner somewhere or other in the establishment, and I hastened to find out his name and get an introduction to him. This I succeeded in doing, and we at once made up our minds to unlimber our kit and set to work on a tour of exploration, my brother amateur's name being Mr. R. Lindley, of Blackheath, London.

We fixed on the following day to visit Ripon, starting by an early train. We found some difficulty (when we reached that old-fashioned town) in securing a trap to take us to Studley Park, as the municipal elections were in full swing, and all the Jehus were driving furiously here, there, and everywhere. Most opportunely a stray waggonette came in view, which we at once secured, and set our faces immediately towards the seat of the Marquis of Ripon.

Now the excitement really commenced. Although the day was rather dull and foggy we were as keen in the scent as if it were the most brilliant morning of spring. We enter the park. Six whole-plates must be exposed from my camera (Mr. J. T. Chapman's, by-the-bye, and the finest I have ever used), and twelve 5 by 4 in the dark slides of my friend, Mr. Lindley's.

Scarcely had we entered the beautiful grounds when I felt my heart leap into my mouth, and I immediately proceeded to fix my tripod and take a "shot" at a cascade in the midst of the mere—a grand reach of water, with scarcely a ripple disturbing its surface, and registering in the most accurate relief all the beautiful outline of autumnal foliage. Here was a sight which, once seen, could never be forgotten. I have seen reflections on Lake Como in Italy, Geneva in Switzerland, Loch Lomond in Scotland, Ulswater in England, Killarney in Ireland, but nothing equal to this view. It seems as if Nature had selected this particular spot to make her profoundest impression. But, fascinating as the scenes on all sides of us were, we felt that there were further beauties yet in front of us, and it was only by the urgent solicitation of my genial friend, Mr. Lindley, that I was deterred from exposing all my plates before ever I reached Fountains Abbey.

After passing through a series of very fascinating "bits" of autumnal scenery we found ourselves in front of the grand old abbey; but, alas! the haze had already settled over the splendid old ruin, and our hearts sank when we saw the dense fog envelope the valley far and wide with its murky incubus. Fog or no fog, I exposed a plate with an exposure of two minutes and a-half, and still made up my mind that, if I could not get a sunlit picture, at least to emulate the ambition of the successful author of *A Misty Morning on the Wear*.

The next view was taken close to the west front of the abbey. After the mist had cleared a little I gave twelve seconds' exposure—this time with Ross' R.S. medium stop—and got a very fair picture. I then determined to take an interior, using my Ross' portable symmetrical lens, giving an exposure of thirty seconds, which has proved to be a very fine and brilliant negative, with marvellous detail. A few more plates were exposed, my friend having used up his dozen, when we turned our faces homeward, having spent a most enjoyable day.

On the following morning we left Harrogate with our dark slides re-charged for an attack on the ruins of Bolton Abbey. We took the train to Ilkley, and thence by carriage to the banks of the Strid; but the fog was as dense as it could possibly be. So we despaired of the grand old ruins and turned our faces towards the Strid. Here I exposed a plate on the large boulders in mid-stream. I gave a long exposure and got a fairly-good picture; but the light was wretched, and we packed up our traps and drove back to our little inn near the bridge, where we had an excellent dinner, and while smoking our cigars made a firm resolution to revisit this lovely spot on some future occasion and stay several days on it with our cameras and a large stock of plates. There is here a stretch of water pursuing a winding course of nearly three miles, and at every turn the most beautiful surprises of landscape and riverscape. I can say, without a shadow of exaggeration, that a week could be easily passed in this neighbourhood with several dozens of plates, and all of them present entirely distinct views. But I feel I am trespassing on your space, and must conclude with the expression of a strong conviction that the enthusiastic amateur will find in this neighbourhood the highest scope for his photographic yearnings in the regions of "sweetness and light."

H. VICTOR MACDONA, M.A.

* At the particular request of our esteemed and enthusiastic contributor we forego our determination (as expressed last week) to close this series for the present season, and we give this article as the "very last" for the year under this heading.—EDS.

OBITUARY.

THE LATE MR. WILLIAM KEITH.

IT is with much regret we have to record the death of another of the early workers in photography, Mr. William Keith, who died on Wednesday, the 31st ult., and was buried on Saturday last, the 3rd inst.

In early life Mr. Keith was a reporter on the staff of the *Liverpool Standard*, after which he entered the field as a professional photographer, and in the pursuit of his work displayed great excellence, for we find that on the 22nd March, 1853, he presented specimens of collodion *positives* at the meeting of the old Liverpool Photographic Society that were very much admired. At that period it was usual to back the plate with black varnish, and this gave the pictures a very cold appearance. It was suggested at the time that if the picture were taken upon a maroon-coloured glass no backing would be required, and the warmth of the colour proved a decided improvement. This style ushered in the collodion negative and paper prints, which is not likely to be superseded entirely for many years to come. The old Liverpool Photographic Society was broken up through the angularity of certain members who fancied the professional photographers were adverse to giving up the results of their experience. Mr. Keith was very far from being open to such a charge. He always displayed the greatest readiness to impart information as to the improvements he effected. He was in every respect a kind and generous man, ready at all times to assist the present Liverpool Amateur Photographic Association, of which he was made an honorary member. His character may be summed up in this—"he lived for others and not for himself." He stood at one time at the head of his profession in Liverpool, being employed officially by the Corporation whenever the services of photography were required. His last work for the Corporation consisted of a series of views of the works in connection with the Vyrnwy Waterworks scheme. Mr. Keith retired from business some little time before his death.

THE LATE MR. JOHN BEATTIE.

MANY years have not yet elapsed since Mr. John Beattie, of Clifton, retired on a moderate competence from the active pursuit of his profession—that of a portrait photographer. Born in Scotland, near Abernethy, Perthshire, and in the early period of his life a lecturer on subjects connected with mental philosophy, phrenology, and electric science, he, in 1850, made the acquaintance of the late Mr. Oliver Sarony, who at that time was "on the road," and on the first day of the year following entered into partnership with him. There are yet many alive who remember the sensation caused in the various towns in the north of England by the arrival, previously announced, of the American Daguerreotype Gallery. The partners worked hard during the day, and Mr. Beattie lectured on photography in the evenings. Great financial success rewarded their efforts. After a few months the partnership was dissolved, and Mr. Beattie entered into business on his own account, travelling, as before, from place to place, and employing several assistants as artists. He eventually settled in Clifton, where he conducted a high-class business up to 1869, when he retired. In the course of his professional career he has had the honour of taking the portraits of many persons of eminence, including H.R.H. the Prince of Wales.

Mr. Beattie was a man of advanced ideas and a frequent contributor, both in his own name and under a *non de plume*, to THE BRITISH JOURNAL OF PHOTOGRAPHY and other journals. Since retiring from business Mr. Beattie conducted many experiments in psychic photography, in which he was a firm believer. While still in the active pursuit of his profession, and in the height of his successful business career, Mr. Beattie gave the following as his idea of the qualification for success of a portrait photographer, which we commend to the aspirant of the present period:—Careful and long study, high culture, an appearance to inspire confidence, all the elements of a gentleman (particularly courtesy), with great patience and good temper, a refined and keen perception of mind in all its phases, and how mind clothes itself in form, and the ability to see at once to what type each form

belongs so as to give prominence to those characteristics which will best show the mental combined with the physical likeness of the individual; and, more, he must be full of general information in order to be able to converse with every person on his or her favourite theme.

For several years Mr. Beattie had not enjoyed robust health, but he was only confined to bed for ten days, when he passed away on the 14th ult. He is affectionately remembered by a large circle of friends.

A FEW NOTES OF A TOUR FROM MAINE TO CALIFORNIA.*

Photography in San Francisco stands very high, both in regard to portraiture and landscape work. I was fortunate enough to gain the friendship of Mr. Tabor and Mr. Watkins, whose names are known all over Europe—the latter from the magnificent views of the Yosemite Valley, and the former from the beautiful portrait photography that he has sent out from his large establishment, which is on a magnificent scale. I owe to both Mr. Tabor and Mr. Watkins a deep feeling of gratitude—not only for their personal kindness, but also for the opportunity they have given me for making the display on the walls this evening. These magnificent views will convey to the members of the Society a better idea of the inexhaustible beauty and grandeur of the Yosemite Valley and Pacific Slope than a volume of word-painting. The drives for many miles around San Francisco and along the Pacific Slope are of the most charming description. The ride to Monterey, formerly the capital of the Spanish territory, is about 125 miles south of San Francisco, at the extremity of the bay. Recently it has been resurrected, and no doubt in the future it will resume its former magnificence. It has in recent years come into prominence as a favourite sanitorium for the Pacific coast. The climate is wonderful, the difference between the mean temperature of January and that of July being only six degrees. Monterey has one of the most commodious hotels, embowered among fine old trees, and surrounded by all kinds of flowers and shrubs—a perfect Eden, endless beauties everywhere for the artist and the photographer.

After our somewhat prolonged journeying along the Pacific coast we had to bid good-bye to the scenes that had thrilled us with wonder and admiration, and bid adieu to the many kind friends who had so greatly enhanced our pleasure and enjoyment. On the 18th of June we began our return journey on the Central Pacific R. R. to pass through Nevada, Utah, Nebraska, Iowa, Illinois, and Canada. We left San Francisco on the ferry boat running across the harbour to the end of Oakland Pier. We then entered the famous silver palace cars, sweeping through fruitful plains and vine-clad villages along the picturesque San Pueblo Bay. The Salano, the largest steam ferry-boat in the world, received our train and conveyed us to Benicia, the former capital of California. We reached Sacramento, the capital of the State, by a bridge, greatly admired, 600 feet long. This city can well boast of a fine capitol building; it is 220 feet in length. The city itself is very beautiful, all the houses being surrounded by luxuriant shrubbery and the streets shaded with magnificent trees. From Sacramento to Colfax we passed through many smiling villages rapidly becoming cities. From Colfax we began in earnest to climb the Sierras. In fifty miles we discovered that we had ascended 6,000 feet, and in looking back we saw as charming a panorama as ever was looked upon. The line runs along the edge of the precipice, descending 2,000 feet, and is carried on a narrow shelf excavated in the mountain-side, workmen having been swung down in baskets.

The scenery was varied, magnificent, and exciting. At the summit we reached the highest point on the Central Pacific line. Fifty miles from there is the town of Trokee, situated in the centre of a picturesque region. From there we entered the snow sheds, which are erected for the protection of the track, and extend a distance of twenty-eight miles; the erection of these sheds must have been a herculean task. We were then 230 miles from San Francisco, and proceeded through Nevada, the youngest of the States, and reached Ogden, from which point we started for Salt Lake City. We crossed the great American Desert, which is upwards of one hundred miles square. Nothing grows there but a sapless weed, five or six inches high; there is nothing that could sustain animal life for any length of time. The earth is very alkaline; the dust came in whirling clouds, blinding us all. Some terrible devastation must have passed over this region.

On the Rio Grande railway we made our way to Zion, or Salt Lake City, which is about thirty-six miles distant. It lies at the southern extremity of the great Salt Lake. The streets are 128 feet wide, and cross each other at right angles. Trees are planted on both sides, and ditches filled with clear, running water we found in every street. All the luxuriant foliage that is presented to the eye has been the result of enormous labour; every stream of water has been brought from the mountains; every little home has its orchard of pear, plum, peach, and apple trees, and all has been done by industry and irrigation. The enormous Tabernacle was the first object that attracted our attention. Its length and width is about 250 feet, and is one of the ugliest buildings I have seen, but its acoustic properties are most perfect. We enjoyed a bathe in the briny lake. It is so buoyant that you can float about like a cork. It is not so dense as the Dead Sea, but, if you happen to get a mouthful of it, it is intensely salt, though pleasant and not horribly bitter, like the Dead Sea. We left Salt Lake City after spending a very pleasant time and gaining a great deal of information about their peculiar social institutions. On leaving the city we ran along the Jordan Valley, which runs into the Salt Lake. We enjoyed the views along its banks for fifteen miles. From Provo we made the ascent of the Wasatch range. Soldier Summit is the name given to the spot where the railway reaches its greatest height. In passing through Castle Valley, its fantastic and wonderful formations excite every emotion of the soul, its kaleidoscopic pictures being presented at every turn.

We next made the ascent of Cedar Creek Summit. The grade was sometimes so great as 211 feet to the mile. We then traversed the black cañon of the Gunnison, which is thirty miles. This cañon is one of the grandest in the Rocky Mountains. The famous Marshall Pass had to be overtaken—upwards of 10,000 feet. It is far higher than any of the waggon passes of the Alps. The train proceeded on its way eastward, and we entered the never-to-be-forgotten Royal Gorge. This is the most stupendous piece of railway engineering that has been attempted. The track runs for 200 feet on a shelf laid upon iron brackets morticed into the perpendicular rock. We had the surging river below and 3,000 feet of a perpendicular rock above. Every voice was hushed and the soul filled with awe. The photographer has not yet been here. I was more overwhelmed with the awful grandeur of this mighty cañon than with the Yosemite Valley, and when the photographer has accomplished his task the world will become acquainted with scenes overwhelmingly grand. From the Royal Gorge we got back to Denver and rapidly reached Chicago. We did not tarry long there. The last time I saw that city a large proportion of it was lying in ashes. Now its public buildings surpass any on the American continent. From Chicago we went on to Detroit, in Michigan, a beautiful city situated on the banks of the Detroit river. It has many large manufactories and foundries. Photography here is flourishing. Dry plates were not much in vogue, but before I left I saw their adoption in four or five of the leading galleries. On our way we stopped at Niagara Falls to see how they stood after seeing the Yosemite Valley, and I must confess that they excited my wonder and admiration more than all I had seen in the valley. I have hurried my hearers through a trip. Only a thread skeleton have I given you. I hope many of you may be privileged to fill in the blanks and crevices I have left. J. G. Tunny.

* Concluded from page 632.

LAMB'S PATENT TRIUMPH VENTILATOR.

The following is a description of this ventilator, exhibited at the recent technical meeting of the South London Photographic Society:—

These ventilators are constructed to prevent down draughts—not only that down draught which takes place from a sudden blast, or, as is more generally known, a down blow, but the down draught that takes place from suction or syphonic action within the building. The first down blow is curable by many fixed ventilators, but the second suctional down draught can never be cured by any fixed ventilators. When suction takes place within a building the wind will find its way through any maze of fixed plates; but with Lamb's patent triumph ventilator the downward current is changed in its course before it passes the vacuum chamber by the motion it creates in entering through the head.

The principle is as follows:—On the top of the shaft is arranged a vacuum chamber, the top cone forming an enlarged fixed cone, on which guides are placed to collect and concentrate the wind over the mouth of the cone. Then the first and second revolving cones, being of the same depth, only placed at different angles, causes the wind as it passes through to be compressed to over double power on the first, and treble power on the second, revolving cone before it leaves the orifice of these cones. This increased power causes the revolving portion of the ventilator to rotate freely and twist the passing air in a pyramidal form over the centre before it is discharged. Now, it must be plain to everybody that the wind cannot descend the shaft without first passing through the openings of the head, and as it passes it creates the motion by pressure as described, which motion immediately exhausts the vacuum chamber and turns the current upwards, and thereby prevents the down draught taking place through suction.

Points of Advantage.—If this ventilator be standing stationary, and the most intense strong wind was to set up, no down draught could take place. A combination of centripedal and centrifugal forces produces the whirl wind motion—a perfect, continuous exhaust, perfectly noiseless, and no down draught.

RECENT PATENTS.

PATENT APPLIED FOR.

No. 5,204.—"Method of Producing Surfaces for Mechanical or Ink Printing by Means of Photography." H. Garside, Manchester.—*Dated November* 2, 1883.

NOTICE TO PROCEED.

No. 4,732.—"Improvements in Apparatus for Use in Transporting and Exposing Sensitised Photographic Plates or Films." John Edwin Atkinson, Greenwich.—*Dated October* 4, 1883.

GERMAN PATENTS.

"A Photographic Collodion Process for Obtaining Greater Sensibility and Durability of the Prepared Plates." J. D. Möller and J. S. Möller, of Wedel, Holstein.—*Dated January* 3, 1883.

"Furniture for Photographic Printing Machines." Faber and Schleicher, of Offenbach-on-Maine.—*Dated April* 17, 1883.

AMERICAN PATENTS.

"A Method of, and Means for, Finishing Photographs." N. L. Stone, Potsdam, N.Y.—*Application filed June* 30, 1883.

"A Photographic Camera." Benjamin W. Kilburn, of Littleton, N.H., Assignor to the Scovill Manufacturing Company.—*Application filed March* 30, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

te of Meeting.	Name of Society.	Place of Meeting.
vember 13 ..	Great Britain	5a, Pall Mall East.
" 13 ..	Newcastle-on-Tyne	College of Science.
" 14 ..	Cheltenham Amateur..........	
" 15 ..	London and Provincial	Masons' Hall, Basinghall-street.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

ɪᴇ annual technical meeting of the above Society was held in the House the Society of Arts, John-street, Adelphi, W.C., on Thursday evening, 1st instant,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, a ter was read from the Secretary of the Photographers' Benevolent sociation, announcing that the Photographic Society of Great Britain d granted the use of their Exhibition on Friday evening, the 2nd inst., aid of the Benevolent Society's funds.

It was announced that the annual dinner of the Society would be held Friday evening, 7th December. Messrs. T. W. Wheeler, W. W. heeler, and H. E. Price were elected members of the Society.

The Chairman called attention to the fact that it was necessary at this eeting to give in the nominations for officers to be elected at the annual eeting in December, to serve for the coming year. He also announced at one of the members had moved the following resolutions with regard the coming elections:—1. That the President, Treasurer, and Secretary elected annually. 2. That there shall be six Vice-Presidents—two to tire annually, and not be eligible for re-election for one year. 3. That the mmittee shall consist of twelve members—four to retire annually, and not eligible for re-election for one year.

The list of the existing officers of the Society having been read, the following nominations were then made:—For Vice-Presidents: Messrs. H. rueman Wood and F. York.—For Committee: Messrs. G. F. Williams, riginshaw, W. Ackland, F. York, and L. Warnerke.

With regard to the artistic competitions for the past month,

Mr. F. A. Bridge said that for the figure subject, *Cat and Kittens*, not a ngle example had been sent in; and for the landscape subject, *Gnarled aks*, only one, which, on examination of the accompanying sealed envelope, was found to belong to Mr. Frank Howard. In handing round e balloting papers for subjects for competition during November he Mr. Bridge) requested the members not to propose such subjects as *Cat nd Kittens*, remarking that perhaps many of the members might not be rtunate (?) enough to possess such a stock of family pets. The subjects ere then balloted for in the usual way, with the following result:—andscape, *The Village Church*; and figure, *Out in the Cold*.

The Society's diplomas were handed to Mr. John Nesbit for his picture nt in for the June competition, *A Country Road with a Finger-Post*, also r his picture in September, *The Milk Maid*; to Mr. E. Dunmore, August ompetition, *A Good Place for a Rest*; to Mr. W. Cobb, August competition, *A Landscape with Moving Figures*; to Mr. Matthew Whiting, July ompetition, *Fisher-Folk*; and to Mr. F. A. Bridge, September competition, *River View*.

Mr. J. R. Gotz then exhibited a collection of aplanatic lenses by Mr. uter, of Basle, Switzerland, constructed with the object of obtaining a erfectly-flat field and good definition with full aperture, and chiefly designed for portrait groups, copying, and indoor work generally, also for rchitecture, &c. Mr. Gotz said that arrangements had been made for dapting the diaphragms and flanges to the standards of the Photographic ociety of Great Britain; also, that they were endeavouring to make a ide-angle lens, which would be about equal to the well-known symmetrical ens, with rotating diaphragms, to cover an angle of from 80° to 90°, and hich would cover about the same-sized plate as the aplanatic lenses.

Mr. Watson (of Messrs. W. Watson and Sons) showed a very convenient pattern of tourist camera, having a double swing-back with inges, to do away with the necessity for turning over the focussing-glass, nd giving the extreme length of focus possible for a camera shutting up nto so small a space; also a tourist dry-plate camera, giving ten and a-alf inches focus, sufficient for any ordinary half-plate lens, and perfectly igid in any position, with three double slides, the whole fitting into a very mall and portable case. He also exhibited an Addenbrooke shutter, rranged to give accurately any length of exposure from one-twenty-fourth f a second to two and a-half seconds, by means of a clockwork arrangement ith a dial for setting to any required exposure. Mr. Watson also showed snap-shutter, a light pattern drop-shutter made in ebonite, a shutter with neumatic discharger to expose without touching the apparatus, some boxwood cases for carrying bottles of chemicals when travelling, and two of rubb's aplanatic lenses in a new form of mount, very similar to Dallmeyer's wide-angle lens.

Mr. F. York objected, with regard to the first camera shown by Mr. Vatson, that with the portable symmetrical lenses now in use a swing-ack was quite unnecessary; he never used a swing-back, but got the same ffect by means of a rising front.

Mr. Watson replied that if everybody used only portable symmetrical enses he granted that Mr. York's objection would apply, but his camera was for use with any kind of lens.

Mr. H. Trueman Wood, referring to a remark of Mr. York's that swing-acks were a source of weakness in a camera, said that he did not think his was the case. He had used one of Mr. Hare's cameras with a swing-back or a long time, and it was still as strong as ever.

Mr. W. Brooks then showed two of Lamb's patent triumph ventilators. He said that, at the late meeting of the Royal Cornwall Polytechnic Society, e had been much interested in examining the various merits of some ventilators exhibited, and those he now showed had struck him as being very suitable for the use of photographers in the drying-room when making gelatine plates. He observed that they all knew how essential it was, with a large number of plates, to have a free current of air passing over the surface of the plates to dry them, and his experience was that the quicker they were dried the better. The principal advantage of this ventilator was that no down draught took place either from a sudden blast of wind or from suction or syphonic action within the building. He considered it the best system of ventilation for photographic purposes he had ever seen, and he said that as Mr. B. J. Edwards, who was present, had had one of them in use for some time, perhaps that gentleman would tell them something about it. [A fuller description of Lamb's ventilator is given elsewhere.]

Mr. B. J. Edwards said he had had one in use for about twelve months, and it answered his purpose very well indeed. It prevented down draught entirely, though it did not create up draught.

Mr. F. A. Bridge exhibited, on behalf of Messrs. Opie and Co., a small reading lamp for lecturers, which he pronounced to be the most perfect thing of its kind he had ever seen, and answered admirably the purpose for which it was designed. It had a signal-bell attached to it, also a match-box and an extinguisher, and by means of a sloped shade at the back the light was thrown only upon the book or manuscript of the reader. He (Mr. Bridge) also showed an improved regulation screw stopcock for the oxy-hydrogen burner, and a field changing-tent of his own invention, weighing only one and a-quarter pound, consisting of the usual black bag with sleeves, which could be put together on a light framework of bamboo in a few seconds, and costing something under five shillings.

Mr. Frank Howard exhibited some envelopes of non-actinic paper which he used for carrying sensitised plates for outdoor work.

Mr. Bridge then showed a photographer's small field note book, published by Openshaw, of Manchester, of the usual form, but containing in addition, at the end, some leaves of small tickets, perforated for tearing out, and numbered from 1 to 250.

Mr. H. J. Dale exhibited his new patent multiplex back, combining the merits of a back and changing-box in one, the arrangement being similar to the revolving album. The back contains thirteen plates in two tiers, the plates being secured in carriers with a metal back to prevent access of light through the plate being exposed on to the one behind it. In the front of the back is the usual slide for exposure, provided with a small window for non-actinic glass to enable the number of the plate about to be exposed to be seen, at the side of the back there being an ivory tablet to record the number and particulars of each plate exposed, in order to prevent re-exposure. The plates are brought into position for exposure by folding the back with both hands, front towards the operator, then turning gently over, away from the operator, two half turns, and securing in position by a screw. By the addition of an extra set of inner frames the back can be adapted at little expense to plates of smaller size.

Mr. J. H. Hare exhibited a stand on the principle of the rule-joint, with the advantage of a sliding leg which fixed itself, at any required height, by means of a spring; it had also a spring arrangement at the top to prevent collapsing.

Mr. Brooks described a dark slide with bag, shown to him by Mr. Kershaw, at Bettws-y-Coed, and which he claimed to be cheap and effective.

Mr. A. Cowan exhibited a method of mounting prints, which he said had been practised twenty years ago, and which appeared to be quick and effective.

Mr. Geo. Smith presented a camera, which he said was an attempt at making one camera do all kinds of work and still be portable. It was a 7½-inch, and weighed, with four dark slides, under five pounds; also a sky-shade, which might be carried in the front tailboard of same.

Mr. Bridge showed one of Mr. Smith's brattice stands, with some improvements.

Mr. W. T. Wilkinson exhibited a changing-bag.

Mr. B. J. Edwards showed a pocket camera stand, telescopic, made of bamboo, and weighing only 1¾ pound, four feet nine inches in height, and sufficiently rigid to hold a weight of 120 pounds.

Mr. H. Trueman Wood exhibited some lantern transparencies toned with nitrate of uranium, and an adapter of his own invention.

Messrs. J. F. Shew and Co. showed their "model" camera, the principal features of which were some improvements in the double swing; also a rigid bellows extending-body front which could be fixed to any camera, a dark slide, and a camera stand.

After votes of thanks to the several exhibitors the meeting terminated.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 1st inst., the chair was occupied by Mr. J. J. Smith.

Mr. A. J. Brown inquired whether any member had experience of the dark slides made of opaque paper introduced some time since.

Mr. E. J. Golding had had them in use every week since he showed them, and so far they were in perfect condition.

A question was read as to the merits of new and old glass for coating with gelatine emulsion.

Mr. A. Haddon said that the method of clearing off old films which he preferred was with chromic acid, liberated by adding sulphuric acid to a solution of bichromate of potash.

Mr. W. M. Ashman had found this plan productive of ulcers on the hands, and therefore he used dilute nitric acid—about one part in twenty being sufficiently strong.

Mr. Brown had found this take the skin off the hands and caused them to bleed.

Mr. Golding preferred sulphuric acid—one in twenty. The films in this solution came off perfectly clean. He (Mr. Golding) then showed two prints on chloride plates. They had been originally of the same colour

but one had been reduced by perchloride of iron and was now cooler in tint than the other.

A MEMBER inquired how this fact could be reconciled with the theory that colour depended upon the size of the reduced particles of silver. The application of the perchloride solution could not have the effect of making the particles larger, and so causing the cooler colour that prevailed in the image which had been subjected to its influence.

Mr. A. L. HENDERSON produced some plates that had been coated with Mr. Haddon's green-fog emulsion, and exposed one of them to the vapour from a solution of cyanide of potassium. This soon produced a clear spot. The same proceeding was then adopted with an over-dense negative which had been brought by a member in order to try the reducing effect of the vapour. During the few minutes left of the continuance of the meeting the vapour did not produce any sensible effect upon this plate, but a drop of the solution itself being spread upon one portion of the plate reduced it considerably. He (Mr. Henderson) believed that this result was due to the action of the air in combination with the cyanide solution, and that the reducing effect would not be the same if the plate were immersed. Mr. Henderson also showed a plate that had been coated with the emulsion mentioned the week before as giving transparent specks. This plate had been cut after exposure, and one half exposed to the daylight. Being developed together the specks in the light-fogged half of the plate were opaque instead of transparent, as in the other half. This bore out the opinion that the specks were of a silver compound less sensitive than the bromide of silver, and the longer exposure had been sufficient to cause this less-sensitive compound (which Mr. Henderson believed to be sulphate of silver) to be reduced by the action of the developer.

Mr. S. Baptie was elected a member of the Association.

LEEDS PHOTOGRAPHIC SOCIETY.

THE usual monthly meeting was held on Thursday, the 1st instant,—Mr. J. W. Reffitt in the chair.

A lecture was given by Mr. Washington Teasdale on the *Lantern as an Educational Instrument.* In the course of his lecture,

Mr. TEASDALE said that his experience with the lantern dated from his childhood, when there was no railway to London, no cheap postage, nor the many facilities now afforded for the spread of educational appliances. In those days his grandfather had procured him a Carpenter and Westley's phantasmagoria lantern and a limited supply of the then much-vaunted "copperplate slides" of the kings and queens of England, public buildings in London, and conventional representations of animals, birds, reptiles, &c., examples of which he then showed—not to raise a laugh at their quaint absurdity, but that, by comparison of these with the best modern slides, it might be seen how great an improvement had been made owing to the subsequent discovery and development of photography and the general spread of education throughout the country. The illustrations shown were numerous and varied, including selections from the zoological and art series of Mr. F. York; museum and other slides by Mr. Philip Fincham; statuary, architecture, and antiquities by Ferrier and other French photographers; samples of most of the Woodbury series, and a private collection of lecturing diagrams, produced not only by photography, but traced and etched on gelatine, glass, &c. Among these were examples of compound vibration and geometric tracery, the geometric dissections and rotation slides of Mr. Henry Perigal, F.R.A.S., and other scientific specialities. The lecturer especially called attention to the excellence of the Woodbury slides as now produced by the Sciopticon Company, under the careful management of Mr. George Smith, described briefly the peculiar mode of production, and finally exhibited the Nasmyth moon series as illustrative (when rightly understood and explained) of the highest class of purely educational slides.

In response to a cordial vote of thanks,

Mr. TEASDALE said that, although he had detained his audience beyond the allotted time and crowded in such variety of illustrations, there had been necessarily too brief comment on each series, and that as regarded the lantern as an educational instrument he had but touched the fringe of the subject; and those desirous of knowing more would do well to procure and study the admirable work of Mr. Lewis Wright, entitled *Light: a Course of Experiments Chiefly with the Lantern*, and thus learn how, with certain special appliances, important facts of physical phenomena might be publicly demonstrated in a manner formerly considered impracticable.

Correspondence.

PHOTOGRAPHY AND ART.

To the EDITORS.

GENTLEMEN,—I am not in the habit of getting into controversy with anonymous writers—it is a one-sided game; and, as to "Audi Alteram Partem," I am afraid to tackle him lest he come out with his dead languages and put me in limbo. I knew enough Latin and Greek once to take my M.A.; but when a man comes at me with Sanskrit I could not stand a moment. I find it hard enough to get at the English use of words with precision; but as to hunting them through a graveyard of dead languages I could not think of it.

"Free Lance," though he keeps his visor down, has a courteous way of running me through, and, though I fear I shall be throwing more ink away—for it is very clear he had not read my letter to which he alludes with any care—I will risk a little of it. I read more current literature on art than "Free Lance," I imagine, and do not find any artist admit what he says they do. A few quotations would h given point to his lance.

I will make what more I have to say short. We talk in a br sense of science and the arts, and "arts" mean in this acceptat anything technical and practical in production as opposed to scie which is theoretical. Thus we rank all the manners of working wh require skill and nicety of manipulation as arts—the art of elec plating, the art of working brass, that of vulcanising rubber, of we ing, &c., &c. The fine arts are those which, in common parlance, distinguished from the useful; but this is not really a distinction kind at all, but of the way that any given state of society accepts arts.

The word "art," however, has a distinct reference to design a have used it, and is not to be mistaken for the arts except by carel people. And in our state of civilisation the word "artist" is appl to those who devote themselves to the arts of design, to musicians a actors, who embody in another way an ideal. When the world large agrees to call photography "art," and photographers "artist the words will have those meanings. So far, neither acceptation obta in common English.

Usage determines the meaning of words; and, according to comm usage, a photographer is no more called an "artist" than a hand-org grinder is. Either *may* be, but the making a photograph does n show it any more than turning the handle of an organ. There m be great taste and feeling shown in grinding a hand-organ, and there an art in doing it well. The poor Italian who performs the operat may be a true musician, and might, perhaps, play a dozen instrumen No one could say the contrary; but, until he shows it on somethi else than a hand-organ, people would not call him an "artist."—I a yours, &c., W. J. STILLMAN.

Florence, October 28, 1883.

To the EDITORS.

GENTLEMEN,—On reading Mr. W. J. Stillman's letter in last wee Journal I have had to make this admission—that if his definition "art" be correct then I cannot say a word more. But here we diff He lays down a definition of art which shuts out photography, a then says triumphantly—"Photography is not art." I deny his rig to do this. I might just as well say that because some artists secure model for every portion of a picture their work is not art. My sta ment might not have the weight of Mr. Stillman's, but that is all th can be said. It would be over again the statement of an old dispute:

"Some say that Signor Buoncini
To Signor Handel's but a ninny;
While some say he to Signor Handel
Is not fit to hold a candle."

I contend that neither Mr. Stillman or anyone else has a right say to the body of men who are daily aiming after art in their pursu of photography—"You can never succeed." I have a strong repugnan to the attitude of some critics who, emulating the Alpine Club, clin to some almost isolated crag which will only afford an *insecure* footi for one, and consider themselves thereupon entitled to lay down t law, and who are often only too successful in damping the enthusias of others.

There is no "grave delusion" in my speaking of "nature's moods Nature isolated has none, of course; but nature to the poet and t artist, *and the photographer who is worthy of the name*, is always sympathy or dissonance with his own moods. I surely do not need explain this to Mr. Stillman. And if a photographer recognising "mood" succeeds, by the exercise of his thought, in bringing befo the art public the scene he saw so as to reproduce on the observe mind what he felt, his work is art despite all assertions to the contra —just as much art when produced by the camera (as a tool) as wh produced by brush, etching-needle, chisel, or pen.

The definitions of "art" are as numerous as the definers. My pr test is against Mr. Stillman's definition—and I am glad to see th there are many who agree in protesting. Mr. Stillman's appreciati of my *reductio ad absurdum* is too high, unless he considers it, as I d fairly drawn from his first letter, in which case all the credit is due him—not to me.

I am not inclined to carry on a discussion. I have made my protes I am sure that there are many of your readers who agree with m and are much better able than I am to maintain the connection betwe photography and art.—I am, yours, &c., H. NORWOOD ATKINS.

Liverpool, November 1, 1883.

"CHARACTER CARDS" FOR PHOTOGRAPHIC ASSISTANTS

To the EDITORS.

GENTLEMEN,—Having read your paragraph, *Character Cards f Photographic Assistants* (in *Foreign Notes and News*), in THE BRITIS JOURNAL OF PHOTOGRAPHY of the 26th October, I wish to express t opinions of myself and fellow-assistants thereon.

Whatever purposes the identity card may serve abroad, it thoroughly unnecessary in this country, as an employer has, in nin cases out of ten, only himself to blame if he engage an unqualifie

cant. A man who presents favourable references from good firms dom found, when employed, to be other than therein stated.

e identity card naturally gives satisfaction to the selfish class of oyers, from whom alone it evidently emanates; and, although its y is suggested in your columns, it will certainly find no favour any intelligent, liberal-minded photographic assistant in these .

ie requirements of an identity card from the employers is quite as spread a necessity as from the employed. The mere fact of a man g established in business is no guarantee of his honesty or respectay. The majority of photographic employers were once *employés* aselves, and, because they are no longer in the ranks of the latter, iat fact any reason for the supposition that their individual character has changed, or that they are any more to be trusted now than riously?

is an everyday occurrence to have one's testimonials and specimens *n*; to accept a situation understanding it to be a permanency and hrown out as soon as business slackens; yet all this is overlooked. ertheless, it is a pity there is no effective means of exposing the nbers who make their money in this scandalous way.

eform being needed, let photographers unite in forming and carry- on a scheme (similar to that prevailing among chemists) whereby connected with fine art shall pass an examination before they are ognised as competent professionals. Then would good results arise, rating photography to a higher standard than it has yet attained.— n, yours, &c., EQUALITY.

Tovember 2, 1883.

SHIPPING SENSITIVE PLATES TO ITALY.

To the EDITORS.

GENTLEMEN,—I have some time ago (and I think twice) warned all ppers of dry plates to avoid sending them to Italy by Chiasso and itzerland, as they are invariably opened at the Italian frontier. I ve just received, in violation of that caution, a box of plates—four zen 8 × 8—of which two boxes had been opened at Chiasso, and alf-dozen package in each box undone. I do not know if the others o had not been, as there was no label on to show the condition.

I again warn shippers to send *viâ* Paris and Mont Cenis, and advise sting on each package a label with the usual caution against exposure light, *in Italian*, as half the Custom-house *employés* understand no ench. This will show at least that a package has been opened and ve trouble.—I am, yours, &c., W. J. STILLMAN.

Florence, November 4, 1883.

"THE EXHIBITION AWARDS."

To the EDITORS.

GENTLEMEN,—I am very much surprised to find a brother amateur rowing cold water on the suggestion I ventured to make on the above bject, and as he has entirely misunderstood what I did write I really ust ask your kind permission to correct him. Although he has called e to book with respect to a clerical error which I inadvertently fell to with respect to the number of the exhibitors, I feel that he has laid mself open to correction when I remind him that I did *not* complain the disproportionate distribution of medals to the number of exhibirs, but suggested that a kind of compromise might be made after the alogy of our public dog shows and other competitive kindred hibitions.

With all due respect to the opinions of "An Amateur," I still main- in my strong conviction that the committee whose province it is to ake the awards would not consult the true interests of photographic ience by making their rule of selection "more rigid" than it is at esent.

One point more. I fail entirely to follow the modest "Amateur" hen he suggests the "weeding out of all doubtful work." This is not ie attitude becoming a society which reckons amongst its members so rge a number of men who are feeling their way *through* their failures the distant haven of success. Encouragement and not *dis*courage- ent should characterise the bias of their decisions.

May I venture just another opinion on the remarkable statement—"It ems a step backward that there were no artists this year amongst the idges?" What does "An Amateur" mean? He certainly pays a very oubtful compliment to those gentlemen who were selected to decide ie awards, all of whom were eminently qualified to do the work lotted to them—a work, I hesitate not to affirm, implying *artistic* ualifications of the very highest order.—I am, yours, &c.,

H. VICTOR MACDONA, M.A.

The Vicarage, Cheadle Hulme, Stockport, November 5, 1883.

PHOTOGRAPHY, COPYRIGHT, AND FINE ART.

To the EDITORS.

GENTLEMEN,—Good protestant though he may be, methinks Mr. Bate doth protest too much, too rashly, and before he fully realises hat which he protests against. I should have thought it unnecessary for me to repeat that photography is a fine art, and that any action which tends to play into the hands of those who would decry it deserves notice, if not reprobation; and if I see copies of photographs—even *legitimately* made, but made in such a manner that the delicacy of the original is lost—such reproduction is, in artistic eyes, nothing better than a "smear." An ordinary inspection of the cigarette boxes will amply illustrate my word. From a fine art point of view the case is very simple. If reputation and love for the beautiful be in the balance, do not copy if you must sacrifice grace and beauty; if its question be purely commercial there is nothing to be said.

I must again repeat there was "no difficulty *anent* the word author" —one who *originates*; that is, by *reflection*, by direction, and, therefore, "go to the Oval."

Judging by Mr. Jackson's "sublime and lofty" language, he seems to have gone up in a balloon—possibly in search of the "ideal." When he can find a suitable opportunity to discharge his ballast and come down to earth again perhaps he will find time to give us *his* views on the word "author," and the name of one London publisher who copies other people's photographs.

I see it urged that some photographers have not the advantage of artistic training, and therefore cannot be artists. Say rather they have mistaken their vocation and should have adopted a more congenial calling, where a knowledge of art was not necessary.

I beg to correct Mr. W. J. Stillman's designation of an artist as one who designs. A design may be a very bad one, and therefore not the work of an artist. A new-fashioned ladder for building operations may be designed; this will not be the work of an artist. The word "artist" is a derivative from the English "art"—skill. Artist, therefore, means *one who is skilful*. Our art comes from the French *art*, from Latin accusative *artem*, from nominative *art*; skill from √ AR—to fit. I suppose if our photographer came across one of Mr. Stillman's "artistic bits," and that he find it destitute of life and expressionless as regards a story, if he *fit* into this bit some figures to tell his tale he may professionally and etymologically be called an "artist."

Mr. Stillman's "gardener" must be correctly designated an "artisan," and this will include the "shoemaker and the tailor" of Mr. Hall. Artisan we get from the French *artisan*, from the Italian *artigiano* —a workman; this from Latin *artitus*—cunning.—I am, yours, &c.,

November 6, 1883. AUDI ALTERAM PARTEM.

EXCHANGE COLUMN.

I will exchange a quarter-plate Ross's lens, in good condition, for useful accessories.—Address, W. A. MALLIN, 50B, New-street, Birmingham.

We will exchange enlargements in carbon, platinum, or powder for photographic apparatus.—Address, PHOTOTYPE CO., 102, Lower Park-road, Peckham, S.E.

I will exchange, for anything useful in photography, accessories, backgrounds, &c., pneumatic shutter for interior or exterior of camera.—Address, A. PHILBURN, 132, Katherine-street, Ashton-under-Lyne.

Wanted, ferrotype material, gem and Victoria cards, collodion, or anything useful for wet plates, in exchange for a extra-rapid *carte* lens, by Shepherd; cost £4 4s.—Address, H. M. ASHLEY, 53, Clifton-street, Exeter.

I will exchange eleven volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY, from 1870 to 1880, a lady's silver Geneva watch (splendid timekeeper), and the "fairy" printing name press with 100 good type and outfit, for backgrounds, posing-chair, or anything useful in photography.—Address, W. J. BROOKE, 62, Town-lane, Shepton Mallet, Somerset.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Thomas Mills, 53, Garth-road, Bangor.—*Two Photographs of R. H. L. Williams-Berkeley, Esq.*

William Elliott Irving, Poplar Court, Annan.—*Photograph of Midland Pullman Express Passing Through Annan Station.*

Vincent Hatch, Byram-arcade, Huddersfield.—*Two Photographs of H.R.H. The Duke of Albany, Photograph of Imitation Temple Bar, and Photograph of Group of Royal and Distinguished Visitors at Whitley Branmont, Yorkshire.*

ERRATA.—Owing to the non-arrival of corrected proof before going to press last week there were several errors in *Studies of and Experiments with Gelatine Emulsion*, page 661. Line 3, for "dry" *read* "wet;" lines 25 and 26, for "per cent." *read* "per thousand;" and line 51, for "difficulty" *read* "difficult."

*** Several Exchanges have been held over until our next number.

J. FLETCHER.—See reply to "A. J. P." in our issue for last week.

THOMAS FORDE has omitted to enclose his address; hence his "exchange" is omitted.

PUZZLED.—We cannot undertake to decide upon the merits of the goods supplied by different advertisers. It is purely a trade question.

S. J. KING.—Vulcanised india-rubber, such as you have been attempting to dissolve, is not soluble in benzole. If you wish to make a solution you must employ unvulcanised rubber, or you will not succeed.

J. C. Earnshaw.—Will this correspondent, whom we answered last week, kindly forward his address, as we have a communication awaiting him? When his query was replied to the letter with his address was destroyed.

A. Z.—There is no gelatine made that is soluble in cold distilled water of which we are aware. Some very inferior samples of foreign glues are partially soluble in cold water, but these, we imagine, are not what is required.

Lux.—1. We cannot understand how a bromide paper, printed out direct, can be any guide to the exposure of a gelatino-bromide plate that is to developed.—2. It was an error of the reporter, the paper appears in the present number.

B. S. Scott.—Unless you have suitable appliances for grinding the pigment it will be better for you to purchase the moist colours in tubes, as sold by the artists' colourmen. These are finely ground, and will answer the purpose admirably.

C. Scouller.—Your better plan will be to purchase another lens of the focus you require. It will cost you far less, as the size is small, than attempting to lengthen the focus of your present instrument by the addition of other lenses.

Viewless Focus.—Focus an image of the sun on the ground glass; then measure the distance of the ground glass from the lens. Of course, by the method you have been trying, the conjugate foci was altered whenever you moved the lamp.

F. Adams.—Either of the lenses will answer quite well for enlarging with, but we cannot say which of them will be the better for you to employ, as we do not know the size of negative you wish to enlarge. Those of the "rapid" type will be the quickest in action.

J. L.—The process given in the Almanac is quite correct, and, if skilfully carried out, will yield excellent results. We know of no means of accomplishing the same end by the method you suggest. The silver on the surface should be perfectly white when polished.

S. Smuin.—Without knowing anything of your method of working we cannot say which gelatine will suit you best. The standard sensitometer is supplied by Messrs. Marion and Co., Soho-square. If you let us know the foci of the components of the lens we shall then be able to give an idea of their covering powers, but not otherwise.

Harry N. Bates.—1. You do not say how you have compounded the varnish, so we regret we cannot assist you. If, however, it is a spirit varnish, it may be that the solvent is not strong enough to hold the gums in solution. —2. The gelatine you mention works very satisfactorily in our hands. If it do not in yours we imagine it must be due in some way to the manipulation.

H. Solter.—1. There is nothing better to be had—indeed, the instrument is the only one in the market.—2. Either of the formulæ will answer equally well for portraiture. If you do not get good detail in the drapery it is, probably, because you have under-exposed the negative. It has nothing whatever to do with the presence or absence of iodide in the emulsion.

J. Berryman.—The reason you have failed with the carbon process on wood blocks is, very likely, that you have employed a tissue composed of too much gelatine in proportion to the pigment. What is required is a tissue containing a large amount of colouring matter, so that the finished picture shall contain very little gelatine, otherwise it will split asunder the graver.

Milton.—Judging from the print, we should say the plate has been considerably over-exposed, and, consequently, has taken the ink nearly as much on the lights as on the shadows. Try again, and expose parts of the plate for different periods. Then you will the better understand the effect of under- and over-exposure when the ink is applied. You must not be disheartened by a few failures when learning any of the collotype processes.

A. G. B.—1. From your description we should say that the dark corners in the pictures arise from the lens not covering, with even the illumination, the size of the plate you are using, but from its focal length we should not have expected this.—2. We should not recommend the slides you name.—3. A changing-box can only be used for one size of plate. Dark slides can be fitted with carriers to take any size, which, in your case, will be an advantage.

Photographic Club, Ashley's Hotel, Henrietta-street.—At the next meeting of this Club on Wednesday, the 14th instant, the subject for discussion will be—*On Vignetting Negatives and Prints.*

Photographic Society of Great Britain.—The first ordinary meeting of this Society for the ensuing session will take place on Tuesday next, the 13th inst., at 8 p.m., in the Exhibition Gallery, 5a, Pall Mall East, when the medals awarded will be presented. A paper, *Thirty Years of Photographic Progress: How it has been Secured, and How it may be Maintained,* will be read by Mr. Jabez Hughes, and other business transacted.

The Lantern Exhibition of the Photographic Society of Great Britain.—Again, on Monday evening last, the capacity of the exhibition hall was taxed to an inconvenient extent by the large attendance to witness the projection of photographic transparencies on the screen. Great applause greeted the appearance of many of the pictures. Among them was Mr. Dixon's tiger, as large as—nay larger than—life; Mr. W. Cobb's street scenes taken from the top of an omnibus, and others. The works exhibited, of which there were upwards of two hundred, were by Messrs. Acworth, Cobb, Dixon, England, Fincham, and Hill. Mr. Fincham's exhibit consisted of a series of views of the Tham[es] from its rise down to its junction with the sea. The number of tho[se] present was four hundred and seventy, including many ladies. T[he] honours of being "showmen" were divided between Messrs. Cade and Cocking, the former officiating at the lantern while the latt[er] announced the subject of each picture. This popular series of ente[r]tainments are to be brought to a close for the season with the display [on] Monday evening next.

LONDON GAZETTE, *Friday, November* 2, 1883.

Partnership Dissolved.

George Millen and Walter Millen, 36, Chancer-road, Brixton, Surrey, and 88, Queen-street, City, photographers.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. Steward, Optician,

For four Weeks ending November 7, 1883.

These Observations are Taken at 8.30 a.m.

Oct.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
11	29·89	SE	54	52	—	60	51	Foggy.
12	30·08	E	52	50	—	58	50	Overcast.
13	30·12	E	48	48	84	60	45	Foggy.
15	29·77	SW	52	51	97	61	49	Cloudy.
16	29·44	SW	57	54	94	62	50	Cloudy.
17	29·45	W	56	52	96	61	52	Cloudy.
18	29·98	W	50	45	90	57	44	Bright & Clear.
19	29·98	W	54	50	—	57	48	Overcast.
20	29·75	W	48	46	78	54	46	Overcast.
22	30·00	N	46	44	71	51	41	Overcast.
23	29·79	SW	51	50	—	58	42	Raining.
24	29·85	W	49	47	75	55	45	Hazy.
25	29·78	W	59	56	70	62	59	Cloudy.
26	30·07	SW	58	56	73	61	58	Cloudy.
27	30·06	SW	56	54	76	63	56	Cloudy.
29	30 24	E	54	53	—	59	54	Foggy.
80	30·46	E	51	50	—	56	51	Overcast.
31	30·33	E	52	50	—	56	52	Overcast.
Nov. 1	30·28	SE	50	47	—	52	48	Overcast.
2	30·20	SE	47	45	—	50	45	Overcast.
3	30·03	NE	48	46	—	51	45	Overcast.
5	29·70	W	43	41	—	55	40	Fine.
6	28·98	W	45	44	—	57	42	Cloudy.
7	29·60	W	37	37	—	41	36	Foggy.

CONTENTS.

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THE OPTICS OF PHOTOGRAPHY AND PHOTOGRAPHIC LENSES.

Chapter XXIII.—The Deterioration of Lenses by Light.

The subject of the deterioration of lenses through time or carelessness on the part of assistants is one fraught with much interest to the photographer, who frequently has a large amount of money invested in them. Complaints as to lenses which were at one time rapid but have become much slower in action have been frequent. In some cases it is possible that imagination has to do with such deterioration; but, for all that, it is not less the case that the falling-off in the effective performance of a lens is a physical fact which admits of no gainsaying.

The clearer and more colourless is a lens the better and more rapidly does it act. This may be accepted as an axiom in photography, although in astronomical instruments and microscopic objectives it is not of like importance. It is well known to ourselves and others that of a pair of portrait lenses which were selected, and for some time noted, for their absolute identity of action, especially as regards rapidity, one afterwards, which had been for over a year relegated to a different class of work from the other, eventually became so slow by comparison with the performance of its twin brother as to prevent their ever again being employed in the capacity of producing binocular portraits. Seeing that a high-class, rapid-working lens involves the expenditure of a considerable sum, its retention in a state of pristine purity is, consequently, an object of importance.

There are two sources of deterioration of a photographic objective, and we may here explain that by "deterioration," in the sense now employed by us, slowness is understood. So long ago as the second meeting of the London Photographic Society, held on the 3rd March, 1853, it was well recognised that some lenses worked much slower than others which had similar dimensions and working aperture, and some attempt was made to elucidate the cause. That the yellow colour of the glass of some of the instruments, as contrasted with that of others, was a prime factor in the slowness was acknowledged; but it seemed to be a moot point as to the part taken in such degradation of working by the Canada balsam with which the component parts of the front lens were cemented. Mr. Robert Hunt, one of the leading spirits of the then young society, went so far on the occasion referred to as to say that it had been observed by Daguerre and others that by dropping upon the surface of a photographic lens a little of the purest oil of almonds, and then wiping it off again in as perfect a manner as could be done by a silk handkerchief, the attenuated film still left would necessitate a great prolongation of the exposure. From whatever cause it may have arisen, neither we nor any one whom we have known to repeat this experiment have found it to yield the result mentioned. But that a film of Canada balsam of no great thickness will render photographic action sluggish is a fact admitting of no question. It has been found by Mr. George Shadbolt that in preparing two similar microscopic objects—the parasites of birds—for photographing, one of them being mounted in balsam and the other in glycerine, the former required an exposure of four minutes, whereas an equally good negative was obtained with the latter in one minute.

The great cause of lenses becoming slower is not the balsam used in cementing their elementary parts together, but the discolouration of the glass itself by the action of light. Lenses formed of dense flint glass are more liable to become deteriorated by the action of light than those of light glass. Why this should be so we are unable to say, although it has been surmised that, in some instances at any rate, it may have arisen from a trace of silver present in the lead which enters into the formation of flint glass. We well remember one lens of the "rapid" type, which was exhibited before the (now) Photographic Society of Great Britain several years ago, by an eminent optician, as possessing a larger angular aperture, and consequently greater intensity of lighting, than any lens of a similar class ever previously produced. A few years afterwards, when inquiring of the maker the reason why a lens of such obvious utility had not been commercially manufactured, he said that the glass of which that specimen had been composed, and which possessed a great degree of density, had deteriorated to such an extent and become so yellow in colour that he would not jeopardise his reputation by allowing one to be issued from his establishment. He showed us the lens in question, and its yellow colour was quite noticeable.

When Mr. Thomas Gaffield, of Boston, brought the subject of the discolouration of glass before the British Association, at the Brighton meeting, in 1872, and showed examples of glass of a fine quality, which from being quite colourless had assumed a very sensible degree of discolouration on being exposed to strong sunlight under a mask for a brief period, it was felt that this deterioration, although of, perhaps, primary importance in such a case as the glass roofing of a studio which was constantly exposed to light, would also affect photographic lenses, in which a degree of discolouration far less in amount would produce a greater effect in the prolongation of the exposure. To ascertain whether optical glass would follow the *rôle* of window and plate-glass, we wrapped a piece of tinfoil round a lens in such a manner as to allow one half to be exposed, and this we placed where it could receive the beams of a September sun for a protracted period. Upon being afterwards examined by laying it on a sheet of white paper, the exposed half caused the paper to assume a decided hue of a character resembling yellow with a purplish tinge.

Why glass changes it is not altogether easy to say with certainty. In the case of plate-glass it is held to arise from the presence of manganese, which is added in the form of its oxide, and known as "glassmakers' soap." One theory of the action of the manganese is that in all kinds of window glass, and in some poorer sorts of flint glass, materials are used which are not chemically pure There is usually iron present, the protoxide of which imparts a green colour to the glass. The addition of the manganese causes some of its oxygen to fly to the iron and convert its protoxide into peroxide, which imparts a yellowish colour to the glass; that being complementary to the natural pink of the manganese, is neutralised and the glass rendered of a white colour. By the action of sunlight upon this glass the nice equilibrium between the oxygen of the iron and the manganese is disturbed, and sometimes a yellow and sometimes a pinkish colour is produced. Another theory is that the manganese is added solely on account of the facility with which it

parts with oxygen, which consumes any impurities of an organic character or any oxidised, opaque, metallic particles. A singular fact in connection with the discolouration of glass by the action of light is found in the further fact that by heating glass thus deteriorated it becomes decolorised.

Now at this stage an element imagined to be of a conflicting nature has to be introduced; it is the Canada balsam. Painters are aware that white oil paint (carbonate of lead) when mixed with megilp, although pure enough while it remains exposed to light, assumes quite a yellow appearance upon being kept in darkness, or, in the case of a painting, in a drawer for a few months or even weeks. In like manner it is affirmed that Canada balsam becomes bleached and colourless by the action of light, resuming its yellow appearance when kept in the dark. Here, then, are two antagonistic forces to be kept under check. If the lens be exposed to strong light the glass has a chance of being discoloured while the balsam becomes decolorised; but if the lens be kept in darkness (except when in active use) the glass remains pure, while the balsam becomes discoloured. Now, while it is true that the discoloured white of the megilp oil painting will assume its original purity when placed in the sun for a few hours (unless it be a very bad case indeed), and, further, that coloured balsam will also become colourless, it is not the case that every kind of balsam changes colour; and we believe we speak within the mark in saying that for the productions of one optician which become deteriorated on this ground those of twenty are unaffected. The balsam scare, therefore, need not prove a source of uneasiness to photographers, the more especially as by the means we recently indicated the old balsam may be readily cleaned away and its place supplied with a fresh and colourless sample.

Of much greater importance is it that the lens be not subjected to any strong light, as it *may* cause a discolouration in the substance of the glass that cannot be removed. We do not here allude to surface stains in the form of oxidised patches, which are often caused by damp and particles of dirt acting as nuclei, and which stains are capable of being polished out, but to a discolouration existing throughout the entire substance of the glass.

If an objective be employed for forming an image by the direct beams from the sun, such as is used in the solar camera, we advise that it be kept for that purpose exclusively, because of the facilities which the light has for acting injuriously upon it and rendering it slower. We would also state that of all classes of lenses which should not be employed in the solar camera, or for any other purpose associated with the transmission of bright light, those of the popular "rapid" type stand at the head; for being formed of dense glass they are more liable than any others to undergo change. It is well, therefore, to keep them covered as much as possible when not in use. Portrait combinations and ordinary single achromatic landscape lenses, being formed of glass of less density, are better able to resist the influence of light; but even these should always have their caps replaced after being used.

THE USE OF THE HEAD-REST.

We should think that in all probability there is, or has been, more annoyance and ill-will created between photographer and client through the use of this instrument than almost all other causes of difference put together. The photographer explains in his suavest manner that it is only as a slight assistance to preserve a beautiful pose, or as a mere gentle support to avoid the vibration caused by the breathing of his subject and its concomitant loss of sharpness, that he employs it; yet the result is always the same. Either the subject acquiesces in a tone of resignation, or he becomes so unpleasant over the matter that neither he or the artist is in a frame of mind conducive to the production of successful results. In other cases—a decided minority—the sitter either submits to the machine with indifference or has the good sense to see the force of the photographer's argument that he, experienced man, finds it necessary, and would not be likely to go to the expense of purchasing it and the trouble of using it unless he considered its employment desirable, if not even absolutely needful.

"It makes me feel awkward." "It makes me unnatural." "I cannot be myself when my head is screwed." Such are a few samples out of many of the daily objections the photographer is plied with when using the rest, and, though he may attempt to be funny and say to his sitters "we don't photograph feelings here," and so forth, the possible smile evolved is too evanescent to be of advantage to him in the exposure. Not that we consider he should aim at producing smiling pictures; far from it, for nothing is so soon disliked as a portrait with an eternal simper.

Thus far from the photographer's point of view. Yet, in justice to the public, their standpoint should not be ignored, and there is not a doubt that some subjects are so nervous or so fidgety—it matters not which term we use, for the end is the same—that it is found almost impossible to secure effective pictures of them when the "rest" is used. It is a question worthy of discussion whether it would not always be better, from the point of view of expression, to photograph such subjects without the aid of the "rest," and take the chance of the result being somewhat out of focus, or even "fuzzy." It is beyond question that children—young children, that is to say—should not be taken with the aid of the instrument, for all that charm of naturalness and elegant, unconscious grace disappears almost inevitably upon the introduction of the head-rest; and we cannot avoid thinking there was considerable truth in the remark of an "old hand" whom we heard say—"No one but a bungler would use a rest with a child."

With old people it is in every one's experience that they make the "sharpest" pictures, and this we believe to be not only because the lines and wrinkles that accompany silvered hair accentuate and give value to crisp definition, but because actually an old man is far more rigid as to muscular play, and less likely to be nervous or easily moved by trivial events. We are quite sure that many more people have a feeling of nervousness when sitting for their portraits than would care to acknowledge the fact.

Up to this point we have practically assumed the necessity for the employment of the head-rest in portraiture; but we would ask, however, are we justified in doing so? It is pretty certain that of the vast number of amateurs who practise portraiture more or less (frequently, perhaps, the latter), very few are possessed of such an instrument, yet we have seen most exquisite portraits and effective pictures executed by such amateurs which have been in nowise marred by deficiency in sharpness. This may possibly be explained by the greater ease and familiarity subsisting between the artist and his model where there is no fee paid; and to some extent the explanation may be received, but certainly not to the full.

Again: when large groups are taken head-rests are entirely out of the question; yet even when the exposure has lasted several seconds, and when, as is usually the case on such occasions, jests are being passed until the very moment before uncapping, it is usually found that when the focussing has been properly done in the greater proportion each of the members of the group will be found to be quite sharp and clear, although every existent condition has favoured an opposite state of affairs.

We are thus almost forced to the conclusion that head-rests are by no means the necessary accompaniments to portraiture that is generally supposed. And now that, by the aid of gelatine plates, exposures are so reduced, the arguments against it become stronger than ever. We should think that four or five seconds would form an ample exposure for an average light during the greater part of the year in the studios of most professional photographers. Cannot so small a space of time be passed without fear of the sitters moving? Or, if their were such fear, would it not be worth while to risk a few spoiled plates for the sake of the greater comfort—not to speak of the saving of time—brought about by the disuse of this old-established instrument? We know that from some photographers we should be met by a flat negative—such is the force of habit and the natural conservatism of man; yet we would say—Give the plan a trial for a fair length of time. When the highest attainable degree of sharpness—microscopical in extent—is looked upon as a *sine quâ non* in a picture, we fear the head-rest will continue in use, though we do not hesitate to say that workers in such a groove will be very closely run by those of their brethren who cease to use it.

This, in course of a short time, we are inclined to predict will be the case with the majority.

In true British spirit we hope there may be a compromise. Few sitters object to a body-rest, and we would suggest that the head-rest give place to it entirely until it is seen that the latter be really necessary. We have the strongest belief that if the rest in one shape or other cannot be entirely abolished it will eventually, and that at no distant date, be in most studios confined to employment as a support for the figure only and not for the head—conditions which few would object to. That this is possible we have been assured, and we are credibly informed that in one well-known studio the head-rest has not been used a dozen times this year, though large numbers of sitters have been operated upon.

With facts such as these before us we cannot but advise our professional friends to do their best to abolish all use of that which is well termed by their clients an "instrument of torture."

ELECTRIC BELLS IN THE STUDIO AND RECEPTION ROOM.

A few weeks since, when alluding to the numerous applications of electricity in photography, we mentioned that electric bells are a very convenient means of telegraphing from one part of a photographic establishment to another—as, for instance, from the reception room to the studio, and *vice versâ*.

The most general mode of communication now in vogue is a speaking-tube, though in some few establishments the telephone is employed. On the whole, both these methods are very convenient, inasmuch as the communication is made by direct conversation, yet they possess certain inconveniences. Here let it be clearly understood it is not for a moment suggested that these modes of communication should be dispensed with and electric bells substituted, but merely that they should be used as a convenient adjunct.

Let us look at the inconvenience attendant on the use of the speaking-tube, and the same remarks will apply equally well to the telephone. For example: the attendant in the reception-room wishes to communicate with the operator in the studio. First, the whistle has to be sounded. This is usually very shrill and discordant, and is likely, therefore, to distract the attention, if not actually disturb, a sitter if the exposure is being made at the time. Then the operator, who may possibly be occupied with the sitter, has to leave abruptly to attend to the tube, or perhaps he is engaged with some important matter which he cannot conveniently leave at a moment's notice—say the development of a plate. This frequently leads to the whistle being sounded again—this time in a louder tone than before. All the time the attendant's ear has to be kept to the tube for, perhaps, some minutes, until an answer is received. Or it may happen that the operator has a communication to make to the reception-room, while the attendant is busily engaged with visitors. Perhaps it may only be to say that the operator has despatched the last sitter, and is ready for another. In any case, the attendant (if there be only one) must leave the customer to attend to the speaking-tube, which is often very undesirable. It is sometimes the case that the communication, when made, does not require a reply. In such instances the bells will prove of immense service.

Another inconvenience with speaking tubes may be mentioned, namely, that frequently a third party, to whom the conversation relates, may overhear all that is said, which, at times, may prove very inconvenient. Here is a case in point:—On a recent occasion we were in the dark room of a west-end establishment when a message came through the tube to the effect that too much time was not to be wasted on the sitter then in the studio, as a far more important one was impatiently waiting below. The message came in tones sufficiently loud for the then sitter to have heard had she (for it was a lady) been, as she was a few minutes later, in the vicinity of the dark room door. Had the lady overheard the communication she would not have been inspired with confidence in the portrait for which she was then sitting.

Now the advantage of electric bells is that the communication can be made direct without waiting for an answer, as in the instance of the speaking tube or telephone. Therefore, the person for whom it is intended is not called upon to relinquish the duty on which he is engaged at the moment, as he can hear the bell from all parts of the apartment, while a third party is ignorant of its meaning. For example: an operator is engaged with a sitter, and the reception-room attendant desires to know when he will be disengaged. A few preconcerted touches of the commutator or "push" prove sufficient to put the question. The operator hears it and if he be engaged replies to it at his leisure, while the attendant's duties may be resumed, as the reply can be heard in any part of the room and irrespective of momentary engagement, and at the same time the visitor or sitter (as the case may be) has no conception of the message that is being conveyed.

But how is this to be carried out in practice? it may be asked. How can an intelligible communication be made with the bells? Easily enough; for we may state that they are largely used for the purpose—though not so much in photographic establishments as they deserve to be on account of their convenience. This, we imagine, is owing to their value not being sufficiently understood.

Electric bells are of two kinds. One is what is known technically as a "single stroke," and the other as a "trembling" bell. The difference between the two is that in the former the bell is only struck once with the clapper when the commutator (the "push") is pressed. The other rings continuously, with a pleasant, musical sound so long as it is pressed home. It is the latter that must be selected for our present purpose. With this form of instrument we have the means of ringing the bell, either for a long or short period, as the ringing begins or ceases the instant the button of the commutator is pressed or released.

In the Morse telegraph, which is largely employed in the Postal Telegraph Department, the message is received on a strip of paper as a series of dots and lines, which represent the different letters of the alphabet. Thus, a dot and a dash (. —) may denote the letter A, while E is represented by a single dot, thus (.); I, by a couple of dots, thus (. .). Those letters which are most frequently in use are represented by the most simple combinations, while those employed less frequently—such as Y, for example—may require a combination of two dots and a dash followed by two more dots, thus (. . — . .), for its representation. By the simple arrangement of dots and dashes a code is constructed not only for all the letters of the alphabet but for the numerals also.

At first sight it might be assumed that this (the Morse) system of telegraphing, owing to the apparently complicated combinations of dots and dashes of which the letters are composed is a slow one; but it is not so, as it is one of the most rapid systems employed in the Postal Telegraph Office. Now, it is very clear that by substituting with our bells—one of which is fixed in the studio and the other in the reception-room—short and long rings for the dots and dashes, and adopting therewith the Morse code, we can maintain a conversation by spelling out the words, as is done with the Morse telegraph.

It would certainly be too much to expect the operator and reception attendant to incur the trouble of learning the entire alphabet code for the purpose of spelling out the communications they have to make. Nor is it at all necessary that they should do so. Besides, unless the communicants prove adepts, it would occupy an inconveniently long time in operating. By adopting, however, a code after the manner now employed by merchants and others for foreign telegrams, in which a single word denotes an entire sentence, the matter is at once simplified. By this means a sentence occupying several words may be communicated to the studio or reception-room, as the case may be, by two or three presses on the "push," and that, too, without attracting the attention of those present.

Next week we shall go into the practical details of the method, and the mode of fixing the bells.

At Kratoklino—a small place in the north of Norway, 69° N. latitude, where the *aurora borealis* is an habitual phenomenon almost constantly in view of the inhabitants—Dr. Tromholt has established an observatory for carrying on observations of *auroræ*,

more especially with the view of establishing their parallax; in other words, the height at which the manifestation takes place. Towards this end we perceive, on the authority of *La Nature*, that the learned observer has many times endeavoured to photograph the *aurora borealis*, constantly under his eyes, but he has never been able to succeed. Even when using the most sensitive dry plates, and prolonging the exposure for six or seven minutes, he could not obtain the slightest evidence of the plate being impressed. Dr. Tromholt attributes this fact to the special nature of the light of the *auroræ*, which, according to him, is far less intense than that of the moon, even when the phenomenon manifests itself in all its splendour.

The production of borax, which we referred to in our last number, appears to be of some special interest just now, an advertisement in our contemporary, the *Chemical News*, offering for sale the concession of a "valuable boracic acid lagune in Iceland, extending over an area of about two square miles," &c. Such a deposit, effectively worked, may probably lead to a cheapening of the salt.

At a meeting of the Chemical Society an interesting communication was read from the Japanese Chemical Society upon a lacquer employed in that country—a product which, judging from the account, could be rendered of the highest value for photographic purposes. This lacquer is a natural juice which hardens in *moist* air at a temperature of seventy or seventy-five degrees Fahr. better than in any other way. In hardening a chemical change takes place, the "urushic acid" being converted into "oxy-urushic acid," which was stated to be insoluble in every substance tried. This lacquer is not to be confounded with the lacquer in use in this country, which consists in the main of an alcoholic solution of lac with one or other colouring matter. For cameras and dark slides, and possibly for varnishing gelatine negatives, this Japanese lacquer would seem to possess extremely valuable properties, though, till an opportunity is afforded of trying it under practical conditions, a true judgment as to its qualities could not be formed.

The President of the Chemical Society called attention to the mode of action of this new material, which, he stated, dried best under conditions the reverse of those required by English varnishes. In some experiments of his own which he had made with an amber varnish, he had found that sunlight had a great influence in promoting the hardening of the varnish.

We learn from the pages of a well-known technical journal that "the managers of the Berlin Chemical Company state, in a circular recently issued, that they have found in a competing '*tannic acid* ten to fifteen per cent. of a substance insoluble in alcohol, besides regularly six to eight per cent., and in one instance twenty-five per cent., of powder starch!' The ten to fifteen per cent. of insoluble substance might be referred to the use of too weak an alcohol on treating the galls; but the presence of the starch cannot be referred to any such cause, and needs no commentary. Facts of this character, coupled with the rage for extreme cheapness in pyrogallic acid and other photographic chemicals, would seem to point to the need for careful examination of materials if uniformly successful results are to be looked for in photographic pursuits."

The small Swan electric light, as our readers are aware, has been adapted so as to be capable of employment for microscopic work, and one of our contributors has experiments in progress regarding its use for photomicrography. The latest application of a particular as opposed to a general illuminating purpose to which an incandescence light has been applied is to be found at the Royal Ophthalmic Hospital, in the operating-room of which institution it was most successfully used the week before last. The light was worked with a four-cell bichromate battery, and consisted of a platinum burner in a metal case, with a lens in front and a reflector behind it, the light being placed on a movable stand capable of being moved about and placed in any position by an assistant. By the aid of some such appliance there is no reason why photographic experiments should not be made for the securing of valuable memoranda in ophthalmic cases.

In the report of the Cork meeting of the British Association in 1843 an account was given of the behaviour of chrome salts (especially chromate of copper) upon silk under the influence of light, and now we have the same thing brought forward forty years after, Dr. Koller, in *Central Blatt für Textil Industrie*, calling attention to it as a novelty. Silk tissues impregnated with chromate of copper, and exposed to the direct rays of the sun, are rendered waterproof and dyed various shades of brown.

The whole groundwork of modern chemistry is based on the theory, propounded by Dalton, of the unalterability and constant weight of the ultimate atoms of matter and their consequent uniting with one another in definite weights. This theory in its entirety is gravely questioned at the present time, and very positive evidence is offered against it. In the *American Journal of Science* Professor J. P. Cooke treats this subject very fully, and points out that more than twenty-five years ago he indicated that on no other supposition than "that the law of definite proportions is not so absolute as has been hitherto supposed" could certain results obtained by him be explained. There is thus an interesting possibility shown of other explanations besides that of impurity of materials for the discrepancies between theory and practice, which, in the case of bromide of cadmium, formed the subject of discussion in our pages a year or two ago.

"LIFE-SIZE" HEADS.

A not uncommon source of difficulty for the professional photographer arises from a commission for a "life-size" head. Of course, in a general way, such a commission could be executed readily enough, without any difficulty being likely to arise; but, when the picture becomes one of importance on account of high price through first-class execution of the painter's work, care should always be exercised that the scale of proportion chosen may not be incorrect. That there are most considerable differences in the sizes of the heads of various individuals "goes without saying," as every one who wears a hat knows; hence the literal interpretation of "life-size" would, in a gallery of portraits, lead to the production of a number of heads varying most conspicuously in the proportion they bear to one another. Now, if nothing were in question but a plain enlargement no difficulty would be likely to be raised; but, if the picture should have to find a place among a collection of family portraits, trouble may ensue if some reference be not made to the actual dimensions of the original. One artist—a frequent exhibitor at the Academy—who has painted for me always asks me to measure with a tape the exact size of the head, and I have found it well to do so; for it so often happens in this class of work that one picture to be painted may have to be specially hung with another, as in the case (say) of husband and wife, so that any great departure from the actual measure of the original may lead to the pictures when hung looking strangely disproportionate.

I knew one gentleman who made a point (unless otherwise instructed) of painting "life-size" heads one inch less than the average of real life, and it needs no argument to show how absurd pictures of husband and wife painted by different artists who adopted these two scales would look when hung together. The desirability of ascertaining this point before commencing a picture need not be dwelt upon.

At the same time, it may be said that this "matching" in questions of size is by no means the simple matter it appears at first sight. Where is the measure to be taken from? From the topmost portion of the hair to the tip of the chin, or how? Again: where the lady's head-gear is considerable—as in the case of her wearing a cap—how is the top of her head to be found? or, once more, how when plaits, puffs, frizzes, or padding so hide the centre of the skull that the topmost hair is inches above what may be termed a "normal" height? These are not fanciful difficulties, as any one who has much work of the class only too well-knows; and it is no light matter, when a picture is sent home, to have a complaint made that "it does not match." A professional photographer has difficulties enough to contend with without bringing down fresh ones of this class if it can be avoided.

Another difficulty—and a formidable one—presents itself when of a pair of pictures one is full face and the other three-quarters, or nearly profile. In such case the full face, though of the same measure exactly (say) as to height and, indeed, as to the actual inches of the original, will usually appear so much smaller than the side face, though in reality strictly on the same scale, that a serious difficulty is likely to arise. It is quite possible for two pictures to be taken from life—one full and the other seven-eighths face, both on the same scale of proportion—yet for one to look very considerably smaller than the other, and it is no trivial matter to decide how to pair in cases of this kind.

The difficulty is increased by the singular apparent difference which is caused when a head is increased in its measurement by only a very slight degree. One's eyes naturally get trained by practice; yet, apart from that, anyone can see how, while in some things the uneducated—or, perhaps, I should say the unprofessional —eye is egregiously incapable of seeing correctly, in others its accuracy of perception is most unerring.

Most photographers are familiar in photographic portraits with the effect of expansion of the albumenised paper upon the features, one print looking absurdly long-headed, while another from the same negative is of normal proportions, and these discrepancies are almost equally well seen by outsiders. Yet, if a measure be applied it will be found that—with a *carte-de-visite* head, for instance—the graduations of the rule will have to be of a very minute character if any difference capable of being expressed in fractions of an inch is to be perceived. And so it is in the size of a head. One would think that half-an-inch one way or the other would make no very perceptible alteration; yet I do not hesitate to say that if two life-size heads, one only an eighth of an inch longer than the other, were exhibited together any one of the general public would detect the larger at a glance. When heads of smaller dimensions are compared differences so small as a sixteenth of an inch are easily seen.

I have said sufficient to show to those new to this class of work—experts are as able as myself to estimate the difficulties—the necessity for great care in making their measurements, and the stumbling-blocks which lie in the way of pleasing their clients. As to the practical mode of easing the difficulties and avoiding the pitfalls, the tenor of my remarks will indicate them; but I may describe briefly the mode I adopt in my own practice.

When the commission is for an important work, or even a slight one where I anticipate a case of "pairing" may be involved, I accurately measure the precise size of the head and enlarge to correspond. Where pictures are brought actually to be enlarged to match I adopt the method of measuring, not the *head*, but the *face*. The roots of the hair where it meets the forehead form a capital guide, and from that spot to the top of the chin I take as my standard. I make it, for men, six and a-half inches, and for women six and a-quarter. In my actual practice I do not find it necessary to make many variations. The height of cap, of plaits, and of bushy hair is thus prevented from becoming a difficulty. A bearded chin will generally give indication sufficiently close as to where the chin lies; and, if there be anything unusual in the position of the spot where the hair joins the face, I use my judgment. It is impossible to formulate a rule for every contingency.

I may conclude by saying that for life-size heads I thus measure not heads, but faces. G. WATMOUGH WEBSTER, F.C.S.

A FERROUS OXALATE DEVELOPER.

[A communication to the Edinburgh Photographic Society.]

For the successful rendering of landscape subjects it is necessary to have a reliable developer and a good sky-shade. In another paper I have described the improved shade used with so much success by my friend Mr. John Parker, of Glasgow. At present I wish to draw the attention of photographers, and especially of amateurs, to the properties of a developer of the ferrous oxalate kind.

In THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for the present year, page 146, there is an article by M. E. Audra (Paris), in which he shows that a developer of ferrous oxalate in combination with tartaric acid after being used will recover all its virtue on being exposed to the sunlight, and be useable again to the very last drop. I have made use of this developer occasionally during the last two months, and in preparing it employed—

Water (distilled)	10 ounces.
Protosulphate of iron	3 „
Tartaric acid	48 grains.

These are, as nearly as possible, the proportions recommended by M. Audra. I had previously made up twenty ounces of a saturated solution of oxalate of potash. Having filtered both solutions through blotting-paper, I made up the developer of the usual proportions—three of oxalate of potash to one of the protosulphate of iron and tartaric acid.

With a view to test its action on a half-plate which had been instantaneously exposed (but with full aperture), I immersed the plate in a flat tray of common water; then poured off the water, and laid the plate in. To twelve drachms of the oxalate solution which I placed in the measure I added two drachms of the iron, and poured it rapidly over the surface, using a flat camel's-hair brush to prevent air-bells. These, however, are less likely to occur with ferrous oxalate than with pyro. and ammonia. At no time have I used bromide to restrain, but I always took the precaution of retaining half of the iron solution—that is, two drachms—to be added at the close of development. Two ounces of the combined solution were thus employed for each plate. The action commenced in about fifteen seconds and gradually increased for about ten minutes, when it was apparent that the plate had been sufficiently exposed. Of course, subjects of open scenery—such as sea coast views, ships at sea, waves, and sky effects—require much less exposure than closed-in subjects—such as glens, large trees, and places where foliage predominates—and which require considerable exposure even to very sensitive plates. I know of no developer which more beautifully brings out cloud effects than that of M. Audra.

After having used about ten ounces of the combined solutions I poured it into a large bottle and added a few grains of tartaric acid. I then exposed it to the light, in a position that ensured the sun's shining upon it at some period of the day. This is of the utmost importance, as it is to the action of the sun's rays that the vigour which it regains is to be chiefly attributed. At the end of the two months during which I used the developer it was as effective as at the beginning. No doubt it may be objected to this developer that its action is very slow. This is quite true; but the difficulty may be overcome by using several baths, and thus developing more plates than one at the same time. I would strongly recommend the use of the old upright baths, especially those made of glass. It is not necessary to wet the plates in the first instance; it is quite sufficient to slide them into the bath with the dipper. They must occasionally be drawn up, that one may watch progress and prevent anything settling on their surfaces. This, however, is not so likely to occur as when one is using the pyro. developer.

Every particle of light in shadows is taken up by M. Audra's developer in a very remarkable manner if there has been full exposure, and the shadows are exceedingly soft, especially under the full aperture of a good lens.

I have once or twice been obliged to leave the plate in the bath and open the door of the developing-room; no harm was done to the plate, however, although clear light came in before I could shut the door. This, I believe, was due to the fact that the developing solution was very dark and dense. At the same time, it would be prudent to slip a thick brown paper cover over the bath in similar circumstances. I have had plates which were apparently under-exposed by the length of time that elapsed before development was hopeful. This, however, was owing to the tedious action of the developer, when the subject happened to have been taken in a dark glen or the interior of a dark church. Retaining such plates fully half-an-hour in the bath, they not unfrequently came out good negatives. One of the greatest difficulties, as we all know, is to determine the amount of time required for such subjects. There is comparatively no uncertainty with good light; for, with such, any make of gelatine plate may meet. But in obscure places one loses calculation, as the degrees vary so much.

While we endeavour to expose the plate to its full requirement of time, we must yet guard against over-exposure as well as under-exposure. The negative, when completed, is not robust in either case. Still, in my experience, over-exposed plates suffer less by this kind of ferrous oxalate developer than they do when developed with pyro. and ammonia. The great superiority of this developer over others lies in its comparative freedom from fogging, giving great clearness to the shadows, and consequently producing a rapid printing negative. The question has been frequently asked —Which of the two developers, the pyro. or ferrous oxalate, is to be preferred? Well, very much depends on circumstances. I do not think it suitable for the professional photographer, when time is a consideration to both himself and the party waiting; but to the amateur, and especially to those working chiefly in landscape subjects, the ferrous oxalate unquestionably is to be preferred. Having two or three baths he can easily get through half-a-dozen plates in an evening. There is no kind of developer which is so free from dimness in the shadows; hence, if the plate has been

under-exposed and thin in development, it is better fitted to be intensified than such a plate would be when developed with pyro. This is one of the ferrous-oxalate recommendations, not to speak of the immense advantage of having this kind of it with tartaric acid in it, thus saving the trouble of having to make up a fresh preparation at each development.

I have noticed, in my experience, after cessation for a time, that a scum is apt to form in the bottle which contains M. Audra's solution. It is well to watch this, and filter always on putting it into the dipping-baths. NORMAN MACBETH, R.S.A.

FINE ART AND PHOTOGRAPHY.

FROM one of Flaxman's lectures the following propositions may be deduced:—1. That a considerable portion of science is requisite to the production of literal art.—2. That whatever is produced from principles and rules only, added to the most exquisite manual labour, is no more than a mechanical work.—3. That *sentiment* is the life and soul of fine art.—4. That *without* sentiment fine art is all a dead letter. Sentiment is described as being "feeling," a thought prompted by feeling a passion.

If, then, sentiment be the *whole gist* of fine art, then that sentiment can be as well represented by photography as by any other means. It is the result—the feeling produced in us—we have to lay hold of, and not the means by which that feeling is conveyed to us.

Surely *a thought* is not influenced by the size or shape of the type it is set up in, or by the language in which it is written. The same idea may be impressed upon us by painting, engraving, printing, and even by signs alone; and so long as the desired meaning is conveyed it matters not one jot *how* it is conveyed if the wished-for end is attained.

Unquestionably, if a man can pose certain figures in front of his camera, and produce by its aid a picture which gives the beholder the same impression as that existing in the man's mind at the time he posed those figures, then I maintain that is fine art. It matters not that the figures be stiff or set, as far as art is concerned, if the sentiment be there, and we are conscious of its presence; and allowance *is* made on this score for paintings, etchings, and sculpture, which are often described as being full of sentiment or feeling, but bad in drawing, crude in colour, or carved by a bad method.

The credit of the highest and finest art is not denied to Rosetti because his drawing is often almost childish and sometimes absurdly wrong; but the state of his mind creeps out through all his works, be they in pencil, pen and ink, or colours, and would equally have been apparent—perhaps in a different form—had he made photography the servant by which his ideas were to be conveyed to the world. For, to quote the words of Sir Frederick Leighton, the accomplished President of the Royal Academy:—"The moral complexion of the artist does in truth tinge *every work* of his hand and fashion in silence, but with the certainty of fate the course and current of his whole career."

It is even questionable whether it is desirable that the means conveying the impression—unless that impression be one of overpowering force—should be of the most perfect kind. It might lead the mind away from the feeling of the work of art. Some of the old masters' and sculptors' work will explain what I mean. In many of these the sentiments cannot be mistaken. Its meaning forces itself upon us at once, and we are powerless to prevent it impressing us, but the drawing, and sometimes the colour or carving, is often atrocious; and, as we are obliged not to take these things into consideration, we pay more attention to the fact which the artist sought to convey to us, and which, perhaps, might not have been so readily perceived by us had the work been more perfectly wrought out, for what appeals to the eye is more readily grasped than that which speaks to the mind.

Who has not entered some of those grand old cathedrals—the work of men who thought less of themselves than of the glorification of the Almighty One, towards whose throne the spires and towers of their handiwork lift up their mighty tops—who has not, I say, on entering one of these been impressed, *whether he would or not*, with a sense of its grandeur and solemnity or hopefulness? And this, not by an inspection of the many details of which the result is composed, but by letting those details—rough, crude, and half-worked-out as many of them are—join in one great and glorious chorus, proclaiming to us in unmistakable language the idea of the artist in whose inner consciousness the work was first conceived. This is art in the truest sense. Take out the old materials, replace them with similar ones more carefully modelled and carved, give these the tinge of age, and if the result then impress you as powerfully as the older and more imperfect work, it is all you can hope for after all your labour.

I do not for one moment advocate bad workmanship; but we should be careful that, however perfect that workmanship may be, the sentiment is not lost, and that it is so telling and prominent that its meaning cannot possibly escape the beholder. The means should be suited to the desired end. No *musical* benefit is derived from fitting a gold mouthpiece to a tin whistle, although it may *look* better.

If the camera cannot create anything, then it is the fault of the process and of the process only; but then that fault should surely no more be cast in its teeth than should the imperfections in the method of one kind of painting be set down to the discredit of that particular style of painting. It is to the *man*, and not the means he makes use of, we must look for the result. An artist with a piece of chalk and his thumb will produce a better picture than will the ordinary house painter with all the colours in creation.

What would be thought of him who could find no other fault with a painting than that, being a water-colour, the pigments had been put on and the whole effect produced in a totally different manner from that made use of in oil painting? Or, because in the one case a certain result has been obtained by careful modelling on the flat, and in the other by "lumping it on" with the palette-knife, I venture to think he would be looked upon as little better than a trifler—more concerned about the shadow than the substance.

If the true sentiment be powerfully given by the artist—in photography or any other process—it will prevail over all other critical considerations. No mere illusive reproduction of texture or manipulation, however skilful, will atone for failure in conveying the pathos or interest of the situation.

No doubt fine art, which conveys a moral lesson, is art applied to the best and highest use; but, nevertheless, if a work do not embody such a lesson it is none the less fine art. If the sentiment be there and we perceive it, and it kindles within us the feeling which the artist intended it to do—whether that feeling be ennobling or the reverse—it has effected its purpose, and is, therefore, fine art.

Feeling and sentiment cannot be separated from art; they are inseparable. Feeling is the essence of art—the *sine quâ non* of its very existence—and if *it* be not apparent, all else is simply subtle skill, brilliant manipulation, or, it may be, neither.

I have mentioned Flaxman's opinion as being, I think, especially suitable to photographers, as the art he practised is one, like their's, which is to a certain extent a limited one, and reaches, perhaps, its highest position in dealing with a simple subject or a small number of figures; and, further, because, like photography, it is "monochrome" work, and, therefore, the charm of colour is not present to lead away the mind, as it often undoubtedly does, from the leading idea of the artist's work. C. W. CROSSLEY.

ISOCHROMATIC PLATES.

[A communication to the Photographic Society of Ireland.]

I PRESUME we are all aware that one of the greatest drawbacks to photography as a means of producing representations of objects in nature or art lies in the fact that, so far, certain colours affect sensitive plates very differently from our optic nerves; in other words, a colour which appears light to the eye, such as yellow, comes out in a photograph darker than a (visually) much darker blue. The reason is equally well known, namely, that the actinic power of yellow, which has great illuminating effect, is but feeble, while blue, which is weak in illumination, is strong in actinism. Indeed, there are some rays of the spectrum which affect sensitive surfaces strongly, while, having no illuminating power, are quite invisible to the eye.

In the month of June last, Mr. J. R. Sawyer read an elaborate paper before the Photographic Society of Great Britain, detailing a series of experiments he had made with various sensitive agents to reproduce different colours according to their natural values—in fact, to convey by different shades of a monochrome the effect of a number of colours. He used iodised and bromised collodions and gelatine plates, both plain and stained with eosine. Mr. Sawyer had heard of but not seen the plates I am about to bring under your notice this evening, and his results went to show that gelatine plates reproduced the various tints much better than collodion, but the eosine staining did not seem to have much effect.

A few weeks ago a lady, unknown to me—a sister of Mr. John Clayton, the inventor and patentee of the "isochromatic" plates, with M. Attout-Tailfer, of Paris—very kindly sent me two prints showing the effect of colours photographed on the new patent plates, which were very striking indeed. A woodcut of one of them appeared in *La Nature* and in the photographic journals a few months ago. In the other a band of orange, blue, and light yellow is rendered with the blue the darkest, orange intermediate, and the yellow almost white,

while on the ordinary plates they are just the reverse. At this lady's suggestion I wrote to her brother, who was good enough to send me a dozen plates to experiment upon. So far, I regret to say, my results have not been at all as good as those sent me by Miss Clayton; but it is quite possible that by more care in adjusting the exposure I may succeed better.

I pass round a few rough prints, for which I must apologise, as, for various reasons, especially an accident to the toning bath, they are very imperfect; but they will serve for illustration. Before describing my experiments in detail I wish to state that so far these "isochromatic" plates, though not entirely or nearly isochromatic, are nevertheless very much more so than the ordinary gelatino-bromide plates are; and I wish at present to avoid pronouncing anything like a decided opinion on such very insufficient evidence.

Experiment 1.—Two skeins of wool—one shading from very dark blue to white, and the other from very dark orange, through yellow, to white. As the French plates were somewhat slower than the ordinary ones used (Wünderschönen) I gave it a little longer exposure to equalise matters. Result: relative tints much better brought out by the "isochromatic" plate than by the ordinary, but blues much lighter than yellows.

Experiment 2.—A spray of Canary creeper (bright yellow) and blue lobelia. Both failed through under-exposure.

Experiment 3.—Two pale yellow single dahlias against a bright blue-covered book. Also under-exposed, but the "isochromatic" plate gave considerable detail in the flowers, and the ground somewhat lighter; while the ordinary plate was almost destitute of detail, giving merely a black patch for the flower on a white ground.

Experiment 4.—A coloured plate of pale blue and pale yellow water lilies. Result: ordinary plate—blue plate very white, yellow very dark; "isochromatic" plate—blue darker and yellow lighter, but yet not like the original, as the yellow was much the lighter colour.

Experiment 5.—A series of green, light yellow, bright blue, deep red, and orange ribbons on a cream ground. Result: "isochromatic" plate—yellow a little lighter than blue, orange darker, and red quite black; ordinary plate—yellow decidedly darker than blue or green, and orange and red both quite black. In this experiment I photographed the card sent me with orange, blue, and yellow alluded to above. My result approximated to, but did not nearly equal, Mr. Clayton's.

Experiment 6.—A coloured plate of a flower having deep blue petals and bright yellow stamens. Result: "isochromatic" plate—flower light, stamens plenty of detail and slightly darker; ordinary plate—flower about the same tint as the others, but stamens quite black and no detail. Exposure to the "isochromatic" and ordinary plate were alike in these two experiments.

Experiment 7.—Same as No. 5, but developed with ferrous oxalate, but no ordinary plate used for comparison. Result: very much the same, but the image was more vigorous than in No. 5, in which, as in all the others except Nos. 7 and 8, pyro. was used—about four grains to the ounce.

Experiment 8.—A light purple flower with yellow stamens; no ordinary plate. Result: purple and yellow rendered about the same tone, yellow rather darker. In *Experiment* No. 3 I had also a light buff flower which, on the ordinary plate, came out very white, but much less so on the "isochromatic" plate.

Messrs. Attout-Tailfer and John Clayton, 18, Rue des Cordeliérés, Paris, the firm who are making these plates, sent me, at my request, their prospectus with prices, which, converted into English measure and coinage, are about as follow:—

Assuming 1 centimetre = ·4 inch.
" 1 franc = $9\frac{1}{2}$d.

$4\frac{7}{8} \times 3\frac{5}{8}$ = 3/2	$9\frac{5}{8} \times 7\frac{1}{4}$ = 9/6.
$6\frac{1}{4} \times 4\frac{1}{2}$ = 4/-	$11 \times 8\frac{1}{2}$ = 12/8.
$7\frac{1}{4} \times 5\frac{1}{4}$ = 4/9	$12 \times 9\frac{5}{8}$ = 16/-.
$8\frac{1}{2} \times 6$ = 8/-	16×12 = 28/-.

These are very much the average of ordinary English makers' plates, and they seem to be good, clean, well-coated plates (one I tried failed to intensify with mercury, I do not know whether that applies to all), and if, in addition, a little practice will enable us to reproduce colours more in accordance with nature they will be a very decided step in advance, and will, no doubt, soon come into general use.

However, it is for figures and for copying paintings rather than for landscapes that I imagine their chief utility will consist. How they differ from ordinary plates I, of course, do not know, but that eosine has something to do with it, to say the least, is highly probable. I have not myself as yet tried the effect of staining an ordinary plate with eosine; but as others have failed to get much result in this way, we may suppose that it is in some other way—perhaps in the emulsion—that it is applied.

GREENWOOD PIM.

OBITUARY.

THE LATE MR. JOHN LESSELS.

WE much regret to have to announce the decease of Mr. John Lessels, late President of the Edinburgh Photographic Society, which occurred on Monday last, the 12th instant, in his 75th year, and the funeral took place in the Dean Cemetery yesterday (Thursday). Mr. Lessels had long been connected with our art-science in the "Modern Athens," and devoted much time and energy, as an amateur, to the cultivation of photography. We are indebted to our contemporary, the *Edinburgh Scotsman*, for the following particulars regarding the deceased gentleman.

This widely-known and highly-respected citizen died yesterday morning, after an illness that had lasted off and on for about six months. Mr. Lessels, who was born at Kirkcaldy in January, 1809, attended the school of his native place at the time when it was successively taught by Edward Irving and Thomas Carlyle. His early ambition was to be an artist, and a marked fondness for drawing was one of his early characteristics. His father, however, on the recommendation of Mr. Ferguson, of Raith, sent him to Edinburgh to be trained an an architect. The first office he entered was that of Mr. Burns, where by-and-by, he became inspector of works, and in that capacity was employed in various parts of the country. In 1846 he began business on his own account, and in course of time attained to the front rank of his profession, by the members of which he was held in high regard. On the passing of the Edinburgh Improvement Act he and the late Mr. Cousin were appointed architects to the Trust, and as such were called upon to take an important part in the carrying out of the scheme that had been devised for ameliorating the sanitary condition of the Old Town. By the Improvement Trust his opinion on any matter under discussion was always received with the greatest deference, the members of that body having the highest confidence in the soundness of his judgment, which, they knew, was never influenced by other than the most upright motives. Among other works accomplished by Mr. Lessels should be mentioned the laying out of the feuing plan for the lands of Drumsheugh and the designing of St. Leonard's House, Edinburgh — considered a fine specimen of Scottish baronial architecture. Messrs. Nelson's works at Parkside; the Smith Institute, Stirling; the Palace Hotel, Princes' Street; the handsome pillars at Hope Park, and Charter Hall and Blackadder House, Berwickshire, may also be specified as testifying to his professional taste and skill. He was one of a number of leading architects selected to furnish competitive designs for St. Mary's Cathedral, and it was said that his drawings were within one vote of being accepted. In leisure hours Mr. Lessels continued through life to cultivate painting, and he from time to time exhibited water-colour drawings of church interiors or street views that had attracted his attention in holiday rambles on the continent. As a critic of works of art he showed excellent discernment. Mr. Lessels was for some years President of the Edinburgh Photographic Society, an office which he only resigned quite recently on account of failing health. He also took a leading part in promoting the very successful exhibition held some time since under the auspices of that Society. As a member of the Architectural Association, Mr. Lessels did yeoman service in connection with the exhibition which that Society was instrumental in organising in Edinburgh about a year ago. He was Vice-President of the Scottish Society of Arts, and an hon. member of various societies in Belgium with which he became connected in early life in the course of frequent visits to that country. As a practical architect, Mr. Lessels is said to have been among the first, if not the very first, to introduce open iron fronts into Edinburgh shops—a change which, whatever may be said of it from an æsthetic point of view, was no doubt the result of an honest effort to meet modern business requirements. By a large circle of friends Mr. Lessels was held in high esteem for his many excellent business and social qualities, not the least noteworthy of which were sterling uprightness of purpose, an equable balance of mind, and a quiet, unassuming manner which rendered intercourse with him easy and pleasant. To an inner circle he could on occasion disclose a vein of genial humour; and he had ever at command a fund of anecdote, chiefly derived from his own shrewd observation of men and manners. Mr. Lessels was an elder and trustee in St. Bernard's church, of which he was a useful member. He was twice married, and is survived by a widow and family.

ENLARGING ON ARGENTIC PAPER AND OPALS.

[A communication to the Dundee and East of Scotland Photographic Association.]

IN appearing before you tonight I feel that the first thing I ought to do is to make an ample apology for having nothing new either to tell or lay before you. The process of making gelatino-bromide of silver prints or enlargements on paper or opal has been before the public for two or three years now, and cannot be called new; but still the number of inquiries that we receive every week in our business of argentic paper-making and enlarging makes me think that it is neither so well known or understood as such a facile and easy process deserves to be. I may just say here that, after a pretty extensive experience in the working of it, I believe there is no other enlarging process capable of giving better results than can be secured by this process when properly understood and worked; as the best results that can be got by it are certainly equal to those obtainable by any other method, while the ease and rapidity with which enlarged pictures can be made by it place it decidedly ahead of any other method.

It is now some seven or eight years since I first tried to make gelatino-bromide enlargements, my first attempt being to coat paper with the pellicle supplied at that time by Mr. R. Kennett, of London. I did not succeed well, the emulsion not being adapted for the production of positives, and it was not till after many trials that I succeeded in finding out the most suitable kind of emulsion and the best method of applying it to paper, &c., for the production of positive pictures. I am here tonight to give you, as far as I can, the benefit of such experience as I have had, and if I am able to clear away or lessen any of the difficulties some may have had I shall consider my trouble amply repaid. I propose first to show you how I make a gelatino-bromide enlargement on opal.

A gentleman connected with one of the oldest and most successful photographic businesses in Glasgow called on me a short time ago, and gave it as his opinion that this was the picture of the future, and likely to supersede all the collodion transfers and coloured daubs called "club pictures," so plentiful of late years, and I think he was right from the standpoint of good taste at least, as with the chaste tone of an engraving they combine the truthfulness of a photograph. [Mr. Goodall then proceeded to make an enlargement on a 12 by 10 opal; using a sciopticon, burning paraffine. After an exposure of two and a-half minutes the developer was applied, and a brilliant opal was the result.]

We now come to the paper process, and most effective enlargements can be made by it also; indeed, as a basis for colouring upon, nothing could well be better. Artists all over the country have told me that after a few trials they prefer it to anything else, while excellent and effective plain enlargements are easily made by it if only carefully handled. A very good enlargement, and one that can be very easily disposed of to a customer at a very moderate price, is made by vignetting the picture as I have just done with the opal, and then squeegeeing it down on a clean glass, and afterwards framing it with another glass in front, when it will have an appearance almost equal to an opal. I here show you two specimens which have been done in that way to make sure of the picture adhering to the glass, and, at the same time, to give greater brilliancy. It is better to flow the glass with a ten- or fifteen-grain solution of clear gelatine before squeegeeing it down.

The one fault or shortcoming of the plain argentic paper is the dullness of the surface when dry. This certainly makes it unsuitable for small work, such as the rapid production of *cartes* or proofs from negatives wanted in a hurry. The tone of an argentic print is also spoken of sometimes as being objectionable, but my impression is that it is not so much the tone as the want of brilliancy wherein lies the fault; and, if once the public were accustomed to the tones of "argentic," they might possibly like them quite as well as the purples and browns with which they are familiar, provided they had the depth and gloss of a silver print. Some time ago, acting on a suggestion made by the editor of the *News*, I set about trying to produce this result by enamelling the paper with a barium emulsion previous to coating it with the gelatino-bromide of silver. My experiments were successful; and we now prepare an enamel argentic paper on which the prints stand out with a brilliancy equal to those on albumenised paper. I here show you specimens of boudoirs and panel pictures enlarged from *carte* negatives on this enamel argentic paper. [Mr. Goodall then passed round several enlargements from landscape and portrait negatives, which it would have been difficult to distinguish from prints on double-albumenised paper.]

I have already spoken of the great ease and facility with which an argentic enlargement may be made, as compared with a collodion transfer, for instance; but there is another and more important point to be considered as between the two, and that is their durability and permanence. Now, with regard to a collodion transfer, unless most particular care be taken in the washing of it (and those who have made them will well know what a delicate, not to say difficult, job it is to get them thoroughly freed from the hypo., and at the same time preserve the film intact), there is no permanence in a collodion transfer, and that practically, in nine cases out of ten, they have the elements of decay in them from the first day of their existence. I know (at least in Glasgow) where an enormous business has been done within the last few years by certain firms in the club picture trade (the club picture being a collodion transfer tinted in oil or varnish colours). There are literally thousands of pictures for which thirty shillings or more have been paid, and of which the bare frame is all that remains at the present day. The gilt of the frame has vanished and the picture—in disgust, perhaps—has followed it; in short, I believe a collodion transfer cannot be made even comparatively permanent unless an amount of care be taken in the making of it which is neither compatible nor consistent with a popular price and extensive output. How now stands the case with an argentic enlargement? Of course it may be said that there is scarcely time yet to make a fair comparison, and that argentic enlargements are still only on their trial.

I will give you my own experience. I mentioned at the outset that seven or eight years ago I had tried Kennett's pellicle and failed, but I got one or two results which I retained as curiosities till only a month or two ago; but up to that time I cannot say they had faded in the least. I have here a specimen made three years ago, which I have purposely subjected to very severe treatment. It has been exposed without any protection to the light and damp, and all the other noxious influences of a Glasgow atmosphere, and, although certainly tarnished, I think you will find it has not faded. The whites are dirty, but the blacks have lost nothing of their original strength. I here show you the picture referred to—a 12 × 10 enlargement on artists' canvas—and may here state, in short, that my whole experience of argentic enlargements leads me to the conclusion that, setting aside every other quality, they are the most permanent pictures which have ever been produced.

Chromotypes and other carbon pictures have been called "permanent," but their permanence depends upon the nature of the pigment employed and with the chromated gelatine in which they are produced. Most of the pigments used, and all of the prettiest ones, were unable to withstand the bleaching action of light for more than a few weeks. Carbon pictures are, therefore, only permanent according to the degree in which the colouring matter employed is capable of resisting the decolorising action of light. There is no pigment in an argentic print—nothing but the silver reduced by the developer after the action of light. That has been shown by, I think, Captain Abney to be of a very stable and not easily-decomposed nature; while, if the pictures are passed through a solution of alum after washing and fixing, the gelatine also is so acted upon as to be rendered in a great degree impervious to the action of damp, and the pictures are then somewhat similar to carbon pictures without carbon.

I may now perhaps be allowed to say a few words on the defects and failures sometimes met with in the working of this process. And, first, in regard to the yellowing of the whites: I hear frequent complaints of this want of purity in the whites, especially in vignetted enlargements, and I believe that this almost always arises from one or other of the two following causes:—An excess of the ferrous salt in the ferrous oxalate developer; and when that is the case the yellow compound salt is more in suspension than solution, and in the course of development it is deposited upon, and at the same time formed in, the gelatinous film. The proportions of saturated solution of oxalate to saturated solution of iron forming the oxalate of iron developer, and which has been recommended by the highest and almost only scientific authority on the subject (Dr. Eder), are from four to six parts of potassic oxalate to one part of ferrous sulphate.

Now, while these proportions may be the best for the development of a negative, they are not, according to my experience, the best for gelatino-bromide positive enlargements. I find, indeed, that potassic oxalate should not have more than one-eighth of the ferrous sulphate solution added to it, otherwise it will not hold in proper solution for any length of time the compound salt formed when the two are mixed. The other cause is the fixing bath. This, for opals and vignetted enlargements especially, should always be fresh and pretty strong, so that the picture will clear rapidly before any deposit has time to take place, as it will be observed that very shortly after even one iron-developed print has been fixed in it a deposit of some kind begins to take place, so that, although it may be used a number of times for fixing prints which are meant to be coloured afterwards, it is best to take a small quantity of fresh hypo. for every enlargement meant to be finished in black and white. The proportions I use are eight ounces to the pint of water.

Almost the only other complaints I now hear are traceable to over-exposure or lack of intelligent cleanliness in the handling of the paper. The operator, after having been dabbling for some time in hypo. or pyro. or silver solutions, gives his hands a wipe on the focussing-cloth, and straightway sets about making an enlargement, ending up by "blessing" the manufacturer who sent him paper full of black stains and smears. Argentic paper is capable of yielding excellent enlargements, but it must be intelligently exposed, intelligently developed, and cleanly and carefully handled.

A. GOODALL.

RECENT PATENTS.

BELGIUM PATENTS GRANTED.

No. 62,680.—"Preparing Photographs and other Pictures for Photographic Reproduction." R. BROWN, R. W. BARNES, and J. BELL.—*Dated September* 22, 1883.

PATENT SEALED NOVEMBER 9, 1883.

No. 2,667.—"Apparatus for Changing and Storing Photographers' Backgrounds. A. M. CLARK.—*Dated May* 30, 1883.

IMPROVEMENTS IN PHOTOGRAPHIC PRINTING SURFACES.

THE following is the final specification of Messrs. BROWN, BARNES, and BELL in relation to their patented invention entitled "Improvements in and relating to the Preparation of Pictures and Photographs to be Used in the Production of Pictures by the Art of Photography and Photo-Engraving, and in the Production of Gelatine Reliefs and Printing Surfaces therefrom."

Our invention relates to certain improvements, hereinafter more particularly mentioned, in the preparation of pictures and photographs to be used in the production of pictures by the art of photography and photo-engraving, and in the production of gelatine reliefs and printing surfaces therefrom.

The object of our invention is to produce pictures or photographs with a grained or lined surface, so that they are suitable for use in the production of pictures by the art of photography and photo-engraving and photo-lithography.

Previous to our invention in the art of photo-engraving, or photolithography, amongst other methods it has been the practice to produce metal type surfaces, or other surfaces, such as plaster of Paris and like surfaces from gelatine reliefs, and then to grain the surface of the metal, or plaster impression. The surface on the metal type has also been produced by the processes known as zincography photo-etching, phototype, photolithography and the like, which processes have hitherto been chiefly confined to reproducing from what are technically known as point pictures. We, in our application for Letters Patent No. 5086, A.D. 1882, describe a means of producing a grained surface on the type by the use of a gauze, or perforated sheet, or by graining the type surface by the use of fine wire gauze muslin soaked in glue, or sand-paper, the grain of such material being embedded into the type by pressure.

Our present invention consists in preparing and producing pictures, photographs and grained type by the following methods:—

First we take the picture, which may be any half-tone picture of photograph, and we give it a stippled, grained, or lined surface, which is effected under one method by hand artistic manipulation, by stippling, lining, hatching, roughening, or breaking up the surface, or any portion of the surface, for example, by stippling with pigments, or inks, or by abrading the surface, or by imparting a grained or lined surface to the picture by pressure from a grained or lined gelatine relief, a sheet of wire gauze, or a

·et of perforated metal, or from a grained or lined steel plate, stone, or ; like. After imparting the grain to the picture it is rubbed over with a t pigment, which shows the grain up. Another method consists in ing or graining the surfaces of the picture by printing the stippling, ining, or lining on the picture from a copper plate, or other printing dium, by the use of printers' inks. Having so produced the stippled or ed surface on the picture, it is submitted to artistic manipulation, ereby it is perfected into condition for use in many of the processes present known. The picture so prepared can be used for producing inting surfaces by such processes as Woodburytype, zincography, oto-etching, photo-engraving, photolithography and the like on metal, ne, or other surface, which processes have hitherto been chiefly nfined to reproducing from what are technically known as "point ctures," whereas by our process printing surfaces can be produced from tural objects, animate and inanimate; for example, having obtained a gative or a positive photograph from the picture prepared as above scribed, we produce a gelatine relief in a manner well known in the art photography. This gelatine relief will have a grained surface over the cture and background, and when applied in the production of metal pe printing surfaces, as by the Woodbury process, or as by the process tented to us No. 5,086 A.D. 1882, the metal type printing surface result- g from the above-described operations has a grained or lined surface ch as is suitable for printing from with ordinary printers' inks.

We utilise that part of our invention where the grained or lined surface produced upon a photograph by pressure from a grained or lined surface, ch as a sheet of wire gauze, perforated metal, or a gelatine relief, for her purposes than the processes hereinbefore mentioned, namely, for aining or lining ordinary photographs for direct sale or otherwise.

Under the second part of our invention we take a grained or lined ject, such as finely-grained or lined paper, or other material, or the tural grain, or lines of any material such as leather or linen. From this ject we take a negative photograph; we also take a negative photograph the picture. In printing a positive on sensitised paper, or glass, or latine we first expose the grained or lined negative, or the negative of e picture, and before the positive is fixed we expose the other negative. 'e thus produce a positive having the picture, and, likewise, a grained lined surface over the picture; or we take a negative photograph the half-tone picture, and in printing a positive on sensitised paper, glass, or gelatine, we expose such sensitised paper, glass, or gelatine with sheet of fine wire gauze, or like perforated material, so that the mesh of e gauze is photographed, so to speak, on the paper, glass, or gelatine, and en before the photograph of the gauze is fixed, we expose it with the gative of the half-tone picture, or we expose the sensitised paper, glass, gelatine with the negative of the half-tone picture, and before the photo- aph of the picture is fixed we expose the sensitised paper, glass, or latine, with a sheet of fine wire gauze or like perforated material. The sult is that the positive picture produced bears not only the photograph the half-tone picture, but bears likewise a grained, or lined, or dotted rface over the picture caused by the wire gauze, or perforated material. ositive photographs on glass, paper, or gelatine, thus produced, can be ilised for the processes described under the first part.

Under another method we take a piece of paper, the surface of which has en printed over with lines or dots. This paper may be sensitive paper, may be sensitised after the lines or dots have been printed on it, and on is paper we print a photograph. Such protograph can be used for the pro- sses before described under the first part.

Under the third part of our invention we produce a gelatine relief from negative photograph taken from any grained, or lined object, such as fore mentioned under the second part. We then take a gelatine relief of e negative picture. In producing the metal type we place the grained latine relief and the gelatine relief of the picture one over the other upon e surface of the type metal and by the Woodbury process, or by our ocess before referred to, we produce a grained or lined surface picture, ch as is suitable to be used for printing from with ordinary printers' ink.

Under the fourth part of our invention in using plates of thin lead and so lead plates of large size, it is found that such plates are liable to come bent and uneven. This is particularly the case when the type is oduced by processes other than by even direct pressure applied simulta- ously over the whole surface. We rectify this defect by the application heat, which is conveniently effected by placing the lead plate which is be levelled on a true and even surface, such as a steel face plate. The at is applied by heating the plate on which the lead rests by a heating edium, such as a gas flame, or placing the lead plate and face plate in a ated oven, care being taken not to overheat. This part of our invention alike applicable to trueing, or making level, the surfaces of lead sheets ed in the carrying out of this present invention and our former invention, plication No. 5,086, A.D. 1882, before referred to and to the Woodbury- pe when thin or large sheets are used, when they become bent and uneven.

Having now described our invention and shown how the same may be rried out, we claim—

First. The method substantially herein set forth of preparing pictures d photographs on paper, glass, or gelatine to be used for the production printing surfaces by the arts of photography, zincography, phototype, otolithography, photo-engraving, and the like, and by the Woodbury ocess for printing from in printing processes, in which are employed tty or greasy inks, which method consists of giving to half-tone pictures photographs on paper, glass, or gelatine stippled, or grained, or lined rfaces substantially in the manner as herein set forth.

Second. The method substantially herein set forth of preparing pictures d photographs to be used for the production of printing surfaces by the ts of photography, zincography, phototype, photolithography, photo- graving, and the like, and by the Woodbury process for printing from printing processes in which are employed fatty or greasy inks, which ethod consists of giving to the picture or photograph an indented surface impressing into the picture or photograph a grained or lined material, or bstance, such as wire gauze, substantially in the manner herein set forth.

Third. The method substantially herein set forth of preparing photographs on paper, glass, or gelatine to be used for the production of printing surfaces by the arts of photography, zincography, phototype, photolithography, photo-engraving and the like, and by the Woodbury process for printing from in printing processes, in which are employed fatty or greasy inks, which method consists of giving to a photograph a grained or lined surface, substantially in the manner as herein described in reference to the second part of this specification.

Fourth. The method substantially herein set forth of giving to metal type a grained or lined surface, as herein described, in reference to the third part of this specification.

Fifth. The method substantially herein set forth of levelling lead plates, which method consists of treating lead plates in the manner substantially as herein described in reference to the fourth part of this specification.

PHOTOGRAPHY IN COURT.

QUEEN'S BENCH DIVISION, November 13.

(Before Mr. Justice Grove and Mr. Justice Mathew.)

M'LACHLAN *versus* AGNEW AND OTHERS.

The plaintiff, Mr. M'Lachlan, an artist, sued Messrs. Agnew, picture dealers at Manchester, and some other persons, in reference to transactions in connection with a painting of the Royal Family at Windsor. The picture, which was painted by the plaintiff, was 17ft. by 10ft.; and it was stated that he had travelled about to various foreign Courts to obtain photographs, and had ultimately composed and painted the picture. The process occupied him for nine years, and he had received and refused an offer of £30,000 for the painting. Messrs. Agnew advanced the plaintiff money during the progress of the work, and there was a deed executed between them. The plaintiff's case was that he was to have the sole right to reproduce the work in photographs, and he claimed compensation upon the ground that the defendants had infringed his right in this respect. The picture had been handed to the plaintiff upon an undertaking that he would return it by a certain day; but the painting had not been redelivered in accordance with this undertaking. Then there was an order of a judge at Chambers that the picture should be delivered to a Master of the Court for safe custody. The plaintiff had not complied with this order, but had applied to Mr. Justice Butt to make an order in lieu of the existing one that the defendants should supply the plaintiff with a detailed statement showing what money the defendants had paid, the amount of stock in hand, and so on. The application was dismissed, and this decision was now appealed against.

Dr. Pankhurst was for the plaintiff, and Mr. Shiress Will for the defendants.

Dr. Pankhurst addressed the court in support of the appeal.

Mr. Justice Mathew said that the proper course would have been to appeal against the order at Chambers, or to deliver up the picture in accordance with it, and not to ask the court to substitute another order in lieu of it.

Dr. Pankhurst.—The defendants made it a question of account only, and the plaintiff replied, "Make the account out and I will pay you." There could only be a small sum due to the defendants, and therefore upon paying it the plaintiff had a sort of equitable right to the picture.

Mr. Justice Grove.—The plaintiff should first obey the order to bring the picture into court, and then make any application he pleased.

The appeal was dismissed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 22 ..	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The first ordinary monthly meeting of the above Society for the present session was held at 5a, Pall Mall East, on Tuesday evening, the 13th inst.,—Mr. James Glaisher, F.R.S., President, in the chair.

The minutes of the last meeting having been read and confirmed, the following gentlemen were elected members of the Society:—Messrs. Thomas Annan, H. R. Banart, Leonard Norman Chadwick, William Cotesworth, W. Dawson, Alfred Ellis, T. Fall, James Goulburn, E. H. Griffiths, M.A., Henry Harben, Lieut. E. C. Tyrell Hawke, R.E., H. Bedford Lemere, W. N. Malby, Harry A. Moncrieff, William Newall, Fox Shaw, A. Stewart, Peter Thellusson, Clement Tulloch, W. H. Weldon, and A. J. West.

The Chairman then presented the Exhibition medals to the following Gentlemen:—Messrs. W. Mayland, H. P. Robinson, Seymour Conway, H. B. Berkeley, W. F. Donkin, West and Son, the Autotype Company, Messrs. Adam Diston, J. G. Whaite, J. Bullock, W. Cobb, A. Common, T. and R. Annan, W. B. Woodbury, and A. Lugardon (of Geneva). He (the Chairman) said that, having thus far fulfilled the wishes of the jurors of the Exhibition, in announcing the awards, he felt it incumbent on him to mention the names of Messrs. Lyddell Sawyer, G. Selwyn Edwards, Manfield, Brightman, Vanner, Henry Dixon, Henry Stevens, F. Beasley, jun., Byrne, Faulkner, Malby, Valentine Blanchard, W. England, W. Ackland, and F. M. Sutcliffe, all of whom had exhibited pictures of great merit. He would now call upon the members for a very warm vote of thanks both to the hanging committee and the jurors, and in doing so would ask them to try and imagine the great labour there had been in connection both with the

hanging and the awards. The hanging committee had to make the best arrangement they could, as it seemed at first almost impossible to get anything like order out of the collection of pictures. Day by day the pictures were put up, while the judges made their notes independently of each other, and this for several hours each day, during several days. He (the Chairman) thought that for so voluntarily giving up their time, and for the care and consideration they had displayed, both the judges and the hanging committee were entitled to the best thanks of all concerned.

The votes of thanks having been warmly accorded,

The Chairman said that up to and including Monday evening, the 12th instant, there had been 9304 visitors to the Exhibition, and the money taken amounted to £222 odd. Therefore, it was the best exhibition they had had, both as regarded the number of visitors and the receipts. At the lantern exhibitions there had usually been from three to five hundred visitors on each occasion, and the question had been mooted as to whether next year they should hold them more frequently.

Mr. Jabez Hughes then read a paper, entitled *Thirty Years of Photographic Progress: How it has been Secured and How it may be Maintained,* in which he commenced by expressing a fear that his communication might prove somewhat dry and uninteresting, but he would ask the indulgence of his audience for its imperfections. Of one thing he felt quite sure, namely, that after the proceedings they had witnessed that evening it was evident that the advancement which had been made in photography was chiefly due to their own Society. He thought that the members might well afford to devote one evening to the consideration of the direct and indirect results of their past work. It was scarcely possible that the same progress would be made in another thirty years as had been in the past thirty, and some explanation might prove interesting as to how this advancement had been brought about. It was the object of his paper to show this, and also that the absolute rise and progress of photography was connected with and through their Society. Photography dated its existence, for all practical purposes, from Fox Talbot and Daguerre, and it was curious to compare those two methods with the experience since acquired. By each method the image in the camera was for the first time secured. Each was worked out independently of the other, and both appeared about the same time. Each used the same sensitive salt (iodide of silver) to produce the image in the camera, and each used a developer to bring out the image. But here the similarity ceased. Daguerre's was a positive photograph on thick glass plates. Talbot's a negative one on thin paper. Daguerre's process had a brilliant existence until collodion came into use, and then it died out. It was not a whole or complete process; only a positive process produced by negative means. Its advent was, however, a splendid episode in photographic history. Talbot's process, on the contrary, succeeded on account of a two-fold advantage it possessed, namely, that it was both a positive and a negative process, each being capable of independent working. All progress since made in paper photography only consisted of alterations and variations of this. Glancing for a moment at the many different ways by which negative wet and dry processes have been produced since Talbot's time, Mr. Hughes remarked that the contrast between the collotype process of 1840 and the gelatine process of 1880 was almost ludicrous. In Talbot's researches the first results were crude and uncertain, and it was to be borne in mind that there was a total absence of collateral knowledge to guide the student into new fields. Men of such high scientific culture as Sir John Herschel and Robert Hunt undertook these researches, and by such labourers as these the art was placed on a firm scientific basis, and, as fresh knowledge was gained, the band of students increased. The exhibition of 1851 gave a special impetus to the work, and the discovery (about the same time) of the collodion process contributed very greatly to the progress of the art. In January, 1853, the first meeting of the present Society was held, with Sir Charles Eastlake as President, and the founding of this Society completed the chain between the very commencement of photographic research until the present time. New enthusiasm was imparted to the early workers by being thus associated together, and an impetus in the art arose, which has never since subsided. The example of this Society was followed by the establishment of others at Liverpool, Edinburgh, Manchester, Dublin, Birmingham, and other places, and about this time appeared the first organ of the photographic press—the present British Journal of Photography—followed shortly afterwards by the *Photographic News.* The Society's own journal actually appeared prior to these two, and can boast of being the oldest photographic journal in the world, and the only non-commercial one. The establishment of photographic exhibitions by this Society also contributed much to the advancement of the art, especially as regards technical skill; and the exhibitions of the Photographic Society of Great Britain might now be considered as the Royal Academy of photography. What had hitherto been merely a curiosity now became a household necessity, and the interchange of portraits became general. He (Mr. Hughes) did not propose to note the myriad courses into which photography has now prominently worn itself, but would simply draw attention to the fact that photography—which was practically unknown thirty years ago—had now taken its place with the other arts. If industry were all that was required the progress would have been much greater; but some of the labour had been ill expended, and to an outside observer there might seem to have been a waste of energy in discovering new processes, and then throwing them aside for others. Photography had already passed through two eras—paper and collodion—and they were now entering upon a third, namely, gelatine, and Mr. Hughes expressed his conviction that the gelatine period would as much excel collodion as the latter had surpassed paper. Having seen how progress had been secured in the past, it would not be difficult to maintain it in the future, by going on doing as they had done before, but with greater zest. In concluding his paper, he (Mr. Hughes) spoke in eulogistic terms of the very important aid rendered to their Society by their President, Mr. James Glaisher, who, he said, had been connected with photography since its earliest days, and he was sure that they had never had a more useful member.

A vote of thanks having been accorded to Mr. Hughes for his paper,

Colonel Stuart Wortley objected to the paper being considered history until it had been taken into discussion, as he had noticed that, while some names of little note in the photographic world had been brought into prominence, other names of distinguished workers had been entirely omitted, as well as some of the leading processes.

Mr. Hughes explained that on account of the great length of his paper originally, he had been obliged to cut it down, and in so doing had taken out some of the names which Colonel Wortley would, perhaps, have liked to hear mentioned. He had not pretended to give more than a mere outline of the progress of the art; but nothing would give him more pleasure than to have a discussion on the paper.

The Chairman said that, as it was usual on the present occasion to close the meeting earlier than usual, to enable the members to walk round and examine the pictures before the Exhibition closed, it would be necessary to adjourn the discussion of the paper to a future occasion. He also said that the first business at their next ordinary meeting would be the adjourned discussion on Mr. Spurge's paper, read at their meeting in June.

The meeting was then adjourned to Tuesday, the 11th December.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 8th instant, the chair was occupied by Mr. W. E. Debenham.

This was the evening for the second of the "lecturettes" which are announced to be delivered monthly, and an attendance of at least double the average numbers gave evidence of the attractiveness of the subject; *The Manufacture and Characteristics of Photographic Lenses;* and of personal interest in the lecturer, Mr. J. Traill Taylor, formerly editor of this Journal.

The Chairman, in a brief introductory address, said that the members would have the advantage of listening to a gentleman who was practically versed in the manufacture of lenses, and at the same time a lucid instructor in the theoretical principles upon which they were constructed. During the long period in which he had from time to time, as Editor of The British Journal of Photography, treated of photographic optics, he had written in such a style as to be understood by any one of fair intelligence and average education. There was, indeed, not the slightest necessity for treating the subject otherwise. Complex mathematical formulæ had their proper place in original investigation; but, even when correctly expressed, they were quite useless, and, indeed, only disheartening when addressed to those not one in a hundred of whom had had the special training necessary to understand them.

Mr. Taylor commenced his lecture by referring to the functions of lenses, and by describing the method by which the necessary curves were computed in order to obtain a definite focal length. The varieties of optical glass were next discussed, and specimens (both in the rough and partly-shaped state) were handed round for examination. The defects frequently met with in glass, such as striæ and tears, were then treated upon; specimens of lenses defective from this cause were submitted to inspection, and the mode of searching for such flaws described. Tools for grinding and polishing lenses of various curvatures were exhibited, together with a collection of glass discs obtained from the factory of Messrs. Ross and Co., and in various stages of manufacture—from the first rough slab to the surface of highest polish. Details of polishing and edging were gone into, and a series of the various grades of emery used in the processes was shown. The lecturer then, by means of diagrams, which he placed upon the black board, showed the forms of various makes of photographic lenses, and explained the influence of particular constructions in producing certain results; positive and negative spherical aberration, and the manner in which they are made to balance each other was also described by the aid of diagrams, as was also chromatic aberration. He next spoke of the question of the optical centre of lenses, and said that that was not, as had been hitherto generally supposed, the true place from which to measure the focus of a lens or combination. This place was a point very near the optical centre, and was known as the "Gauss" point, from the name of the eminent German mathematician who had investigated and made known its properties, the knowledge of which was of the greatest importance in the construction of lenses. A diagram was drawn to show the manner of ascertaining the two Gauss points of a bi-convex lens, and a sheet exhibited in which the various kinds of lenses with their optical centres and Gauss points were shown. For this drawing he (Mr. Taylor) said he was indebted to Dr. Hugo Schroeder, now with the firm of Ross and Co. The lecturer congratulated the newly-proposed member of the Society, Mr. John Stuart, for his enterprise in securing for this country a man of such profound acquirements. The subject of distortion was next treated of, and the manner in which the idea of a non-distorting doublet could be evolved from a single bi-convex lens by division into two plano-convex lenses with a central diaphragm was shown. The influence of density of glass was illustrated by a description of the doublet of Steinheil, the parent of the large family of rapid doublets now known under various names. The effect of thickness of lenses was shown by a diagram of the ingenious method of Mr. F. Wenham, who had long ago by this means corrected spherical aberration in a microscopic objective. The construction of portrait lenses was next gone into, the influence of the negative element of the back lens being especially noted. A method was then referred to of making a rapid portrait lens cover a very large angle by pivoting at its optical centre and traversing the plate in the manner of the pantascopic camera. The lecturer concluded by requesting a careful examination of the valuable exhibits upon the table, kindly lent for the occasion by Messrs. Ross and Co., and said that he had left several important subjects untouched, which would, however, doubtless be afterwards treated of by the Chairman in a subsequent lecture.

Mr. A. L. Henderson inquired what was the cause of the defects that arose in the manufacture of glass for optical purposes.

Mr. TAYLOR replied that it was due to imperfect vitrification. Very reat improvements had been made in the manufacture of optical glass in ngland. Originally studied in Switzerland, there was a family there ho excelled in the manufacture. A member of this family, named ontemps, had been induced to enter the service of the house of Chance nd Co., of Birmingham, whose optical glass was now renowned throughout he world.

Mr. W. COLES asked what was the effect of blemishes in the glass of a lens.

Mr. TAYLOR said that with a large diaphragm the result would be trifling, hilst with a small one the image might be utterly destroyed.

Mr. HENDERSON said that he had observed great difference in the peed of lenses, independent of the size of diaphragm. This he attri- uted to the discolouration of the glass. He knew of two lenses of qual length of focus of which one worked in half the time of the other, hen both had stops of equal size. It had been shown that glass ould discolour when exposed to light, and the balsam used in cementing nses would discolour if kept in darkness. Which, then, was the better ourse to adopt? Could not the yellowness acquired by lenses be removed y heating in a kiln just under the heat which would cause a loss of shape?

Mr. TAYLOR did not think there would be any advantage from heating. enses in a solar camera had been known to become yellow from the heat to hich they were subjected.

The CHAIRMAN said he thought that such very great differences as had been oken of as existing in the rapidity of lenses of equal focus and aperture, not due to inaccurate observation, were probably not due to any inherent owness in the less rapid lens, caused by discolouration, but to a diffusion of ght from defect either in the glass or the mount of that lens which seemed e more rapid. From such a source as this the defective instrument might, hilst giving an inferior image, cause that image to be impressed in some- hat less time, as in the case of a plate to which what was called "auxiliary xposure" had been given.

The meeting concluded with a hearty vote of thanks to the lecturer.

EDINBURGH PHOTOGRAPHIC SOCIETY.

HE twenty-fourth annual meeting of the above Society was held at , St. Andrew-square, on Wednesday evening, the 7th instant,—Mr. William Neilson, occupying the chair.

The Secretary read the minutes of last annual and ordinary meetings, hich were approved, and the following were unanimously elected ordinary embers of the Society:—Messrs. Erskine Steele, W. A. Hyslop, R. A. roctor, Alex. Lawrie, Edmund Jarman, Wm. J. C. Barry, David Harvie, ndrew Hunter, and Miss Helen Hennell.

The Secretary submitted the following—

REPORT FOR THE YEAR ENDING OCTOBER, 1883.

HE Council, in presenting the twenty-fourth annual report, have pleasure congratulating the members on the continued prosperity of the Society.

It is with much regret the Council has received intimation that, through he serious indisposition of our esteemed President, Mr. John Lessels, he as been compelled to resign. It will, therefore, be necessary to appoint a uccessor at this annual meeting. There are also five new members of ouncil to appoint.

At the beginning of the session the Society lost by death the services of s esteemed Secretary, Mr. Malcolm G. Dobbie, and Mr. William Dougall ndertook the duties of *interim* Secretary until a successor was appointed. t the second meeting of the session the *interim* Secretary read a minute f the Council, recommending that the dual-secretaryship be abolished, and hat Mr. William T. Bashford be appointed to do the whole secretarial uties for the current year. This recommendation was unanimously adopted.

During the past session the Society has lost eight members by death, and irty-nine by removals and resignations—total forty-seven; whilst fifty- wo new members have been admitted. The total number on the roll is ow 392.

The attendance at the monthly meetings has been exceptionally large. he matter brought before the Society has been interesting, practical, and structive, and it has been gratifying to the executive to find that some of e communications have been reproduced on several occasions in scientific urnals other than photographic. The following papers have been read:— . *An Early Taste for Art.* By Mr. Norman Macbeth, R.S.A.—2. *A lexible Window for the Dark Room.* By Mr. Andrew B. Stewart.—3. *A ew Departure in Alkaline Development.* By Mr. J. M'Kean.—4. *Canter- ury: its Cathedrals and Antiquities.* By Dr. Alexander Hunter, .R.C.S.E.—5. *Dry Plates and their Development.* By Mr. Samuel amkin.—6. *Notes on Commercial Photography in the United States.* By r. John P. Suverkrop.—7. *Gelatine Plates for Transparencies.* By Mr. ndrew B. Stewart.—8. *Notes on Green Fog.* By Mr. John M. Turnbull.— *Dead-black Surfaces for Optical Brass Work.* By Mr. William Forgan.—). *A View-Meter.* By Mr. Thomas H. W. Knolles.—11. *A Camera- irector.* By Mr. Thomas H. W. Knolles.—12. *Microphotography.* By r. William Forgan.—13. *Notes on a Trip from Maine to California.* By r. John G. Tunny.—14. *A New Sky-Shade.* By Mr. Norman Macbeth, .S.A.

The following items were also exhibited:—Gaslight photographs, by Mr. Tamkin.—Moonlight photographs, by Mr. F. Moffat.—Instantaneous ews, by Mr. Reid.—Platinum prints, by the Hon. A. U. Erskine.— hotography by artificial light (magnesium in oxygen), by Mr. James owie.—Snowscapes, by Mr. Robert Murray, C.E.—Lantern transpa- ncies, by Mr. J. Macdonald.—Apparatus for the production of micro- otographs, by Messrs. William Forgan, Dr. Thomson, and Alexander athieson.—Microphotographs, by Mr. Garner.—A large series of Ameri- n views, by Mr. J. G. Tunny.

The question-box has been made use of on several occasions, and has en the means of eliciting useful information.

The popular meetings still continue to be an attractive feature of the ciety's operations. Two largely-attended meetings were held in Queen's-street Hall—the first on the 24th January, being "A miscellaneous collection of Transparencies, by members of the Society," with remarks by the Secretary; and the second on the 21st March, when the Rev. John A. Ireland delivered a lecture, "Shetland and the Shetlanders," illustrated by a series of transparencies. In both these exhibitions the Curator, Mr. J. M. Turnbull, conducted the lantern manipulations with much acceptance.

The annual trip took place on the 12th July. There was an attendance of 109; and Mr. Turnbull, who was treasurer of this excursion, reports that, from a financial point of view, it was the most successful ever held under the auspices of the Society, there being a surplus of £3 13s.

The presentation print for the last year, *Will They Never Come?* by Mr. H. P. Robinson, and for which he was awarded the gold medal of the Society at the international prize competition, has been distributed, and the presentation print for the session will be issued shortly.

The thanks of the Society are due to Mr. Turnbull, who kindly allowed the use of a room free of charge for several committee meetings, also to the editor of the *Photographic News* for the loan of phototype blocks to illustrate a paper.

The Society has also received the following presentation:—1. *Madeira, Spectroscopic.* By Professor Piazzi Smyth.—2. THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, and *Year-Book of Photography.* By their respective editors.—3. An enlarged autotype photograph of the members attending the annual trip to Dirlton. By Mr. M'Ghie.—4. Two framed pictures. By Mr. Pettit.—5. The *Journal of the Photographic Society of Great Britain.*

FINANCIAL STATEMENT.

Mr. H. H. Pillans read a report of his intromissions during the past year, of which the following is a condensation:—

Condensed Report of Treasurer's Intromissions, 1882-83.

DR.		
To Balance from last year		£97 10 0
,, Arrears of Subscription from last year		13 5 0
,, Subscriptions, 1882-83		104 5 0
,, Miscellaneous Receipts:—		
Advertising in Transactions, &c.	23 5 0	
Photographs sold	1 15 0	
Interest on Deposit Receipts..	1 17 5	
Interest on Current Acct. with Royal Bank....	0 5 9	
		27 3 2
		£242 3 2

CR.		
By Rents		£9 10 0
,, Printing, Postages, Clerk and Collector's Commission, and Stationery		67 13 0
,, Expenses attending Popular Meetings		5 11 6
,, Subscriptions paid for Officials		1 0 0
,, Expenses of Competition for Presentation Pictures, Advertising, Attendance, Packing, Medals, Money Prizes, and Presentation Print, 1881-82............		41 6 11
,, Arrears of Subscriptions written off		19 0 0
,, Subscriptions in arrear....		10 10 0
,, Balance in Royal Bank	80 8 7	
,, Balance in Treasurer's hands....	7 3 2	
		87 11 9
		£242 3 2

Edinburgh, 1*st November*, 1883.—Having examined the Treasurer's Accounts for year ending 31st October, 1883, and compared these with the vouchers and instructions, I have found the whole to be in all respects correct, and I have to report the foregoing as exhibiting a true statement of the Treasurer's Intromissions, corresponding with the books which he has kept.

(Signed) A. T. NIVEN, C.A., *Auditor.*

The election of office-bearers was then proceeded with.

The President, Mr. John Lessels, having been compelled to resign through serious illness the Council recommended Mr. Norman Macbeth, R.S.A., for the office. Subsequently, however, to that gentleman's consent to the nomination, his medical adviser had recommended him to spare himself all unnecessary labours, and the Secretary had received a letter from Mr. Macbeth stating that in deference to the wish of members of his family, while respectfully acknowledging the honour offered, he was constrained to decline it. On the motion of Mr. J. G. Tunny Mr. William Neilson was unanimously elected President. Mr. Craig-Christie was elected senior Vice-President, and Mr. J. G. Tunny junior Vice-President. To fill the five vacancies on the council the following gentlemen were elected:—Messrs. A. B. Stewart, A. M. Forbes, Thomas Wardale, Jun., Samuel Tamkin, and J. M. M'Kean.

The Secretary was instructed to convey the thanks of the Society to Mr. Lessels for the many services it had received at his hands during the time he had so efficiently acted as its President, to inform him of its extreme solicitude on his behalf, and express the hope that he might be speedily restored to robust health, with a prolonged extension of his successful and useful career.

A cordial vote of thanks was awarded to Mr. A. T. Niven, C.A., who still continued to audit the accounts in his usual elaborate and thorough manner.

The thanks of the Society having been accorded to Mr. James Henderson, retiring Vice-President, and the five retiring members of Council, Mr. Norman Macbeth, R.S.A., read a paper entitled *A Ferrous Oxalate Developer* [see page 687], after which the meeting adjourned.

[It will be seen from the obituary notice in a preceding page, that Mr. Lessels has succumbed to his long illness, having died on Monday last.—EDS.]

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE third general meeting of this Association was held in the Religious Institution Rooms, on Thursday, the 8th instant,—Councillor Robertson in the chair. The minutes were read and approved.

Mr. J. PARKER proposed that Mr. Norman Macbeth, R.S.A., be elected an honorary member of the Association. This was seconded by Mr. MACTEAR, and unanimously agreed to.

At the request of the Chairman,

Mr. Parker described the process by which he made the transparencies which gained the prize in the recent competition. He said there was really nothing in the process he used which was not familiar (he should think) to every member of the Society. Such as it was, however, he would give:—1. As to taking the impressions: these were all done in the camera, as his negatives were all large, so that he could print the transparency by superposition. He had to reduce in all cases. The method of reduction was nothing new, and had been described a thousand-and-one times in the photographic journals. He used daylight, but artificial light might, of course, be employed. 2. He used the ordinary wet plate and silver bath—the bath decidedly *acid*, the collodion *old*, or at least with free iodine, so as to secure clean, clear shadows. Rapidity, of course, was quite a secondary matter. 3. He developed with the ordinary iron and acetic acid, but to this he added two or three drops per ounce of Mr. Carey Lea's collo-restrainer, some of which he made eight or ten years ago, and which he still possessed. This was really the only thing to note in the whole process. 4. Fix with cyanide of potassium. 5. Tone in the ordinary acetate of gold bath as used for paper prints, but with a little addition to the proportion of gold. Of one thing he was especially careful, namely, to use *no* negative with *dense* deposits on the lights, as on foliage, &c., which always produced a snowy effect, and which he thought should be carefully avoided, whether in transparencies or paper prints.

A number of coloured photographs were exhibited by Mr. Rowan, as agent in Glasgow for a French firm, who patented the process in Great Britain this spring.

They were much admired, and the Chairman thanked Mr. Rowan for his kindness in showing them.

A number of magic-lantern slides, lent for the occasion by Messrs. York and Son, London, illustrating towns and places of interest on the Mediterranean, were then thrown on the screen, and were explained by the Secretary reading a descriptive paper which accompanied them.

A vote of thanks was then heartily accorded to Messrs. York and Son for their readiness in complying with the request for specimens of their work; to Mr. Swan, who exhibited the slides; and to the Secretary.

The meeting, which was composed of members and friends, was very large, and was brought to a close by a vote of thanks to the Chairman.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The annual general meeting of the above Society was held in the Royal College of Science, Stephen's Green, E.,—Professor J. Emerson Reynolds, President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. W. Hogg and J. Roberts were elected members, and Messrs. C. J. Smith, Dr. Pearsall, and John Chancellor were proposed for membership, and will be balloted for at the next meeting.

The following report and statement of accounts of the Council was read by the Honorary Secretary.

Report of the Council.

In bringing before you once more the report of the work done during the past year, we have much pleasure in announcing the continued increase of members, seventeen having been elected during the year, so that the number at present on the list is seventy-seven.

The ordinary monthly meetings have on the whole been well attended, when the following communications were laid before you:—*On a Reliable Method of Drying Gelatine Films.* By J. V. Robinson.—*With the Camera in North Italy.* By Greenwood Pim.—*A Fortnight in the West of Ireland.* By Chas. W. Watson.—*On Halation, or Blurring.* By Alex. Conan.—*On Crystoleum Photography.* By J. V. Robinson.—*On Microphotography.* By Dr. Scott.—*On Electricity for Dark-Room Illumination.* By Chas. W. Watson.—*On the Present State of Amateur Photography and its Probable Future.* By J. V. Robinson.

Besides the above communications a number of instructive and interesting objects have been laid before you, and various novelties in apparatus have been brought under your notice. We have to again express our thanks to those members who have contributed to the general information, and hope that the supply of papers in the coming session may be fully sustained. The annual outdoor excursion and lantern exhibition were held as usual. We have also to express our thanks to the Council of the Royal College of Science for the use of their premises during the year, and to Professor Barrett for the use of his laboratory.

The following balance-sheet, which has been audited by Messrs. Samuel Baker and Blayney T. Roper, jun., clearly shows the income and expenditure.

Signed on behalf of the Council, Greenwood Pim, *Chairman.*

Statement of Account for the year 1883.

Thos. A. Bewley, *Hon. Treas.*

Dr.	£	s.	d.	Dr.	£	s.	d.
To Balance from 1882	£42	19	1	By Lantern Slides	£5	15	1
,, Subscriptions	26	10	0	,, Lantern Expenses	2	17	9
,, Entrance Fees............	8	10	0	,, Excursion Meeting Expenses	2	12	10
,, Arrears	0	10	0	,, Stationery	11	9	10
				,, Albums	7	10	0
				,, Postages	5	13	6
				,, Attendants	2	6	0
				,, Incidentals	0	5	0
				,, Balance	39	19	1
	£78	9	1		£78	9	1

We, the undersigned, have examined the above statement of Accounts for the year 1883, and find it correct, and that there is a balance of £39 19s. 1d. in the hands of the Treasurer.

(Signed) Samuel Baker.
B. T. Roper, Jun.

The following resolution was proposed by Mr. Thomas Mayne, and seconded by Mr. Edward Roper:—"That the report of the Council and statement of accounts as now read be adopted."

As no names had been proposed to take the place of those members the Council who were retiring according to rule,

Dr. Scott proposed the following resolution, which was seconded by M Robert Mitchell:—"That the officers and members of the Council who a retiring, according to Rule 2, be re-elected for the ensuing year."

The Chairman then called upon Mr. Greenwood Pim for a communic tion on *Isochromatic Plates.* [See page 688.]

There was a well-sustained debate on this paper, in which Messr Alexander Conan, J. V. Robinson, J. Woodworth, T. Mayne, and othe took part.

Dr. Scott exhibited a photograph of the vocal organs while singing.

At the close of the meeting the Chairman in his address drew particul attention to the various theories and experiments which have arisen fro time to time on the action of light on the sensitive film, Captain Abney recent researches in this direction claiming a large share of attention.

The albums of the Society were also placed on the tables.

The next meeting will be held in the Royal College of Science on Frida December 14.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

The ordinary monthly meeting of this Society was held on Tuesday las the 13th inst.,—Professor Bedson in the chair.

Mr. Bulman, of Gateshead, was nominated for membership.

Mr. J. Pike (Hon. Secretary) read a paper on *The Carbon Process,* a gave a demonstration, which was highly appreciated by those present.

Mr. Pike was accorded a hearty vote of thanks.

A large number of pictures have been promised for the Exhibitio Over 300 frames will be on view, and these contributed by some of t most eminent photographic artists in the kingdom. Owing to a slig misunderstanding it is not yet too late to contribute pictures. They w be received at the Art Gallery, Market-street, Newcastle-on-Tyne, up Tuesday evening next, the 20th inst. They should be addressed to Messi Barkas and Tweedy, and be carriage paid. A notice should be at t same time sent to the Hon. Secretary, giving name of picture and oth particulars, for insertion in the catalogue.

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION

A meeting of this Society was held on Wednesday, the 7th instant,—M R. S. Burgess in the chair. Owing to inclement weather the attendance members was small, and little business was transacted, excepting t election of officers and reading the annual report.

The Chairman called upon the Secretary to read the—

Annual Report for 1883.

As it is barely a year since this Association was organised, this c scarcely be termed an annual report, so we will designate it "the Rep for the Season, 1883," the month of November being practically, as far outdoor work is concerned, the end of the photographic year. We are a bound by one of our rules to hold a meeting annually at Martinmas, the election of officers, &c., and at this meeting this must pass.

Sometime ago an opinion was expressed by many of the leading pho graphers, both professional and amateur, residing in this district that association might advantageously be formed, and it was determined to t the experiment. A preliminary meeting was held at Stoke-upon-Trent, a rules were drawn up, &c. Invitations to join the Society were sent to the known gentlemen, who either professionally or as amateurs pract photography; and in the majority of cases these invitations have be accepted—the election of applicants for admission being determined ballot. Eleven meetings have been held—some at Burslem, others at St and Hanley. Two outdoor excursions have been made—one to Doveda and the other, by the kind permission of His Grace the Duke of Sutherla to Trentham. An excursion arranged for October did not take place account of unpropitious weather. The excursions have in both cases b eminently successful, and productive of much enjoyment and feeling good fellowship among the members.

The first President of the Society (Mr. Sexton), having obtained appointment elsewhere, resigned his post on the 19th of July. One of worthy Vice-Presidents, Mr. Charles Alfieri, has well and ably filled temporary vacancy.

On the 2nd of August—the day of our excursion to Dovedale—we l by death one of our most valued members, Mr. J. Lockett, whose pl it will be difficult to fill, he having been one of the oldest amateur ph graphers in the district, his only fault being his too good nature. name of another member having been erased from the list we have ex rienced a total loss of three members during the year.

Five papers have been read on various subjects, and the thanks of Society are due to those gentlemen who have contributed to the edificat and, in one case, amusement of the members.

It has been decided in future to hold all meetings at Hanley on the f Wednesday in each month.

The temporary Committee appointed until November now resign. will be also asked to elect a President and two Vice-Presidents.

On several occasions during the Society's meetings the question of lodion *versus* gelatine has formed the topic of discussion. On one occa an enthusiastic wet-plate worker even challenged any gelatine-plate wo to test his photographic strength with him under equal conditions of li lens, &c. The challenger not, however, turning up on the day appoin it must perforce be conceded that here, as elsewhere, the gelatine proce in the ascendant, and that we in North Staffordshire are in no way beh the times.

Taking into consideration that we are a young Society—or, rather old one resuscitated, which is much the same—we have in a short spac

time firmly established ourselves; and we only require a little more additions to our numerical strengthto enable us to compare favourably with older societies. Our numbers, I may say, increase at every meeting, and several gentlemen of standing in the county have joined us, lending their names and assistance as honorary members. Should we as an association progress as favourably during the coming winter and season, our county of Stafford will not be photographically—behindhand.

On the proposition of the Chairman the report was unanimously adopted and a vote of thanks passed to the retiring officers.

Mr. Josiah Spode was elected a member.

A ballot was taken with the following result:—*President:* Dr. Craig, M.D.—*Vice-Presidents:* C. Alfieri and F. J. Emery.—*Committee:* Messrs. T. Blackshaw, T. Kirkby, W. C. Potter, T. H. Hall, J. Henshall, R. S. Burgess.—*Secretary and Treasurer:* W. B. Allison, 32, West-street, Stoke-upon-Trent.

It was decided to use the Derby plates for making lantern transparencies for the coming exhibition, and the Secretary was instructed to procure twelve dozen.

The meeting was then adjourned.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The second regular meeting for the winter session was held in Lamb's Hotel, on Thursday, the 1st instant. There was a very large attendance, over fifty being present.

The revised edition of the rules was passed with a few slight alterations.

Mr. D. Ireland, Jun., was elected Honorary Secretary in place of Mr. Charles Johnson, who resigned the office some time ago. There were several prints sent in for the competition on "Sky," and it was agreed to let the Council adjudicate on these.

Six new members were proposed for admission.

Mr. Goodall (of the firm of Goodall and Stevens, Glasgow), assisted by Mr. McGhie, then proceeded to give a practical demonstration of his method of *Enlarging on Argentic Paper and Opals.* [See page 689.]

Mr. McGhie showed some novelties in photographic apparatus, amongst others Cowan's box for packing dry plates, Pumphrey's filmograph, and a novel instantaneous shutter. He also handed round some specimens of a new photo-engraving process, by Messrs. R. and T. Annan, of Glasgow.

A vote of thanks to Messrs. Goodall and McGhie brought a very interesting meeting to a close.

YORKSHIRE COLLEGE PHOTOGRAPHIC CLUB.

A Club, with the above designation, has recently been started in the Yorkshire College, and held its first meeting on Thursday, November 1st. The Club is open to professors, instructors, and students of the College who actually practise some branch of photography. Meetings will be held on the first Thursday in every month for the exhibition of specimens, discussions, &c. The Club is to be worked in as informal a way as is consistent, a chairman being elected at each meeting, and the only fixed officers of the Club are a Treasurer (Mr. H. Ingle) and a Secretary (Mr. W. O. Senior).

The first meeting of the Club was devoted to a discussion on composition, and afterwards arrangements were made for a prize competition among the members. The subjects selected for the competition were—*A Group of not less than Three—A Cottage—"Winter."* All the pictures are to be sent in to the judges by the 15th of January next. The judges are Prof. T. E. Thorpe, Ph.D., and Prof. Rucher, M.A.

The next meeting of the Club will be held on December 6th, when a paper will be read by C. H. Bothamley, F.C.S., on "*More Light.*"

Correspondence.

November Meeting of the Photographic Society of France:—Presentation of Paper Films by M. Thiebaut.—Proofs Representing a Maniac in Different Positions.—M. Scola and his New Light for the Dark Room.—A New Photometer and an Ombrometre, by M. Simonoff.—A New Instantaneous Shutter, by M. David.—A Proposed Photographic Congress.—New Publication by M. Gauthier-Villars.

The first meeting of the present session of the Photographic Society of France was held on Friday last, the 9th inst.,—M. Davanne in the chair.

M. Thiebaut presented some negatives which he stripped off paper in presence of the members.

M. Chapiro, of St. Petersburgh, sent some very interesting photographic studies, being the pictorial history of a madman. The photographer had the idea of making use of a very talented actor to mimic the actions of a maniac. The photographic plate has portrayed all his gestures—from calm to a stormy period—in a most truthful and pathetic manner. These studies are intended to illustrate a medical work on madness.

M. Scola was one of the first to introduce a coloured light to the notice of photographers by dissolving a perchlorate of strontium in alcohol. The flame would give a red light. That gentlemen has continued his experiments and has counselled us to employ a perchlorate of soda in preference. He submitted to the meeting a light of a yellow colour, and if surrounded by a very light yellow-coloured glass globe the most rapid dry plates can be developed without the risk of fog; at the same time the laboratory is brightly illuminated—so bright, indeed, that a newspaper can be read at a distance of two yards from the source of light. M. Scola (who, by-the-bye, is a very learned and clever man) is very sanguine in his belief that he has found a monochromic light. If so, what service he will have rendered to the photographic community, and especially to the poor manufacturers of dry plates, who are (some of them) obliged to feel their way about in their insufficiently-lighted rooms, not to speak of the baleful influence the red light must have sooner or later upon their vision!

I have not yet tried it myself as I am waiting to have the copper wick-holder of my spirit lamp replaced by a silver one. Any of the readers of The British Journal of Photography can experiment for themselves. The formula M. Scola gave me is as follows:—

Wood alcohol	100 parts.
Perchlorate of soda	2 ,,

This solution is put into a spirit lamp, and the wick is then lighted up; a yellow light is obtained of the same colour as when boys dip a tuft of cotton wool into alcohol, dredge it with common salt, and light it up for their own amusement and the consternation of the parlour party by seeing their neighbours assume such a spectral and frightful appearance.

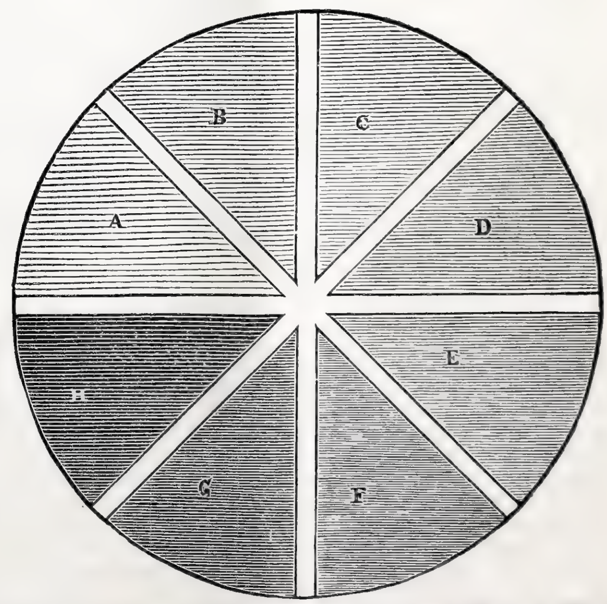
This light will prove that the remarkable experiments of M. Bardy on light emanating from sodium is perfectly monochrome, and that a dry plate can be exposed for twenty minutes to a most brilliant flame without fogging.

M. Simonoff exhibited (as he calls it) a new photometer, the principle of which can easily be understood. He takes a small field telescope, and at the bottom he fixes a piece of ground glass, in the centre of which three or four figures are printed. A slip of brass, in which are a series of holes of different sizes, can be slid in at the bottom of the field telescope. The hole acts as a diaphragm, and diminishes the light going through the instrument.

The operator acts in this wise:—He puts in the diaphragm No. 5, with which he generally obtains a portrait in (say) five seconds, he looks through the instrument and he can barely read the figures if the light be of the same power as when he exposed last If the light has become more brilliant, naturally the figures can be seen too plainly; therefore it is necessary to put in a smaller diaphragm until the figures are barely visible. Upon looking at the number on the hole or diaphragm the time of exposure will be seen to be either two seconds or one second. On the reverse, if a cloud come over and make it dark, in looking into the instrument the figures cannot be seen, therefore a larger diaphragm must be chosen. The right one has been found when the figures become barely visible. If a large hole be necessary the time may be seen to be from ten to forty seconds. Whether this instrument will be useful in daily practice in the field as well as in the studio remains to be proved.

The same inventor showed me another "dodge" very novel in itself, and I believe it has not been thought of before, so I will endeavour to describe it fully. First of all, I shall commence by stating its object. It was invented to aid photographers in obtaining the half-shades in their pictures; in fact, showing them the intensity of the shadows in comparison with the high-lights falling upon their sitter. As is well

FIG. 1.



A, First Tint. B, Second Tint. C, Third Tint. D, Fourth Tint. E, Fifth Tint. F, Sixth Tint. G, Seventh Tint. H, Eighth Tint.

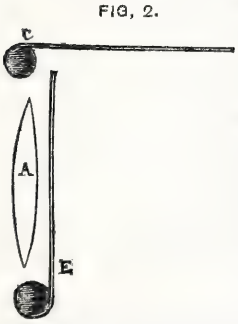
known, a photographer obtains light and shade by means of blinds and curtains. It requires a man of great practice with artistic skill to take every advantage in the lighting up of his picture. When a studio is new, harmony in the picture is difficult to obtain, The half-tones

are either too heavy or too flat, the high-lights too brilliant or too soft. M. Simonoff has made a little apparatus by which a photographer can judge of the contrast between light and shade in his studio.

This is how it is made:—Take a piece of cardboard six inches square, and with a compass strike a circle as large as possible; draw four lines through the centre at equal distances on the diameter. We have now an octagon similar to *fig.* 1. Cut out eight pieces of sensitised albumenised paper; expose the first one minute to diffused light, the second piece for three minutes, the third for five minutes, the fourth for seven minutes, the fifth for nine minutes, the sixth for eleven minutes, the seventh for thirteen minutes, and the eighth for fifteen minutes. Tone and fix the eight pieces in the same baths, and when finished and dry cut and part them in regular order in the segments of the circle, only the precaution must be taken to cut each piece of paper a little narrower on the side, so that a space of about a-quarter of an inch be left between each piece of paper. An apparatus is now obtained showing a difference of shades from one to eight, the latter being the darkest. The handle of a penholder is now glued in the centre at right angles with the cardboard; that is to say, perfectly upright. The instrument is now placed upon the table near the sitter. If all the side blinds be open the shadow of the stick will be deeply marked upon the apparatus, the latter being turned so that the shadow falls between the tints seven and eight. It is probable that the tint eight coincides with the depth of shade given by the shadow of the stick. The blinds are now closed one by one; the shadow of the upright stick becomes more and more feeble; now it is for the operator to judge when to stop, and the *ombrometre* will serve as a good guide in teaching or showing him the shade best suited to obtain the object he has in view.

M. David presented a new *obturator*, or instantaneous shutter, by which he can obtain any fraction of a second. The instrument is composed of two flat shutters fixed inside the camera as close as possible to the lens. When fixed for work the top flange is raised up at right angles with the lens, and the bottom one hides the lens completely (*fig.* 2). A pneumatic tube is attached to each of these two shutters separately, and by pushing a ball each one in its turn could be made to work at the will of the operator. But as only long exposures could be obtained by this method, M. David has invented something new. Instead of the balls he has placed two little bellows, one at each end of each india-rubber tube; one on the flap shutter inside the camera, and one attached to the other extremity of the tube. The two outside bellows are fitted upon a flat piece of wood to which is adapted two strong steel springs; these springs at a given moment fall upon the bellows, press the air out of them, and by so doing open and close the shutter inside the camera, and give the exposure. In order to regulate this exposure, M. David has taken an idea (I suppose) from the barrel of a hand organ. He has made a drum or barrel through which an axis passes, and to the axis is attached a handle, so that it can be turned with ease. The barrel, drum, or cylinder is about two inches long and about three inches in circumference. The drum is in two parts—that is to say, is formed of two cylinders—but form one piece when at work. On the left-hand part is fixed a pin; as soon as the handle is turned this pin lifts a lever and down goes a spring upon the bellows, and immediately the lens is open for exposure. The left-hand part of the drum is divided into sixty parts; it has also a pin, but this cylinder being movable the pin can be set to any position the operator chooses. If half-a-second be required, the pin is placed at one and a-half inch from the other, or at the mark thirty. The drum is turned round in one second; it is obvious, then, that before the hand has caused the drum to turn round once the springs have acted and the exposure finished. In fact, any exposure can be obtained in this way, from one-hundredth part of a second to a full second, if the shutter in the inside of the camera can be made to open and shut quickly enough.

FIG. 2.



A, Lens. B, Flap Shutter ready to fall for exposure. C, Second Flap Shutter ready to fall to close the lens.

The Belgium Photographic Society informed us that the Government would be most happy to aid in every way a photographic congress in order to take into consideration the advisability of a unity of weights and measures, photographic denominations, unity of light, sensitometry, lenses and diaphragms, &c., &c. In my opinion the time is indeed ripe for a change for the better, and to put things upon a more scientific footing. In the nomenclature of processes, not to speak of the annoyance of weights and measures, a change would be a great boon. If we cannot obtain a universal monetary system let us endeavour, at least, to have uniformity in weights and measures, and so that if we ask for a pound of silver and a pound of one of its salts they may be weighed by the same weight, and not, as at present, one containing 480 grains, the other only 437½ grains.

M. Gauthier-Villars presented to the Society a new publication on the platinotype process, translated from the German. Thanks to two Austrian gentlemen—Captain Pizzighelli and Baron Hübl—this process has made great progress in Austria, so much so that these gentlemen received the gold medal offered by Voigtländer, and their interesting experiments were published at the expense of the Photographic Society of Vienna. To all who take an interest in the admirable proces brought to light by Mr. W. Willis, Jun., this publication will rende service. The theoretical and practical parts of the work are bot admirably written and clearly explained by the authors. No secret are kept back, and every person can now make his own paper, prepar his solutions, and obtain with ease those beautiful and permanen pictures which have not yet secured in France or England the honou or patronage they so much deserve.

The same editor has just sent me a book, compiled by M. Trutat, o gelatino-bromide solutions spread upon paper. Great praise is due t M. Gauthier-Villars for the pains he is taking to create a photographi library. Before his establishment took up this branch it was ver difficult to find a work on photography. E. STEBBING, *Prof.*

25, *Rue des Apennins, Paris,*
November 12, 1883.

INTENSIFICATION OF GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—I wish to ask the opinion of any of your readers who have tried the plan of intensification with pyro. and silver, as recommended in an article by Mr. Brooks not long ago in your pages. He used the old pyro. and silver intensifier together with alum and citric acid with great success. He says:—"I have tried it and the only result I get is a staining of the film (the well-known pyro. stain)." I do not get any extra density in the image itself, though I followed carefully Mr. Brooks's instructions. I am one of those who have discarded the abominable mercury intensifier, and, rather than run the risk of spoiling a thin negative, I prefer to make the best of it as it is.

Will Mr. Brooks kindly answer this:—Is the effect to "build up" the image, or is it merely a universal staining? If it be, a non-actinic varnish on the back of the negative would serve the same purpose without any risk of ruining a good negative. Would it not be a good thing if workers gave their experiences with intensifiers other than mercury? We want sadly a good intensifier for gelatine negatives.—I am, yours, &c., L. MACDONA.

Cheadle Rectory, Manchester,
November 12, 1883.

THE EYE AS AN OPTICAL INSTRUMENT.

To the EDITORS.

GENTLEMEN,—One has often come across the quotation from Helmholtz on the defects of vision, which appeared in your columns in your issue of October 26th, and it is only fair to him to supply somewhat more of the context; for he is a clever man, though not altogether a wise one, I think, or he would not fall foul of an optician for selling him an instrument with the various defects enumerated, so long as that instrument was equal to all that was required of it:—"I have not," continues Helmholtz, "dwelt upon these considerations in order to depreciate the performance of that wonderful organ, or to diminish our admiration of its construction. * * * The adaptation of the eye to its functions is most complete." But such remarks, when made for a purpose by a man like Helmholtz, appear senseless or objectionable when attempted by one of different calibre, as when we find Mr. Norman Lockyer, F.R.S., pronouncing the superiority "altogether" of a photographic camera over the eye simply "because the range is greater and the focussing power does not deteriorate with age."

As to the first point: in no sense is the range greater, but in every sense it is less. To quote Helmholtz:—"Compared with other optical instruments we observe the advantage the eye has over them in its very large field of vision." As to the second point: when a camera can be produced that has been in work twelve hours a day for sixty or eighty years, and has focussed clearly for that period, undimmed by mist, wet, mildew, or dust, unfractured by torrid heat or arctic cold, it will be time then to consider what such an assertion is worth.

You have pointed out two inaccuracies of this gentleman; allow me to add another instance, from which his hearers can hardly have derived much benefit. He remarks that there is just such an arrangement in the camera for focussing as exists in the eye. I presume he refers to drawing out the camera or moving forward the lens. The eye has no such arrangement. The focussing of the eye is well known to be effected in an altogether different manner; at least, I remember to have read twenty years ago, in a work by Donders, a German physiologist, the experiments which prove this, and which show that the focal length of the lens itself is altered at will by the contraction of the ciliary muscle in which it is set—this contraction increasing the convexity of the surfaces, and with it the power of convergence of the crystalline lens. When Helmholtz further remarks that the visual arrangement "which may be reached by innumerable generations working under the Darwinian law of inheritance coincides with what the wisest Wisdom may have devised," I think that the exquisite arrangements just referred to forcibly suggests the latter consideration, however we may endeavour to reconcile it with the former.

Allow me to add one more idea, as to the perfection of the manufacture of this wonderful—though not, perhaps, the most wonderful—work of nature. I have referred to the "durability" of vision. If a

is or camera were to receive a hard blow it would probably be idered useless. I do not know whether any of your readers ever w a prize fight. I once had the misfortune to be present on one of ese choice occasions, and could not but think—and this was really e origin of the hypothesis since then unfairly assigned to Darwin, io had not at that date been heard of—that pugilism must have been e normal condition of our pre-Adamite ancestors, to have enabled e "fittest"—as represented by the champion of the light-weights—emerge, not with defined or visible features, but with unblemished esight from such an ordeal.—I am, yours, &c., M.A.

November 9, 1883.

TONING LANTERN TRANSPARENCIES.

To the Editors.

Gentlemen,—In Mr. Jabez Hughes's little work on photography he commends intensification of lantern transparencies made by means of e wet collodion process and developed with iron—to be obtained by ooding with a weak solution of chloride of *iridium* until fine, black nes are attained.

After some difficulty and expense I procured some two ounces of ten-per-cent. solution of potassic chloride of iridium from Messrs. hson and Sons; but, as far as any result appears, I might as well put ı pump water.

Can you, or any of your readers, furnish me with the proper formula r the use of this salt, and how it is to be used? By so doing you will eatly oblige,—Yours, &c., Wm. C. Headland.

Oakroyd, Horsforth, near Leeds,
November 8, 1883.

ARTIST AND DESIGNER.

To the Editors.

Gentlemen,—I think, with all deference, that Mr. W. J. Stillman slightly confusing the two words "artist" and "designer." We do ıt speak of Turner's *Venice* as a grand design, but a grand composition a grand conception. An ornamental cabinet, or an elegant candela-um will be alike works of beautiful design.

A designer is more correctly one who practises mechanical drawing—ıe who works by *marks* or *signs*. The etymology clears this in a oment. Latin *de*—fully, and *signare*—to mark, from *signum*—a mark sign.

For our present consideration the "arts" may be broadly divided to two classes—the *Industrial Arts*, which will include the designer's ork in the shape of pottery, weaving, carving in wood, chasing in rass, &c., and the *Fine Arts*. Now, here comes our trouble in the word fine." This English term does not express the meaning so clearly as ıe French or Italian *beautiful*. The beautiful arts are those which, to ›py Mr. Stillman's phrase, "embody an ideal," and an ideal is reached hen exquisite harmony delights our ears, or when a perfect composi-on enchants our eyes; and it matters not how this perfect composition -this perfect form, this perfect balance and contrast of light and ıade—has been produced. The result is the same—*ideal, beautiful ıe art.* It is the ideal which is fine or beautiful, and not the eans by which it has been presented to our admiration.

In my last letter I described an artist as one who is skilful, and I aced the Latin "art" to its root, AR—to fit. I will now show how art ust be the *perfection* of skill by comparison with the Greek *αρτιος*—*exact*, and the Latin *artus*—a limb. From this root we have articu-tion—a *fitting*. Now a limb is the perfection of fitting, and speech is ıly articulate when distinctly or perfectly divided into its *joints*—that into its words and syllables. Art, then, is the perfection of skill ithout eliminating any process which exhibits that skill, and fine or autiful art is that art or perfection of skill which "embodies an eal" regardless of the *technique* which has produced that ideal.

It must not be forgotten that this perfection of skill is not attained the cutting of hair, the making of boots, or the laying of bricks. ıese operations require more dexterity or cunning than art, and they e the produce of artisan's labour.

Mr. Stillman will kindly remember it is not my *name*, but *that which have to say*, which bears upon the subject; all he has to do is to *›set the etymology of art.*—I am, yours, &c.

November 13, 1883. Audi Alteram Partem.

THE PHOTOGRAPHIC EXHIBITION.

To the Editors.

Gentlemen,—There is a certain ancient gentleman mentioned in sopian history as having brought matters to an uncomfortable crisis endeavouring, for the satisfaction of his many-opinioned advisers, "do circus tricks" with the aid of his son and an austere member the Jerusalem-pony species.

I am afraid it is only now that I fully appreciate the feelings which oved this respectable old party, after I have read and heard some of e diametrically-opposed opinions expressed in connection with those ctures of mine which I have had the temerity to exhibit at Pall Mall is year. Not, however, being blessed with the obliging disposition of the gentleman alluded to, I am afraid that I yet feel no inclination to deviate from my own course; rather, I look forward to that distant, but by-certain-means-attainable end when it is immaterial whether the face or back of the picture be exposed to view, the Great Initiated subtly condensing its art-merits in the sentence—"What's the name—Doblin? Oh! that's really splendid—we'll medal him, of course;" and the attendant, uninitiated, meanwhile exclaiming—"Got a medal! Well! that is beautiful, dontchaknow!"

I notice that in your issue of the 2nd instant, amongst other matters, you allude to the unsportsman-like manner in which the gun is held in one of my pictures, entitled *Maiden Fair, Oh! Have a Care!* &c. Well, my endeavour was to portray an unsophisticated country girl being tempted by a foppish cockney sportsman, who is more at home "spooning a barmaid" with "a bitter" in his hand than a gun; and I cannot see that the fact of this weapon being carelessly handled—as I purposely intended it to appear—should seem objectionable in the picture. Besides, "Love laughs at locksmiths;" are gunsmiths without the pale of this vulcanite appellation?—I am, yours, &c.,

November 12, 1883. Lyddell Sawyer.

To the Editors.

Gentlemen,—In reference to your most just criticism *re* dress of *Patience*, may I just say that the photograph was not especially got up for exhibition or to present any particular character, being only one of my ordinary sitters in a rather pretty fancy dress? As the most suitable name I called it *Patience*, after, of course, the heroine of Gilbert and Sullivan's opera; but it must not be taken as representing my idea of what a rustic milkmaid usually is. All the photographs I sent were of my ordinary type of sitters.

Now that I am writing I should like to say that I entirely agree with Mr. Vernon Heath and others that the present time of holding the Exhibition is exceedingly inconvenient to the professional photographer, who should have no time in the summer to devote to the production of negatives or prints for exhibition purposes. If the Exhibition were held (say) in March or April photographers would have time to get up a few negatives. Now the majority are quite debarred from exhibiting.—I am, yours, &c., Norman May.

November 12, 1883.

PHOTOGRAPHY AND ART.

To the Editors.

Gentlemen,—The letter of Mr. McLeish in The British Journal of Photography of the 2nd inst., is a good commentary on much that has been written lately against photography as a fine art.

Mr. McLeish has produced in his *Misty Morning on the Wear* a photographic picture that has been generally admired, and has gained him several medals. Three other photographers were present when he took this picture, and packed up their cameras thinking there was nothing to take. One of these gentlemen considered Mr. McLeish was only "wasting his plates."

According to Mr. W. J. Stillman Nature has "no moods," but she has "effects"—most lovely "effects" of light and shade and delicate distance, hazy or clear. One of these effects Mr. McLeish has evidently secured in his *Misty Morning*.

Mr. Stillman is well known to me, personally, as an able photographer. I may venture to call him a friend. He is a voluminous writer on many subjects, and during the last few weeks he has had controversial letters in four different journals—English and American—on four different subjects. According to his view, and those who side with him, the term "artistic photograph" is a misnomer, and that artistic photographs are a mere matter of chance, the obtaining of which does not depend on the taste, judgment, and feeling of the photographer.

However, notwithstanding the dictum of Mr. Stillman that "photography is no art," artistic photographs will continue to be produced by photographers who have the true art instinct, just as Turner, the great landscape painter, produced with paper, brush, and sepia, a beautiful effect in a few minutes, from his sympathy with "Nature's moods" and his knowledge of the means of rendering them.

Mr. J. H. T. Ellerbeck says truly that the great majority of the "brethren of the brush" are merely "copyists in colour." Alike the majority of photographers are but "copyists of Nature." Those who have the true art instinct—with or without art education—are few among painters or photographers.—I am, yours, &c.,

Florence, November 5, 1883. Francis W. Turton.

To the Editors.

Gentlemen.—As an artist (painter) working for photographers I have often heard discussed the question as to whether a photographer has a right to call himself an "artist." Now, it can no doubt be proved that he has so; and, perhaps, equally well demonstrated that he has not. I do not purpose to argue whether he has any right or not, but to come between the disputants with a few observations which I hope may have a peace-making tendency.

I would, therefore, suggest that instead of trying to acquire a title which certainly is not by custom theirs, photographers should rather

endeavour to preserve their distinctive denomination, and seek to invest it with so much honour that it shall be esteemed in public opinion equally with that of "artist." "Comparisons are odious," but they often convince where other reasoning fails; and if those who wish to substitute for, or add to, their accepted appellation of "photographer" that of "artist" would only reflect on the abuse that has followed the general desire to be dubbed "esquire" they will feel inclined to relinquish their object. If I mistake not, there is such confusion of ideas as to who really ought, or ought not, to be honoured with the above title, that many sensible men who really have an incontestable authority to be "esquired" prefer to be addressed as plain "Mr."

One more suggestion I will make in all humility. Let there be some method of examination by a photographic society, and diplomas issued to all deserving candidates which shall authorise them to adopt an affix to their names, such as shall distinguish them from their less idea-embodying brethren. This might be "brother to the sun," or anything as glorious as they liked.

Personally, I may have a good claim to the much-disputed title of "artist," but I really prefer to subscribe myself—Yours, &c.,

November 10, 1883. PHOTOGRAPHIC COLOURIST.

EXCHANGE COLUMN.

Wanted, a large mahogany camera, 16 × 20 or over, with dark slide, in exchange for other photographic goods.—Address, C. R. TRUEMAN, The Studio, Southwold, Suffolk.

Wanted, printing-frames and rolling-press, in exchange for Solomon's magnesium enlarging apparatus.—Address, R. E. WILKINSON, 127, Lower Park-road, Peckham, S.E.

I will exchange a 10 × 8 Dallmeyer's rapid rectilinear for a 3D, 4D, or a fifteen-inch portable symmetrical. Difference adjusted.—Address, J. H. T. ELLERBECK, 54, Bold-street, Liverpool.

I will exchange a lamp for taking photographs by night, also a canister containing 10 lb. of fire for same, for photographic apparatus.—Address, J. BIDDLE, 97, Medlock-street, Hulme, Manchester.

Wanted, THE BRITISH JOURNAL OF PHOTOGRAPHY for 1858, 1859, 1860, 1867, and 1874, in exchange for 1863, 1864, 1877, 1878, and 1879.—Address, LUX, care of the Publisher of the *Railway Reformer*, Chiswick, London, W.

What offers for a 10 × 8 square bellows-body camera, screw adjustment, two backs, rising front, with box, as good as new? Also Solomon's enlarging lantern and lamp.—Address, M. BATISTE, 29, London-road, Reading.

I will exchange a large electric bell, glass case, made for exhibition, value £3, 9 × 7 travelling bath, value 12s., 2,000 good *carte* mounts, value 18s. Wanted, Phœnix shutter, &c., useful.—Address, P. MITCHELL, Sydenham, S.E.

I will exchange *Negative Retouching*, by Burrows and Colton, and *Manual of Photographic Colouring*, by Joseph Wake, for Hardwich's *Photographic Chemistry*, ninth edition.—Address, S. W. OAKES, photographer, Patricroft.

I will exchange a good useful developing hand carriage, coach builder's work, for use with plates up to 12 × 10 size, in exchange for a good harmonium; photograph sent.—Address, A. DEBENHAM, 28, Union-street, Ryde, I.W.

I will exchange a 10 × 8 folding mahogany camera, with one single and one double dark slide, with leather case—also about eighty numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY—for backgrounds, chair, or grey fur rug, or offers.—Address, PHOTOGRAPHER, Fore-street, Abingdon, Berks.

I will exchange a full-plate Kinnear camera, with repeating-back and screw, suitable for studio, quarter-plate portrait lens (Lancaster), Entrekin cabinet burnisher, good as new, camera for 7¼ plates, all possible actions to front and back, double slide, &c. Wanted, a portable half-plate camera and stand, without lens; must have all possible actions.—Address, L. B., 5, Elliott-street, Rochdale.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Thomas C. Bayfield, North-street, Horsham.—*Two Photographs of Machinery, Pugg Mill.*

Vincent Hatch, Byram-arcade, Huddersfield.—*Two Photographs of H.R.H. The Duke of Albany, Photograph of Imitation Temple Bar, and Photograph of Group of Royal and Distinguished Visitors at Whitley Beaumont, Yorkshire.*

PHOTOGRAPHIC EXHIBITION.—We are reluctantly compelled by circumstances to postpone our Sixth Notice of the Exhibition till next week.

S. A. WARBURTON.—Received. Thanks.

J. A. SHORT.—No specially-prepared plates are necessary for depicting hoar frost. Any good ordinary plates will answer.

J. R. BURT.—Any good, clean paper will answer your purpose quite as well as the Rives or Saxe, as silver does not enter into the composition of the picture.

A. Z.—You cannot well employ a more efficient instrument. The only suggestion we can make is to have another lens in your outfit about two inches longer in focus.

HYPO. (Malvern).—Possibly the negative is at fault, although from the print we should say that it is a good one. Try another sample of paper. With some papers it is impossible to obtain rich purple tones with any bath.

W. R.—If you wish to make your opals by the carbon process the *Autotype Manual* will be your best guide. If by any other process, you will find details in any of our ALMANACS. Any glass merchant will supply the opal.

OMEGA.—1. Nelson's X opaque gelatine will answer as well as any.—2. Do not make the solution too hot—110° to 120° is quite sufficient.—3. The bichromate should not be added until just before the solution is to be used.—4. Quite correct.

HYPO. (Gosport).—The way you treated the hypo. solution was quite correct, and the silver ought to have been precipitated as a sulphuret. Was the liver of sulphur in good condition? If it had been exposed to the air for any length of time it would be valueless for the purpose.

OLD PHOTO.—Is your invention a thing that can be registered, or does it require a patent? From the wording of your letter we imagine that it does. In this case, after the end of this year you will be able to secure provisional protection for twelve months for the sum of twenty shillings.

VETO.—The studio you propose to build will enable you to produce first-class work. After all the so-called improvements nothing, in practice, answers better than either the ridge-roof or a "lean-to." We should advise you to have it the full fifteen feet wide. This width will enable you to take groups with comfort.

OPERATOR.—A very fertile source of the collodion film splitting off the glass as it dries is dirty plates. Is it so in your case? Try cleaning the glass with dilute nitric acid, and use them as quickly as possible afterwards, taking care that moisture does not condense on the glass immediately before the collodion is applied.

R. BRIDGER.—It is clear that in making the transfer paper for collodion transfers you have added too much chrome alum to the gelatine; hence it does not become sufficiently softened in the warm water. Try again, using half the quantity of the alum. The double transfer paper, as used in carbon printing, will answer quite well for collodion transfers.

T. H.—If the opal pictures are by the collodion process, as from your communication we assume they are, it is quite unnecessary to wash them for so long a time. If you simply wash them as you would a collodion negative that will be quite sufficient, without any after treatment. We cannot account for the fading, unless you supply us with further particulars.

NORTHUMBRIAN.—Fused nitrate of silver is an article of commerce and may be procured from any photographic chemist. You can, if you choose, prepare it for yourself. All that is necessary is to put the crystals in a Berlin basin and heat over a Bunsen burner until they become liquid, and then allow to cool. It is better to maintain the heat for a few minutes, to ensure the destruction of all organic matter.

*** We have to ask the indulgence of several contributors whose articles we are compelled to leave over this week.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club on Wednesday, the 21st instant, the subject for discussion will be—*Alkaline Pyro. Development: Relative Merits of different Formulæ and Methods of Employing them, especially with the object of Developing Rapid Exposures.*

THE LANTERN EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—On Monday evening last no fewer than seven hundred and forty visitors passed through the turnstile of the Exhibition to see the lantern display. There was scarcely standing room in the gallery. To the disappointment of all, Mr. T. Sebastian Davis, who had early in the evening begged the forbearance of the audience in consequence of some delay in the arrival of the oxygen, eventually announced that information had been just received that there had been a breakdown in the machinery by which the gas was made, and the lantern exhibition would be postponed till Thursday evening. The popularity of these lantern displays has been something altogether unprecedented.

OUR FORTHCOMING ALMANAC.

WE shall be glad to receive at once the contributions of those friends, English and continental, who have already promised articles for our ALMANAC for 1884. Those who intend to contribute to its pages, but have not yet signified their intention of doing so, we would ask to forward their valued *quota* by an early post.

We have been informed by the Publisher that he can receive a few more Advertisements, if forwarded NOT LATER THAN WEDNESDAY NEXT, the 21st instant.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1229. Vol. XXX.—NOVEMBER 23, 1883.

PHOTOMICROGRAPHY.

Vertical Arrangement.—It is sometimes advantageous, when photographing objects mounted in liquid in cells, or such objects as living animalculæ, or *infusoria*, to use the whole apparatus placed in a vertical position, or else so to arrange the apparatus that the image of the object may be received vertically upon the face of a right-angle prism, and be reflected along the remaining part of the apparatus which rests in the horizontal position. The first plan scarcely suits for photographing objects with high powers except under small magnification, as the height of the arrangement would be inconvenient for examining the image on the focussing-screen except under special conditions.

Dr. Moitessier, Gerlach, Stein, and others adopted the simple plan of fixing over the ocular end of the microscope a frame, so arranged that the sensitised plate-holder may slide light-tight upon it, and generally of a sufficient length to provide for two pictures being taken after the manner of the ordinary stereoscopic slide. For this method the microscope should be capable of supporting the frame and plate-holder without any shifting of the focus through their combined weights; hence it is best to make the connection not with the ocular end of the microscope direct, but by attaching the frame to the part that holds the tube of the microscope, so that the ocular end of the tube can be racked up or down without moving the frame, in order to relieve the fine adjustment as much as possible of the weight.

If the object is to be photographed by transmitted light, the mirror, with or without the bull's-eye condenser, according to the source of light used, or a prism, is employed for the reflection of the rays. For an opaque object on the stage the illumination can be easily made, either by the rays transmitted from the mirror by the side of the opaque object—when it only partly fills the field, being received upon a Lieberkuhn reflector—or by light transmitted through the bull's-eye on to a side reflector, or the reflector simply turned towards the source of light, so that its rays shall fall across the object in the best direction for showing its details or peculiarities. Sometimes with low powers it is only necessary to throw a wide beam of light by the bull's-eye condenser across the object. Special care is needed not to alter the focus when introducing the slide, and also in *excluding* all light from entering the plate-holder when its shutter is opened until the moment of making the exposure. The mode of doing this must be left to the ingenuity of the operator. The simplest, perhaps, is to exclude all light from the stage, except that which is the source for illumination, and to shut this off by a black card laid upon the mirror. When the focus has been finally made there should be some plan by which the parts can be clamped in position to prevent any slip through the other operations.

To obtain the correct actinic focus this plan offers great facility for the use of the before-mentioned focussing eyepiece. By using a larger frame and a repeating slide several negatives of the same object can be secured on the same plate. We, however, deem it best, unless the exact time of exposure can, by previous trials, be determined, to only take two negatives on the same plate. Should it be required to use a repeating plate-holder it will be more convenient to support it upon a frame with four uprights fixed below to a base-board, upon which the microscope rests, or which can be simply placed over the microscope; and the connection between the ocular end and the frame made by an additional sliding tube. If the legs of the frame be made to slide increased height can be gained, and one or more sliding tubes used, or even a small bellows between the frame and the ocular end of the microscope. If the whole be placed on a low table the height need not be inconvenient. If a greater height be needed and a small bellows camera be employed, then a small door, shutting light in the side of the camera, can be opened to see the image thrown on a white card, in the place of the ordinary glazed glass, and the focussing made by the naked eye or by the help of a lens. The camera might slide up and down between the uprights, and if these be provided with slots it could be fixed at the desired position by clamping nuts. Some support the small camera and a connecting cone of cloth upon a large, firm laboratory stand, upon which it can be fastened at the required height.

Dr. Malley has the base-board divided and a part clamped at right angles, so that, with a leg behind the base-board, the camera can be supported vertically. The same can be effected with the small form of camera first described if a strong strut or leg be hinged to the inside of the cross-piece at the camera end of the base-board, the length being made sufficient when projecting backwards to hold the base-board vertically, while it rests upon its front edge, the microscope being placed on the table and supported at the required height, so that the ocular end can be rendered light-tight, care being taken to keep the parts centered and the camera properly clamped to the base-board. There are several inconveniences with the latter method; but charming negatives at a small magnification can be taken when the frame is used over the eyepiece end, and when the frame is made of an oblong shape and a wide body-tube employed the image can be made to fill, when using higher powers, a stereoscopic or larger-sized plate. Figures are given of these arrangements in Moitessier's and Beale's works, also in Gundlach's.

Vertical and Horizontal Arrangement.—A combination of the vertical with the horizontal arrangement is very useful, as it embraces the advantages of both in some respects, though it may not exactly equal them singly. The base-board with camera is placed in the horizontal position, and to the front of the camera is added some sliding tubing of rather large diameter, the end piece being closed up—except in the centre, which has a smaller short tube attached to it. Another small tube is fixed on this one at right angles, and engages, light-tight, the ocular end of the microscope, the tube of which should be short. In the angle formed by this elbow piece is correctly placed a right-angle prism, which receives the image of the object when the microscope is used vertically, and by total internal reflection transmits the image-forming pencils to the focussing-screen, the operator watching the focussing of the image through the small side door in the body of the camera. The elbow-junction tube should allow of the free ocular end of the microscope being moved through the necessary distance for use with the low powers, or, what is better, the body-tube should consist of two sliding tubes, which, when used at their full length—as with high powers—should still be short, otherwise the prism will have to be of some size to receive the entire image-forming pencils from the objective.

If the objective be made to screw into the elbow piece just below the prism, and another small microscope without a body-tube, but which has a rack-work to move the stage, be placed beneath it properly centered, many facilities are offered for lighting and focussing rather large transparent and opaque objects. Again: if the front wide tube be made to admit a reversed stereo.-compound combination, and the objective be entirely removed, then objects of some considerable size can be photographed from one to several diameters. The front tube should be cut away at one side, so that the stereo. combination can be moved by its own rack without decentering the prism over the object on the separate stage, or in any way interfering with the illumination. Care must be taken that no light save that reflected from the hypothenuse of the prism enters the large tubes. Where an increased range is required it can be obtained by the sliding tubes. The loss of light is compensated for by the large surface. A figure of this plan is given in Moitessier's book.

LIGHT FOR THE DARK ROOM.

Whether it be that too much "familiarity breeds contempt," or that photographers, through the greater knowledge acquired by longer practice, can more correctly appraise the power of coloured light upon the sensitive gelatine plate, one less frequently sees nowadays the dim light—darkness visible—that the first gelatine-plate practitioners found necessary, just as did their forerunners of wet plates in their early days, as is evidenced by the very name itself—"dark room." Now, however, with canary medium, naked gas flame, and other such treasonable substitutes earnestly recommended by a number of experimentalists capable of doing first-class work, it is evident that a considerable latitude may exist as to modes of illumination of the dark room and still permit perfect negatives to be produced.

In considering this question it should be clearly understood that lighting the apartment in which dry plates are prepared and lighting the room in which they are developed are two very different things. In one case a plate may be exposed for twenty-four hours, and in the other not much more than twice as many seconds. It requires no discussion to show how different a class of light may be used in one case from the other. Few modes of obtaining "non-actinic" light by filtering white light through various coloured screens will leave a perfectly monochromatic light; there will usually be found a slight residuum of light removed from the least-refrangible portion of the spectrum, and, indeed, there are few portions of the spectrum entirely without action upon a gelatino-bromide plate; hence a light chosen for any given class of dry-plate work should naturally have reference to the possible length of time a plate may have to be exposed to it.

It rarely happens that, from the time of being taken from their packages, changing the slides, and completing their development, a plate is under exposure to the dark-room light for more than ten minutes at the outside, so that it would be absurd to reduce the light used for developing (say) a thousand plates to a degree that would be safe for a plate which, through some exigencies of working, might need an hour or two to develope; and, as a matter of fact, anyone intending to give such time to a plate would be certain to cover his developing dish so that it would be screened from light. Many photographers seeing the force of this reasoning have adopted a light in accordance with it, and work in comfort without fear of fog.

During the winter months, however, when daylight is so soon gone—and also, we may say, all the year round in some inconveniently-situated dark rooms—it becomes necessary to employ some kind of artificial light if development is to be carried on with any degree of comfort. Paraffine lamps or gas are naturally made use of, and it is in view of their use that we would give a few warning words. In some laboratories we have visited the operator has worked by the light of an orange- or ruby-shaded flame, holding up his negative to the light whenever he wished to scrutinise it closely for any purpose, and never taking any steps to screen his eyes from the direct light of the flame; but in others we have seen him wisely wearing a screen upon his forehead, so that no light fell upon his eyes except when he specially raised his head or when examining his negative by the same. This, however, is a method only likely to be utilised when the operator's work is confined to development, as he would find it too irksome, each time he took a sitter, to put on his eye-shade on each occasion of entering the laboratory.

We, however, do not hesitate to say that a screen of some sort to shade the eyes, when developing by artificial light, from the direct light of the flame—dim though it may be owing to coloured screens—is an absolute necessity for anyone who has to spend any time upon plate developing. It is even not possible to do the work so well under such conditions. But above that we set the care of the eyesight; and we experience no feeling of doubt in asserting that every medical man would seriously condemn the working with a dim-coloured flame immediately within range of vision beyond an exceedingly limited period. We, therefore, advise every photographer who values his eyesight not to endanger it by omitting the precautions we here indicate; for, if he neglect our advice, sooner or later he will regret it.

We have seen in the dark room of one photographer a contrivance as simple as it is inexpensive, and as suitable for the purpose as anything that could be devised. This gentleman adopts artificial light during the winter months, and says the gain in uniformity is so great that he is strongly inclined to employ it all the year round, though he has a thoroughly-good open light from the north. He uses double panes of ruby glass (separated several inches) for the latter purpose, and in winter he simply uses a gas-light placed between the two, the room being thus lighted by gas passing through one thickness of ruby glass. The windows extend right and left of his working bench. The one immediately in front he screens entirely from the eyes by suspending a board by a string and a couple of hooks attached to the framework of the window; another piece of string attached to the lower end of the board, running through a hook in the ceiling, enables it to be placed at any angle. It is drawn forward to clear the developing dishes and allow the full light of the window to fall upon them, and yet left sufficiently low to prevent any light passing direct from the window to his eyes, which are thus completely shaded while the plate is illuminated sufficiently strong to show every detail of the image. He judges of the density by holding the negative up to one of the side windows.

When using artificial illumination somewhat different arrangements have to be made. The first plan he adopted, he informed us, was to remove the board and attach to the window an opaque screen so as to shade his eyes from the glare; but this was to some extent troublesome on account of the necessity for observing the progress of density in the negative, which required a strong light behind. He now overcomes all difficulty by placing a piece of opal glass immediately below the gas flame, dropping down his board screen to the usual slope, and piercing a small aperture into it about three-quarters of an inch in diameter. All that is necessary when the negative has to be seen by transmitted light is simply to lean the head slightly forward, when the illuminated opal is seen through the aperture as the negative is raised and examined. So long as development in the dish progresses no light falls upon the eyes, the first-named opaque screen hiding flame and opal, except when the head lean forward.

We describe this model not so much as an arrangement specially to be copied, but simply as one where all desirable conditions are fulfilled. Still, it is almost impossible to imagine a cheaper contrivance; and when, as in this particular case, acute vision is assisted by a small, folding eye-glass suspended by a tack over the aperture described, we may say that we have pictured an arrangement at once cheap, efficacious, and luxurious.

ELECTRIC BELLS FOR THE STUDIO AND THE RECEPTION ROOM.

Resuming the subject of electric bells as a convenient adjunct to the speaking tube for keeping the studio and reception room departments apprised of the immediate state of the business in hand, we shall now give some practical hints on their installation and employment.

The necessary apparatus, which is very simple, consists of the bell (the "trembling" bell) the battery, and the commutator (or, as it is commonly termed, the "push"). Of course, each of these must be in duplicate if the communication has to be made both ways; that is, if the studio is to communicate with the reception-room as well as the reception-room with the studio. Many bell-hangers, particularly in large towns, now undertake the fitting up of electric bells; but we shall assume in the present instance that the photographer intends to do the work for himself, and that he has no knowledge of electricity whatever. With regard to the selection of the bells: these may be obtained of various sizes; but, for our present purpose, two inches to two and a-half inches will be quite sufficient—indeed, better than if it were larger. The price of these is from five to ten shillings each, according to their quality and where they are purchased. It is always better to secure well-made bells in the first instance. Though costing a trifle more, they are less likely to get out of order by continual use.

For the battery nothing is better or so good as the "Leclanche cell," and, for a bell of the diameter mentioned, that known as the pint size will be quite sufficient. The cost of these is about three shillings per cell. They can be purchased ready fitted, and then they only require filling with water, when, after standing for a few hours, they will be in working order, and will continue so for two or three years. One cell will be quite sufficient for each bell, provided the distance it is from the push do not exceed thirty or forty yards. If it do, then a couple of cells for each may be required, but much will depend upon the conducting wire and its quality. The "pushes" are made of various forms, but the most general are those which are fixed to the wall with a screw.

In addition to these articles, some cotton-covered copper wire is required—sufficient to reach from the push to the bell and battery and back again. Two kinds of this wire are supplied, one being "single covered" and the other "double covered." The latter is to be preferred. With regard to its thickness, that known as "No. 16 Birmingham wire gauge" is the most suitable. Its price, according to the place of purchase, is from one and sixpence to two shillings and sixpence per pound. Single covered is a few pence per pound cheaper. As a guide to the quantity requisite, it may be mentioned that a pound of wire of the above gauge contains about twenty-five yards. Having provided the necessary parts, the fixing is a very simple affair.

In the first place, the base-board of the bell should be securely fastened to the wall by a couple of nails or screws near the top of the room, as from thence it can be better heard from all parts without attracting undue attention. In fixing it is necessary that the bell should be at the top or bottom, so that the clapper occupies a vertical and not a horizontal position. The battery should be placed on a shelf or other convenient place adjacent. Then one pole of it —say the wire coming from the zinc element—must be connected by a short piece of the insulated copper wire, with one of the binding screws on the base-board of the bell.

We now proceed to fix the commutator, or "push"—say in the reception-room. In the first place, the piece holding the ivory stud in position is unscrewed. It will then be seen that there are two metal springs which do not touch each other, unless they are pressed together with the stud. At the side of each of these (close to where they are secured to the wood) is a small hole, through which the ends of the conducting wires are to be passed from the back, after they have been filed or beaten flat. The screws holding the springs are loosened, and the flattened ends of the wires inserted beneath them. This done the screws are then tightened again, and by this means the wires will be held firmly and good metallic contact secured. It is a good plan to make the connections between the wires and springs by soldering, though the above plan will answer nearly as well. Care must be taken that there be no metallic contact whatever between the springs until they are pressed together with the stud. Having made these connections good, the push is secured to the wall in the place most convenient. All that now remains is to lead one wire to the vacant binding screw on the base-board of the bell in the studio, and the other to that of the battery adjacent.

The whole is then complete, and it will be noticed, if all be arranged correctly, that, starting from the push, there is a continuous metallic circuit from it to the battery, thence by the short wire to the bell coil, and through it back to the push. Here the circuit is interrupted, unless the stud be pressed when it is completed and the current circulates, ringing the bell, and continues to do so until the stud is liberated. If two cells be used in the battery, the zinc of one is connected with the carbon of the other, and the two free ends treated as if the compound battery were a single cell. Before making the connections the ends of the wires should be made bright with a piece of emery cloth. When a bell is fitted both in the studio and he reception-room, a single wire (which need not be insulated) will answer for the return current; or, indeed, a couple of wires only may be made to serve for both bells. But it requires some little knowledge in electricity to make them available; hence the novice in electrical bell-fitting cannot do better than employ distinct conductors for each bell, as described above. At the base of the clapper spring of most bells is a small set screw for regulating the rapidity of the stroke. It may be so adjusted that the clapper strikes the bell slowly, or so rapidly that the ringing sounds as a continuous musical note. The latter is the way it should be set for the present purpose.

The bells being fixed, a code of signals must be arranged as we explained last week, namely, by rings of a short or long duration. In arranging the code it is better, in practice, to confine ourselves to two periods of ringing only—one as short as possible, such as is produced by an instantaneous touch, and the other of longer duration, as by pressing the stud, for (say) a third or half of a second. Then the code can be represented on paper as a simple dot (-) and a dash (—). A copy of the code should be affixed in the vicinity of the pushes, until the communicants have committed it to memory, which can be accomplished in a very short time.

Appended is an example of a few sentences and questions as frequently employed in a photographic business, arranged with the simplest combinations from the Morse code. These will serve to illustrate how a code may be framed to suit special requirements:—

- — A sitter arrived by appointment.
- - — " " without "
— Studio disengaged now, send up next sitter.
- - - How long before the studio will be disengaged?
— - Five minutes.
— - - Ten "
— - - - Fifteen "
— — A lady now in the dressing-room.
— — — A gentleman " "
- — - Have you many sitters waiting?
— - — Are any appointments due?
- - - — Sitter has arrived in a great hurry.
— — - Communicate through the speaking tube when you are disengaged.
- — — The light is now very indifferent.
— — - - Repeat last signal—it was not understood.
- Yes!
- - No!

The above few examples will serve to show that an almost endless number of questions may be readily put, and answers given, by means of a few touches of the commutator.

THE PHOTOGRAPHIC EXHIBITION.

[Final Notice.]

We were reluctantly compelled last week, in consequence of extraordinary pressure, to leave over our final notice of the Exhibition now closed, and which has proved probably the most successful the Society has ever held.

Of the large number of exhibits as yet unnoticed we can but mention a few, and to these we shall be obliged to give but brief notice. Mr. W. J. Byrne is the only exhibitor this year who was represented in so-called "red carbon," his *Photographs of Children* (No. 204) being worthy examples of the style.

Captain N. Clarke contributed a frame of interesting *Views of Portion of the Lines of Tel-el-Kebir* (No. 208); while the Postal

Photographic Society sent a couple of frames of specimens of the work of its members, amongst the collection being several very fine platinotypes.

Mr. Valentine Blanchard exhibited a variety of work, his own exhibits being in silver, while several of the Platinotype Company's specimens were from his negatives. Of the latter the one that pleased us most was *Study of an Italian Girl* (No 561); while equally good—artistically as well as technically, though not so attractive—was *Study of an Old Man* (No. 491). This is a characteristic portrait of poor old Christian Riminick, until within a few months ago a well-known character about the Strand, whose death from starvation dispelled the rumours of the fabulous wealth "the old Frenchman" (he was a Swede, by the way) was supposed to have amassed. In all weathers, bareheaded and with his arms folded across his body as if to hold his rags together, was he to be seen plying his vocation, and his flowing white hair and beard and striking features formed one of the finest model heads a painter or photographer could choose. Amongst the silver prints the best was perhaps *Listeners Never Hear any Good of Themselves* (No. 276); while an easily-recognisable portrait was that of Mr. C. E. Pearce, the editor of *Funny Folks.*

Mr. Robert Faulkner's *Portraits of Children* (No. 224) were similar in character and pose to his exhibits in previous years. A similar remark may be applied to Mr. H. Pointer's *Brighton Cats* (No. 230), though these latter are not so good as some we have seen by the same artist at previous exhibitions.

Mr. W. Trenemen showed a number of good landscapes (No. 229), and Mr. Alfred Dismorr was represented by four excellent Spanish views (Nos. 234-7).

Mr. Joseph Gale's style of work is too well known to require much description, his rustic scenes (Nos. 242-4) being this year very carefully studied, though we prefer No. 87 for general excellence. The London Stereoscopic Company had a few good portraits, including those of *Mr. Gladstone* (No. 253) and *Mr. W. E. Forster* (No. 251).

Mr. A. H. Dyke Ackland exhibited a number of very praiseworthy studies, *Looking Back* (No. 343) and *Sunset* (No. 347) being the best.

Mr. J. E. Mayall's portraits by electric light—the best of which is *Professor Adams* (No. 295)—are interesting, as showing what can be done with artificial illumination.

Mr. Fred. Hollyer — one of the judges—exhibited in different classes, including portraiture, reproductions, and flower subjects in decorative panels, one of which latter (No. 563) we have chosen for illustration. The panels, being about two feet high, are composed of two pictures joined, and so cleverly is this effected that the *ensemble* is pleasing in the extreme. Mr. Hollyer, it is needless to say, as one of the judges was *hors concours.*

No. 563—*Decorated Panel.* By F. HOLLYER.

Mr. F. M. Sutcliffe was well represented this year—at least so far as numbers are concerned; for we scarcely think he was quite up to his usual standard, though many of his sea pieces are of marvellous beauty. The figure subject we have engraved, *Waiting for the Herring Boats* (No. 409), is specially good, though we fancy there is a too sudden contrast between the shadowed foreground and the hazy distance, the effect being apparently that of double printing, the water line marking the junction.

Of Mr. W. Gillard's exhibits *Day Dreams* (No. 308) is decidedly the best, our illustration being scarcely a fair representation of the picture, as the wood engraver is unable in a few lines to convey the *expression* contained in the photograph. *In Fairy Land* (No. 332) is also worth notice. Mr. Abel Lewis's portrait of *The Late Dean*

No. 409—*Waiting for the Herring Boats.* By F. M. SUTCLIFFE.

Stanley (No. 310) is the next which attracts attention, and two ladies' portraits, by Messrs. Russell and Sons, were not to be passed without notice.

No. 308—*Day Dreams.* By W. GILLARD.

Mr. William England's Swiss views (Nos. 322-30), in his usual style, formed a feature amongst the landscapes, from which we select No. 329 as the best.

Captain Abney exhibits a number of English landscapes of uniformly good quality. If we have a preference it is in favour of *An Autumn Morning, Godstone*, and *Windsor Castle* (Nos. 338-9), the latter being a difficult subject to render pictorially, except from the hackneyed standpoint.

Two portraits by Mr. W. E. Debenham (Nos. 356-7) are remarkably good, the delicacy of the lighter tints and the combined vigour of shadow calling to mind the supposed superior quality of the wet plate, though these are, we believe, produced upon gelatine plates.

A few Welsh views, by the Rev. A. Johnson, exhibit artistic taste. Two of them, representing spots with which we are personally acquainted appealing more directly to our feelings—*Near Llanrwst* (No. 392), and the *Mill Stream, Trefriew* (No. 394).

Mr. S. W. Rouch exhibits a number of views, exterior and interior, of Tullymore and Castlewellan, the seats of Lord Roden and Lord Annesley. The interiors are, in some cases, particularly good. Mr. Bedford Lemere also shows a frame of interiors of large size, which speak well for the capabilities of our modern processes.

Mr. W. Wainwright, Jun., has a couple of frames of landscapes—*Views of Lynmouth and Clovelly* (No. 429) and *Views of Eton and Lynmouth* (No. 529). These are remarkable for their general good qualities. If we may, however, point out a possible fault, it is in

No. 529—*Eton*. By W. Wainwright, Jun.

the too great prominence of the clouds. A distant view of Eton in the latter frame we have selected for reproduction.

Of the many other pictures which we have been unable to notice for want of space, some probably may possess points which recommend them in preference to others we have mentioned. But without making our notices a complete explanatory catalogue, it is impossible to do justice to the vast amount of good work which is annually exhibited. We have done our best to select the finest examples of technical and artistic excellence, and have now only to bid farewell to the Exhibition of 1883.

The sudden and unexpected death of Sir William Siemens, from the effects of an accident, causes a gap in the ranks of science that will not soon be filled. It appears that, returning from a scientific meeting, in company with Sir Frederick Bramwell, some time ago, the deceased slipped and fell on the pavement in Hamilton-place; but the injuries received were not considered serious. It was found, however, that the muscles of the heart had been strained, and death ensued, somewhat suddenly, on Monday evening last. Sir W. Siemens was the second of four brothers, all of whom have made themselves famous by their achievements in science, their discoveries and inventions having been made sometimes by the brothers singly, but more often worked out in conjunction. The subject of this notice was known in many branches of science; but his attention turned itself chiefly to the application of science to industrial purposes. He came to England first in 1843, and became connected with Messrs. Elkington in the electro-gilding process, in which he made great improvements. His next great invention was the Regenerating Furnace, which bears his name and which is now so universally employed; while his numerous more recent triumphs in electricity and the application of electric force to lighting, heating, and other practical purposes, as well as his improvements in gas-lighting and heating will be fresh in the memories of our readers. Sir William Siemens was born at Lenthe, Hanover, on April 4th, 1823, and was consequently in his 61st year. He received his education at Labeck, Magdeburg, and finally at the University of Gottingen. He came to England, as we have said, in 1843; but it was not until 1857 that his first paper was read before the Royal Society, from which time his name has had a prominent place in the scientific annals of the country. He was elected F.R.S. in 1862, and was a member of the Council of the Society in 1869-70. He joined the Institute of Civil Engineers in 1854, and was for years on its Council; the Society of Telegraph Engineers, of which he was President; and he was also the first President of the Institute of Mechanical Engineers and the Iron and Steel Institute. He was a member of the Council of the British Association, of which he was President in 1882, and was at the time of his death the Chairman of Committee of the Society of Arts; and almost the last time we saw the deceased gentleman was on the occasion on which, in that capacity, he had to do the honours to the Prince and Princess of Wales at the annual *conversazione* of the society. Only a few months ago Sir William Siemens received the honour of knighthood in recognition of his great scientific labours.

Few subjects have such a powerful hold upon the mind as the thoughts conjured up by a sight of the buried city of Pompeii, when excavations have been sufficiently long continued to lay bare a large portion of the place, and to enable the spectator to form a vivid idea of the Pompeii of the past. Still further to enable this to be done a number of drawings of the original elevations of various parts of the ruins have been made and photographed, for issue in book form side by side with actual photographs, taken on the spot, of the same localities as they now appear. The photographs (thirty-nine in number) have been taken expressly for the purpose by a Neapolitan firm, and it may fairly be expected that with so interesting a subject the book will have a wide circulation.

It has often been attempted to make lenses with the aid of a liquid, but without any great practical success, although, for experimental purposes with prisms, highly-refractory liquids, such as bisulphide of carbon, have been used with advantage. The chief drawback to the use of this substance is, however, its volatility, which often gives rise to leakages, whatever precautions may be taken. A chemist of Leipzig, however, Herr Carl Rohrbach, has lately described the composition of a liquid of extreme density and of extraordinarily-high refractive and dispersive powers, which may be found very useful for many optical experiments. He mixes 130 parts of scarlet biniodide of mercury with 100 parts of iodide of barium, then stirs in (according to the published formula, which, as it reads, is nonsense) twenty c.c. of distilled water, and heats the whole in a test tube by means of an oil bath heated to 150° or 200° Centigrade. A fluid double iodide of mercury and barium is thus formed, and it is next evaporated in a porcelain dish till of such density that a crystal of epidote will not sink in it. Its density is 3·575 to 3·588, and its colour is said to be yellow—of what depth we are not told. Its refractive index is 1·1755 for the C line, and 1·8265 for the E line, of the spectrum. It is said that, so great is the dispersive power, "the two D lines are separated by almost exactly 2′ of angle" when this liquid is used in a hollow prism. The new compound apparently possesses remarkable properties, but present accounts evidently need correction.

According to *La Nature* (which quotes an American paper as its authority), a very singular and novel use has been found for photography. The New York safes and their electric bells have been quite outdone:—"Notice to merchants and men of business. A German mechanician, according to the *Chronometric Review*, has just invented a kind of safe which not only causes a bell to

ring upon being tampered with, but throws forward a beam of electric light, and also sets in action a photographic apparatus, which thus, with the aid of the light, takes an instantaneous view of the features of the burglar." Thieves will now require not only the familiar crowbar and "jemmy," but will also need a supply of masks, lest the tell-tale safe should reveal their features to the already too attentive myrmidons of the detective office. We expect to hear next of the rural constables being provided with a similar apparatus to secure details of the dress and appearance of light-fingered gentry who are also too light-footed for the myrmidons of justice. It may be questioned whether the apparatus should not be entirely automatic, and the best place for so useful a contrivance could not better be selected than at a spot where a burglar rather than a policeman would be the most likely frequenter, the two not being convertible descriptions.

A most brilliant series of experiments were performed by Mr. W. Crookes, on the 5th instant, before the members of the Western Microscopical Club, meeting at his own house. Our readers will probably be familiar with his experiments upon high vacua, and those referred to were founded on the same phenomena. He showed how the small residual number of molecules were carried (or, rather, forced) by the electric current to travel in straight lines and exert their energy in a most remarkable manner. They were reflected from mirrors to a point, and by their impact upon a bundle of platinum wires caused it to become white hot. They printed a temporary pattern in light upon the walls of the glass tube when any object was placed in their path, and they produced effects of phosphorescence when directed upon various minerals. These beautiful experiments are the present outcome of those which enabled Mr. Crookes to produce the well-known radiometer—an instrument from which so much was hoped at one time as a light measurer, but which, unfortunately, turned out to be as much acted upon by heat as light, and so useless for photographic purposes.

We have on a previous occasion brought before our readers the views of the late Sir William Siemens upon coal gas for heating and lighting purposes, and in our article upon the use of electricity we showed the use of gas engines in lieu of steam engines. We now have to make note of a very remarkable article bearing upon the subject, which last week secured a conspicuous place in the columns of our contemporary, the *Chemical News.* The writer boldly says that Bunsen and all recognised authorities upon the composition of coal gas are quite in error in their analyses. The following are the writer's words:—"Investigations extending over a lengthened period have shown me that all the previous analyses of coal gas are of no value, and are, moreover, inaccurate." He asserts that the bulk of the illuminating agents of coal gas can readily be absorbed by olive oil, &c., and sold in a portable form for illuminating purposes, leaving behind a gas suitable for heating and giving only a feebly-luminous flame when lighted. All this means, if a practical end is to be found, that a gas for heating purposes may be, and possibly will be, prepared ere long at a price far below what is now paid for gas made only, as it now is, for its illuminating properties.

PROJECTING BY THE LANTERN.

The incapacity of a portrait combination of lenses of short focus to project a lantern picture on a screen in such a manner as to ensure an equal degree of sharpness at the margins as at the centre has, for a long period, been recognised by lantern experts. The centre of the disc is so well defined in every instance in which a lantern objective of this nature is employed as to render the slight falling off towards the sides apparently greater in consequence of this central perfection than it is in reality.

At the recent lantern exhibition of the Photographic Society of Great Britain, where the apparatus employed is presumably of the best, although the angle of projection was only small, and hence occasioned no great tax upon the capabilities of the object lens, yet even under these favourable circumstances the marginal definition was inferior to that of the centre in a greater degree than was desirable—a fact commented upon by a group of experts in the vicinity of the writer.

Every one is aware that by employing a lens of long focus, and placing the screen at a great distance from the lantern, the enlarged image will have such a degree of equality of definition as to present no one part in subordination to any other, the sides being quite as sharp as the centre. But it is not always expedient to have the screen erected at a distance of thirty, forty, or sixty feet away from the lantern in order to obtain a uniform disc of twelve feet.

Previous to the adaptation of the portrait lens to lantern projection, it was a rule that, in order to illuminate a disc of any given dimensions, the distance between the lantern and the screen should nearly equal the diameter of such disc. For example: a twelve-feet disc was obtained by erecting the screen twelve feet in front of the object-glass, the cone of light being usually projected at an angle of from fifty to fifty-five degrees. The object-glass in this case was mounted with its convex side towards the light, a diaphragm being placed outside. Now, although the definition was greatly inferior to that at present obtained by the use of the portrait lens, yet the uniformity of such definition was much superior to that of the present day when employing a portrait lens of short focus. The pre-achromatic objective of the high-class lanterns was composed of a plano-convex and a meniscus, both of crown glass, mounted close together with their convex sides towards the light, the meniscus being placed towards the outside.

It does not appear to be generally known, or at anyrate adequately recognised, that the analogue of this system, properly achromatised, will give an image of great distinctness and equality over a large area when used with a lime light, and also one possessing a high degree of luminousness. But that it is recognised by some is proved by the occasional employment of the system by the more experienced lantern exhibitors. Two achromatic lenses of plano-convex or flat meniscus figure, ten to twelve inches in focus and two inches in diameter, form when combined an efficient lantern objective, the only fault it possesses being a tendency to give an outward curve to any architectural portions of the picture which may be near the margin.

If the exhibitor be willing to sacrifice extreme central sharpness for a lessened degree of this quality, coupled with an enhanced flatness of field, and hence a greater uniformity, he may do so, with a gain in the size of disc, by selecting as an objective a portrait combination in which the lenses are retained in the cells by means of screwed rings. The combination selected for the purpose should be one of two and a-quarter inches diameter and of short focus; a foreign *quick-acting carte* lens fulfils this requirement.

Having placed in the lantern a photographic transparency extremely sharp at the margin as well as the centre, let the marginal definition be carefully noted, together with the amount of racking out required to bring the centre to an equal degree of sharpness; for it may safely be assumed that both are not equally sharp simultaneously (if they are, then the lens is a treasure and must not be tampered with). Let the lenses be next unscrewed from the back cell, and the flat ring by which they are separated be removed from between the components of the back lens, which must then be returned to the cell in contact with each other. By this act the negative aberration, or the power of flattening the field, will have been increased. To ensure this property being fully brought into action, the distance between the front and back combinations forming the objective must be lessened, which, by the judicious employment of rings of the diameter of the lens, may easily be accomplished.

The presence of an excess of negative aberration in a lens, it may here be explained, is discovered by examining a piece of printed matter through it, and observing how much greater its magnifying power is at the centre than near its margin; and this is the property which a back lens must possess in order to ensure flatness of field. It is a property possessed by a *carte-de-visite* lens, corrected to give a flat field, in a degree much exceeding that required in an ordinary portrait lens, although scarcely sufficient for a lantern lens intended to project a large disc from a near standpoint.

That the slight falling off in the sharpness is really not appreciable, it is only necessary that the drop scene of a theatre, which appears so sharp and fine to the spectator at a distance, should be examined within a few feet, and the comparative crudeness and even coarseness of its details observed. And so it is with a lantern projection when viewed at a distance of twelve feet and upwards. The absence of any spot of intense sharpness causes the softness and evenness of the definition to be examined with a degree of satisfaction greatly exceeding that obtained from the unequal delineation

secured by means more perfect, which, perhaps, in a purely optical point of view, are less so when the optical instrument is considered merely as the means to a certain end. HERBERT J. RIGBY.

OPALESCENCE IN GELATINE NEGATIVES.

How seldom do we see the deepest shadows of a gelatine negative, or even the margin protected by the rebate of the dark slide, represented by perfectly-clear glass! Perhaps, as regards the former, the cases are extremely few where the result is to be anticipated or desired when a proper exposure has been given; but when the unexposed margin of the plate is in question, there is not a shadow of a doubt that, where all conditions are as they should be, the glass ought to be perfectly undimmed by deposit or veil of any sort.

I am not alluding now to fog of the ordinary description, nor even to what is sometimes known as "slight veil," though these are rarely altogether absent if the negative be carefully examined when pressed in contact with a sheet of clean, white paper, however clean and pure the transparent portion may appear when examined by transmitted light. The defect, if such it can practically be considered, is rather of the character of a faint opalescence, which clearly arises from no deposit of silver nor from any form of developing stain.

I was inclined at one time to attribute it to lime, either contained in the gelatine itself or precipitated in the film from the water by the ammonia employed in developing. But this supposition became untenable when I reflected that, whereas a bath of weak hydrochloric acid sufficed to entirely remove the much denser "cloud" of lime produced by washing the film with ordinary hard water after ferrous oxalate development, the slight opalescence I refer to entirely resisted such treatment. Indeed, where the phenomenon exists, it is possible to entirely remove the image itself by resorting to the strongest measures, without in any way modifying the opalescence, which remains evenly spread over the whole film after the entire disappearance of the silver image. Again: plates of the same batch which have, after development, shown this opalescent appearance, have been soaked in dilute ammonia—that is, water containing the same proportion of ammonia as would be present in an ordinary developing solution—and after careful washing fixed without development. These have been perfectly free from the defect, which cannot, therefore, arise from precipitation of lime salts by the ammonia.

Noticing at last that the defect was generally visible, or at least more prominent, when the clearing solution of acid and alum (or in a less degree plain alum) was used, it struck me that it was most likely due to some reaction between the alum bath and the hypo. remaining in the film after fixing. A very few experiments proved this to be undoubtedly the case; and though alum is certainly not the only substance that conduces to the production of this veil, I have little hesitation in saying that hypo. is almost invariably at the bottom of it.

Much has been said in past years on the subject of the result of the mutual decomposition of alum and hypo. when brought together in solution or in a gelatine film. In the former case the reaction may be easily followed and accounted for; but when it comes to the consideration of an imperfectly-washed gelatine negative film subsequently treated with alum or a mixture of alum and an acid, numerous complications are introduced, the result varying with the amount of washing after fixing, the length of time the plate was in the fixing bath, as well as the strength and age of the fixing solution employed. Suffice it to say that the result may be the deposit of a minute quantity of sulphur and (or) sulphide of silver in the film in an extremely-fine state of division—varying, of course, with the conditions, but in any case producing the transparent opalescence of which I have spoken.

As the result of numerous experiments I have come to the conclusion that in at least the great majority of cases the opalescence is caused by sulphur alone, and for these reasons:—Though when alum and hyposulphite of soda are mixed in plain solution a certain proportion of sulphur is found mixed with the deposit that occurs, it is in comparatively small proportion. But if the mixture of alum and acid be substituted for the plain alum solution then a much more copious precipitation of sulphur occurs, the acid, in fact, playing a stronger part than the alum. So in using the acid clearing solution a far greater amount of opalescence is produced than is the case with alum alone. It may be said that if any hyposulphite of silver be left in the film the acid will convert that into sulphide, but I do not think so; at anyrate, plates purposely soaked in solutions of plain hypo. and hypo. half saturated with silver haloids, have, when slightly rinsed and treated with alum and acid, showed no perceptible difference. The silver is, I am inclined to believe, converted into *sulphate*, and as such is washed out of the film.

But the most cogent reason for laying the blame upon precipitated sulphur—and here lies the gist of what I have to say—is that the opalescence or veil is removed by sulphur-solvent, or, at least, such as can be made to penetrate the film, and these may, therefore, be used as the remedy. Thus, by immersing the opalescent sulphur-containing film in a saturated solution of sulphite of soda for some time, the sulphur is dissolved, forming with the sulphite *hypo*-sulphite of soda, and so removing the veil.

Sulphurous acid also acts as a clearer, and it is still the subject of inquiry with me as to whether this may not profitably be used to replace the hydrochloric, citric, oxalic, and other acids usually employed in combination with alum. H. Y. E. COTESWORTH.

TRANSATLANTIC JOTTINGS.

ALL the American journals to hand contain full details of two secret processes that have been much talked of for some time past—the well-known Obernetter cold-emulsion process, and another, of American birth, the Hartley dry-plate process. Of course it is not in our province to say whether the details are correct or not, but there is no doubt they are full and explicit. The value of the former has been well canvassed in the German periodicals, *pace* previous numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY. The latter process is, in this country, a comparatively unknown one, though, judging from the publicity given to it, the process-mongers have been having good times of it on the other side of the water. We have not yet mastered all its details, but the following extract we feel sure will interest all readers familiar with the details of emulsion work. About its value we are less confident:—"Put a quantity of nitrate of silver into an evaporating dish on a sand-bath, with a small quantity of water; add to every pound of silver about half of the white of an egg; *fuse* the silver until it has melted and run back to an oily liquid; take it off the fire, cool, and granulate. This silver is just right for making emulsions, and also for making *baths* by the wet process, and will work in one-third the time of any other way of fixing silver!"

The *Photographic Times* (New York) heads its number for September with an article from the pen of its able editor upon *Stereoscopic Portraits with a Single Camera*, in which he explains how relief may be produced by shifting the sitter instead of the camera. He explains that the sitter is to be seated on a revolving office chair and an exposure duly made; he is then to be "enjoined to remain perfectly still while the chair is rotated to an exceedingly slight extent—an extent, indeed, that should not be more than is barely appreciable—and another exposure made on the same plate." Seeing that with a camera at twelve feet and a chair of ordinary dimensions it would have to be moved no more than about one-third to one-quarter of an inch, the steadiness of hand required may be easily judged. "When experimenting in this direction," the editor says, "the photographer will not fail to notice what striking and novel effects can be obtained when a back view, either wholly or partially, of the sitter is focussed upon the ground glass," and that *dilettante* photographers will find if they try "a full or three-quarter *back* view it will afford an agreeable modification of the routine of their practice." We think so, too; but we are afraid the *dilettante* would be further taxed for a more ordinary view also.

The storms experienced a little while ago in this country have evidently been paralleled in America, and some of the studios there have had narrow escapes. We read that, at Atlantic City—"The surf rolled in and lifted the photographic galleries, occupied by Bellis and Chandler, and Sheets from their underpinning, first carrying them out to sea, and then dashing them back and crushing them to fragments. The spectacle was a grand and awe-inspiring one to the thousands who witnessed it, though, probably, the losers did not think of the grandeur." We should not imagine they would!

Mr. H. M. Parkhurst, writing to the *Photographic Times*, says that in experimenting upon variations of exposures, he found (with $\frac{f}{15}$ stop) "that thirty grains of pyro. to the ounce of developer divided by the number of seconds of exposure gave the best average results." In experimenting with carbonate of soda his experience of its strength is that "one drachm of a saturated solution of soda to each grain of pyro. gave the best results. This proportion cannot be followed above eight grains of pyro., because that

reaches the limit of saturation of the soda." This is about the readiest mode we have seen of describing the proportions in which carbonate of soda with pyro. is to be used. Large numbers of operators are evidently using the former method in preference to that with ammonia; yet, strange to say, it does not find favour in this country to any extent.

Accounts of a very sad accident are given in the American journals as having occurred at Boston (Mass). Mr. C. H. Codman (a well-known gentleman, and the senior partner of a large house of business there) has lost his life through inhaling the fumes of nitric acid which had been spilled upon the floor of the room where he was engaged. It appears that the first carboy of acid that the firm had ever received was being brought into the premises, when, through some careless handling, it got broken and its contents spilled over the floor. Mr. Codman left his place to superintend the carrying out of needful precautions, fell down, and afterwards inhaled so much of the fumes as to cause his death in a few hours' time, though he manfully stuck to his post for two or three hours after the accident. This is the first time for a number of years that we have heard of death from this cause. The last occasion was some dozen years ago, when a Winchester of nitric acid was spilt upon the floor of a house of business in this country, and a death resulted from the fumes being inhaled.

In Mrs. Fitzgibbon's journal—the *St. Louis Photographer*—an interesting article is given upon the relative cost of American and English dry plates. We, ourselves, some time ago, in these "Jottings," gave an average of the relative prices of dry plates in this country and America, and the editor of that journal does the same, giving the following table:—

	4¼ × 3¼	6½ × 4¼	8½ × 6½	8 × 10	10 × 12
"English price...	.50 ...	$1.25 ...	$2.20 ...	$3.50 ...	$5.00
American ,, ...	.60 ...	1.20 ...	2.30 ...	3.40 ...	5.00

It will be seen that the prices of the double *carte* and the double cabinet are actually cheaper in this country (the States), with its protective tariff and well-paid working-men, than the same sizes are in England, with its free trade and pauper labour. Taking into consideration the fact that our manufacturers have the cost of transportation, insurance, breakage, and customs' duties to add to the cost of the raw material (glass and gelatine) * * * we think our consumers have no cause for complaint." So says the *St. Louis Photographer*, and it is quite right too; but it is well understood that the above prices do not resemble those charged by the *majority* of English makers.

We conclude by giving an account of a ground-glass substitute from the above journal, which seems to be of very promising character:—A couple of old worthless dry plates were taken and exposed to diffused light for about five seconds, and then developed —one with ferrous oxalate and the other with pyro. Each yielded a fine grey or brown plate, which, when fixed, gave a capital surface for focussing upon. The idea seems good and worthy of trial.

ON THE INJURIOUS ACTION OF RUBY LIGHT UPON THE EYE.

It will doubtless be remembered by some of my readers that, at the termination of my paper upon *The Influence of Ammonia Vapour on the Causation of Lung Disease*, I alluded to *another danger* to which the unfortunate photographer was exposed. I shall now redeem my promise and make it the subject of the present article, in which I shall endeavour to prove to the complete satisfaction (?) of the profession generally, that light either deficient in quantity or of injurious quality, by compelling the eye to work under unfair conditions, tends to the production of various diseases, chief among which are:—1. Myopia, or short-sight, with consequent staphyloma, or protrusion of the back of the eyeball; 2. Colour-blindness; and, 3. Congestion and undue sensitiveness of the retina, with resulting impairment of vision. Also, that ruby light is as injurious a light as you can well have. As, in order to understand what I am about to say, it is necessary to possess a distinct idea of the mechanism of vision, and as most of my readers probably have not recently looked up the subject, I think it will not be out of place for me to preface my remarks with a short description of the eye itself.

The human eye is really nothing more nor less than a very perfect photographic camera, furnished with wide-angle lens, diaphragm, and sensitive plate, and possessing a focussing arrangement of such scope as to sharply define objects from about eight inches' distance up to several miles. To be more explicit: the eye of a globular form is composed of three concentrically-placed coats, named respectively the "sclerotic," "choroid," and "retina," which are deficient in front, where they are replaced by a sort of window called the "cornea." The outer of these coats, the sclerotic, is thick and opaque, gives strength to the walls of the eye, and serves for the attachment of six muscles (the four recti and the two oblique), by which the globe can be turned in every direction. The middle coat (the choroid) is the nutrient coat of the eye, and is composed of blood vessels, supported by a delicate framework of connective tissue. The inner coat (the retina), which forms the lining of the eye and acts the part of a sensitive plate, is a very complex structure, consisting almost entirely of nerve fibres and the peculiar organs, called "rods" and "cones," in which they terminate. These nerve fibres, entering the back of the eye as a large bundle, called the "optic nerve," radiate all over the retina from the point of entrance, being so closely applied to each other as to form a continuous membrane.

Each nerve fibre ends in either a rod or a cone, these rods and cones being packed side by side to form a continuous pavement, like a mosaic, over the side of the retina next the choroidal coat. Between these two coats is a layer of pigment, which acts as a backing to the sensitive retinal film. This film is represented by the layer of rods and cones, which possess the power of secreting a substance to which the name of "visual purple" has been given. This substance is bleached by light. It is infinitely more sensitive to its action than the most rapid gelatino-bromide. The image brought to a focus upon this substance, and thus impressed upon it, is at once appreciated by the intellect in a way which is at present not quite understood.

The nerve connected with each rod and cone evidently transmits a message as to the precise state of the "visual purple" in that particular structure, and the brain, by somehow combining these perceptions, constructs a complete ideal picture which, curiously enough, we perceive as erect, although that upon the retina is upside down. That this is the true explanation is probable from the well-known fact that we are unable to appreciate as distinct objects two things which subtend a smaller angle than will cause their images to fall upon any two adjacent cones. The image upon the retina, after having been recognised by the brain (the difference between which events will be the time taken by a nerve wave to traverse the two inches or so of optic nerve), is instantly, as it were, wiped out by the re-secretion of the "visual purple" to be immediately impressed with another picture. Picture follows picture at such short intervals that no break is apparent, and we seem to have before us an everchanging panorama.

The lens of a double-convex form is suspended behind the transparent cornea, having in front of it the iris—an annular curtain which, ever altering its size with every variation of light, acts the part of a diaphragm. The interior of the eye behind the lens is filled with a gelatinous material called the "vitreous humour," which, being transparent, offers no obstruction to the rays of light. The space between the lens and cornea is occupied by water, in which the iris moves freely.

The lens is of such a focal length that in the normal eye parallel rays—and for practical purposes all those rays may be taken as parallel which come from objects more than twenty feet off—are brought to a focus upon the layer of rods and cones. In other words, the retina is situated at the principal focus of the lens. But, to obtain the same thing for nearer objects, a focussing process has been provided to which the name of "accommodation" has been given. By "accommodation of the eye" is meant the power which, by muscular aid, that organ possesses in itself of bringing to a focus on its retina rays proceeding from objects situated at various distances. Its mechanism is as follows:—The lens possesses a high degree of elasticity, and on gentle pressure its form is easily altered, to be immediately regained on the cessation of the pressure. The edge of the lens is set, as it were, in a ring-like muscle, called "the ciliary body." Now, when we look at a near object this muscle by contracting exercises pressure upon the lens that it has in its grasp, and thus, rendering it more convex, shortens its focal length. On again looking at a distant object the muscle relaxes, and the lens resumes its original shape. At the same time that ciliary contraction is taking place the two eyes are converged upon the near object by the two powerful internal recti muscles, which also, by exercising pressure upon the eyeballs, assist accommodation by altering their shape. At the same moment the pupils contract more or less. In short-sighted people, the axis of the eye being longer than natural, parallel rays are brought to a focus in front of the retina.

With this, I am afraid, rather tedious but nevertheless necessary preliminary, I will proceed to the remarks I have to make upon the subject of the present communication.

The light which passes through stained glass is essentially artificial, and, unfortunately for the dark-room operator, red light of all colours is a great deal the most injurious. It is a well-known fact that the blue rays afford by far the sharpest definition of objects seen by them, and the red rays the least; hence, in seeing objects with the aid of the latter, we must either have a much larger quantity of light relatively or we must approach our eyes nearer the object under observation. It being impossible to obtain a sufficiently-large quantity in the dark room one has to employ the latter method, and, in order to get a larger image, approach the object closer than we should have to do in white light. This necessitates, of course, the employment of accommodation by the eye in order to see distinctly; but, owing to the nearness of the object, and the fact that the pupil is dilated to admit as much light as possible, instead of being contracted as in normal accommodation, thus diminish-

ing the sharpness of outline, as any large stop would do, the accommodation has to be carried to a much further extent than usual, and a correspondingly greater strain is thrown upon the eye under these unfavourable conditions. This is further aggravated by the position of the operator, who, to get close enough to the developing tray, bends over his work, causing congestion of his eyes and tending to increase existing myopia, or produce it *de novo*, especially in young people.

How it acts thus will be readily understood from a short study of some investigations made by Dr. Cohn on the condition of the eyes of a number of pupils of schools in Switzerland, and published by him as a monograph under the name of *Untersuchungen der Augen von* 10060, *Schalkindern*, Leipzig, 1867. In these schools, from the disproportion between the height of the desks at which the pupils worked and that of the children themselves, they were forced to bend forwards to write, &c., which, by hindering the return of blood from the eye, produced blood stasis in the choroid. It follows, also, that they were compelled to regard their work from too near a point (exactly as photographers have to do), and consequently obliged to make excessive efforts of accommodation, attended by injurious pressure upon the eye-balls by the recti muscles. These two consequences of a forced and faulty attitude were sufficient to produce elongation of the eyeball with consequent myopia, and in some instances even bulging of the back of the eye—in other words, *posterior staphyloma.* Proceeding to consider the effect of bad lighting, the author found that the proportion of myopes or short-sighted pupils was always larger in direct ratio as a school was situated in a narrow street, as the opposite houses were lofty, and as the rooms were low. These investigations have been continued by Professor Liebreich, the famous oculist, who has arrived at substantially the same results.

To recapitulate: the following chain of events take place:—1. Light of bad quality and quantity. 2. Consequent approximation of the eye accompanied by increased accommodation. 3. Resulting elongation of the axis of the eye-ball, and myopia with congestion of the choroid. These we may regard as the *mechanical* evils produced indirectly by red light upon the eye.

But we now come to the effect produced upon the retina by the quality of the light itself, and more especially by the sudden transition from a very dim light to the full glare of day, which photographers constantly experience when they leave the dark room to examine the negative they have just developed. Illumination generally may be hurtful to the eyes, either by excess or deficiency; and here we evidently have both factors at work, as the light of day, although not excessive to an eye that has been exposed to it for some time, is yet relatively so, in a very high degree, to the eye which has been up to that moment immured in the semi-darkness of the developing chamber. The amount of light which is required to stimulate the retina to functional activity depends very much upon the quantity to which it has become accustomed, and any sudden increase, although it may only be to ordinary daylight, has often been injurious to the sight.

Anyone who has looked for a moment at the sun through a glass insufficiently smoked must have experienced, for some time afterwards, the sensation of a dark spot over some portion of the field of vision. In other cases on record complete blindness has ensued. Professor Arlt records three cases of this description after the solar eclipse of 1851. The difference between this phenomenon and what occurs to every photographer suddenly leaving the dark room is simply a question of degree, and, equally in the latter case, the retina being alternately under- and over-stimulated, its nutrition will be impaired and what is called "amblyopia" will result. This is usually accompanied by considerable loss of sharpness of definition, and by congestion of the optic nerve. It is worthy of note that these injurious effects will be much accelerated by any over-indulgence in alcohol or tobacco, which of themselves are now known in excess to originate analogous conditions of the retina. And now I pass on to the question of colour-blindness.

It is sometimes found that those who work continually by light in which there is a preponderence of the *red* and green rays become comparatively insensible to these colours, so that when they are in white light, or looking at a white surface, they see an appearance of points, lines, or clouds of the corresponding complementary colour. There is a familiar child's book in which the principle upon which these appearances depend is applied to the production of aërial apparitions. The book contains pictures in bright colours, and, after looking at one of these steadily for a time, if the eyes be turned towards a white surface, the same picture appears in the air in colours complementary to those in the book. Assuming the picture to be red, the eye by looking at it for a time becomes insensitive to red rays. It is then turned to the white light, in which it is capable of being impressed with the blue and green rays only. Hence one sees a bluish-green figure, in other respects resembling the red one at which we have been looking. It follows that the eye exposed many hours to a red light may become *permanently insensible* to those rays, and the person consequently colour-blind.

As I find that I have now reached the limit of the space allotted to me, I shall be unable to discuss a subject which I certainly intended to include in this paper. I allude to the well-known action of coloured light upon the emotions. Some time ago experiments were made upon lunatics, who were subjected to various coloured light with certain definite results, and it would be an interesting investigation to determine whether the converse was in any way true when the light acted upon persons who were sane at the time. But, as in order to establish anything certain upon this interesting point, statistics will have to be collected I am compelled to leave its consideration to a future occasion. G. A. Herschell, M.D. (Lond.)

PHOTOGRAPHIC LENSES: THEIR FOCI, APERTURES, AND ANGLES.

[A communication to the Leeds Photographic Society.]

In the short paper which I have prepared for this evening I have endeavoured to bring together some of the more important facts relating to photographic lenses.

We all know that the colour, distance, and position of the object to be photographed will affect the exposure we must give, and that on these points experience and judgment alone can help us. But, so far as our lens is concerned, we can know its power and what it is capable of doing; for, without a perfect knowledge of the apparatus and the instruments we employ, it is impossible for us to have that command over them which is necessary.

The first thing to which I will ask your attention is the "focus." We find several kinds of focus mentioned in optical works and in makers' catalogues. The most important of these is what is known as the "principal focus." The principal focus of a lens is the point to which parallel rays of light are made to converge, and the distance between that point and the lens is the principal focal distance of the lens. It is also the shortest focus a lens can have. It is called the "equivalent focus" in makers' catalogues, because it is the equivalent *principal* focus for parallel rays in a compound lens. An image of the sun is formed at the principal focus, because rays of light coming from the sun are practically parallel rays.

"Equivalent focus" is a term applied to compound lenses. By "equivalent" is meant the focus of the combination-equivalent, meaning that it is equivalent to the distance between the point at which the rays are brought to a focus and a single lens that would give a similar image.

The equivalent focus of a lens will differ in the same lens according to the distance the object is away from the lens. For distant objects, the rays of light coming from which are practically parallel, the equivalent focus will be very nearly the same as the principal focus; but, as the distance is lessened between the object and the lens, the equivalent focus becomes greater and greater, until the distance between them is equal to the principal focal distance of the lens, when the rays of light forming the image are rendered parallel and, of course, not brought to a focus at all. We shall see when considering the apertures of lenses how the equivalent focus will affect the exposure; because, whilst the principal focus distance is fixed, the equivalent focus will differ with the distance of the object.

The focus of a lens determines its rapidity so long as the size of the lens or, in other words, the aperture remains the same, and that rapidity increases inversely as the square of the focal distance. Light, like all radiant forces, decreases inversely as the square of the distance, and thus a lens of eight inches focus would work four times as slow as one of four inches focus, the apertures in both cases being the same, because $8^2 = 64$, $4^2 = 16$ and $64 \div 16 = 4$. Thus we see that lenses of longer focus must have that longer focus compensated for by larger apertures, in order to make them equal in rapidity to shorter-focus instruments.

The size of the image given by any lens depends upon its focus. The magnitude of the image varying directly as the square of the focal distance, a lens of six inches focus gives four times the magnitude of the image that one of three inches focus would. By "magnitude" I mean the *area* covered by the image and not its *linear dimensions*. These will vary directly as the focus; and the image of a church spire which measured three inches in length with a lens of five inches focus would measure six inches with one of ten inches focus. [Photographs to illustrate this were exhibited.]

The greater and lesser conjugate foci are terms used when speaking of the distance between the object and the lens and the lens and the image respectively.

The optical and chemical foci of a lens are the points at which rays of different refrangibility are brought to a focus, the optical focus being situated a little farther from the lens than the chemical focus, which is the point where the rays possessing the greatest actinic power fall. The non-actinic rays of the earlier days of photography—namely, the red, orange, and yellow—cannot be regarded in the same way now as some years ago, because the hyper-sensitive plates of the present day are sensitive to those rays, and it is, therefore, more than ever necessary that a lens should bring to a focus the whole of the rays of the spectrum at one point, or, in other words, that lenses should be perfectly achromatised.

From what I have said it will be seen, so far as photographers are concerned, that on two points only need the focus of a lens specially concern them:—First, with respect to the size of the image, the linear dimensions of which vary directly as the focus, and the magnitude as the square of the focus; and, secondly, that the exposure will vary inversely as the square of the focus if the size of the lens remain the same.

The Apertures of Lenses.—The aperture, stop, or diaphragm of a lens determines the amount of light admitted, whilst the focus regulates the area over which that light is distributed. The amount of light admitted by any stop varies directly as its area. If you make your stop twice the area you admit double the quantity of light. Apertures are usually made circular, and, as the areas of circles vary as the squares of their diameters, it follows that the amount of light admitted by a set of stops will vary as the squares of their diameters; but the larger the stop the less the exposure will be, therefore the exposure will vary inversely as the square of the diameter. This would enable us easily to arrive at the exposure necessary with any stop by simply squaring its diameter if lenses were all of the same focus; but as this is not the case, and we have seen that the focus determines the *area* over which the light is distributed, it is evident that the focus must be an important factor in the calculation.

Now, if a stop have some fixed relation to the focus of the lens, and that relation is the same in two lenses, those two lenses will work with equal rapidity; the shorter-focus lens will have a smaller stop, and thus admit less light than the larger stop in the long-focus lens. But the short-focus lens will distribute the light over a less area, whilst the long-focus lens will distribute the larger quantity of light over a larger area. Stops are often spoken of as $\frac{f}{5}$, $\frac{f}{8}$, $\frac{f}{10}$, &c., meaning that the diameter of the stop may be divided five, eight, and ten times respectively into the focus of the lens; and a stop whose diameter can be divided ten times into the focus of the lens is said to be $\frac{f}{10}$, and will work with the same speed as $\frac{f}{10}$ stop in another lens of different focus. In order, however, to know the different ratios of stops one to another something more is necessary than $\frac{f}{5}$ or $\frac{f}{10}$, because $\frac{f}{5}$ stop will not work half as quick as $\frac{f}{10}$ stop; we must square five and ten, and divide the square of one by the square of the other, when we shall find that $\frac{f}{5}$ stop is four times as rapid as $\frac{f}{10}$—$10^2 = 100$ $5^2 = 25$ $100 \div 25 = 4$; or, to put the rule—the exposure varies directly as the square of the number of times the diameter of the stop can be divided into the focal distance of the lens.

If we take up half-a-dozen lenses by different makers, we shall find that no two will agree in the size of their stops with respect to the focus. In one lens the largest stop will be $\frac{f}{5}$, and in another the largest stop $\frac{f}{14}$, and in each lens the largest stop will be numbered *one.* It is evident, therefore, that the numbers 1, 2, 3, 4, &c., engraved on the stops, mean very little, and, with the exception of showing which is the largest stop, they are absolutely misleading.

In order to arrive at a more satisfactory state of things, a committee appointed by the Photographic Society of Great Britain to consider the subject of lens diaphragms came to the following conclusions:—They ask in future all makers of photographic lenses to accept a lens having an aperture of one-fourth ($\frac{f}{4}$) its focal length as an unit or standard, and to engrave on all stops the number of times greater or less exposure necessary with that particular stop than with the unit stop $\frac{f}{4}$. Take a stop (say) $\frac{f}{12}$.

$$12^2 = 144$$
$$4^2 \text{ (the unit stop)} = 16$$
$$144 \div 16 = 9,$$

or nine times the exposure, and nine is the number to engrave on that stop, whether it be the largest or the smallest stop supplied with the lens. They also ask that apertures should diminish in area to the extent of one-half from the unit stop of $\frac{f}{4}$, and thus make any stop require double the exposure of the next larger stop.

If we accept $\frac{f}{4}$ as our standard, of course there are hundreds of stops in use now which do not diminish as the Photographic Society of Great Britain recommend; and, in order to arrive at their value compared with $\frac{f}{4}$, it is necessary to measure their diameter, divide it into the focus of the lens, square the product, and divide by sixteen. Thus, in a six-inch portable symmetrical the largest stop is $\frac{f}{17}$,

$$17^2 = 289$$
$$289 \div 16 = 18,$$

and eighteen is the number to give to that stop, because it requires eighteen times the exposure of the standard stop. Take the smallest stop in the same lens; it measures $\frac{f}{51}$—

$$51^2 = 2601$$
$$2601 \div 16 = 162 \text{ nearly.}$$

In a five-inch portable symmetrical the smallest stop is $\frac{f}{62}$—

$$62^2 = 3844$$
$$3844 \div 16 = 240.$$

Thus we see that in the same series of lenses the stops vary, although numbered the same.

In the following table I have calculated the exposure necessary with every stop from $\frac{f}{1}$ to $\frac{f}{100}$ compared with the unit stop. The figures which are underlined show in the first column what $\frac{f}{a}$ must be in order to increase the exposure in geometrical ratio from $\frac{f}{1}$, the intermediate numbers showing the uniform system number for any other aperture.

Uniform System Numbers for Stops from $\frac{f}{1}$ to $\frac{f}{100}$.

f	U. S. No.	f	U. S. No.	f	U. S. No.
1	$\frac{1}{16}$	15	14·06	58	210·25
$1\frac{1}{4}$	·097	16	16	59	217·56
1·414	$\frac{1}{8}$	17	18·06	60	225·00
$1\frac{1}{2}$	·140	18	20·25	61	232·56
$1\frac{3}{4}$	·191	19	22·56	62	240·25
2	$\frac{1}{4}$	20	25·00	63	248·06
$2\frac{1}{4}$	·316	21	27·56	64	256
$2\frac{1}{2}$	·390	22	30·25	65	264·06
2·828	$\frac{1}{2}$	22·62	32	66	272·25
$2\frac{3}{4}$	·472	23	33·06	67	280·56
3	·562	24	36·00	68	289·00
$3\frac{1}{4}$	·660	25	39·06	69	297·56
$3\frac{1}{2}$	·765	26	42·25	70	306·25
$3\frac{3}{4}$	·878	27	45·56	71	315·06
4	1·00	28	49·00	72	324·00
$4\frac{1}{2}$	1·12	29	52·56	73	333·06
$4\frac{1}{2}$	1·26	30	56·25	74	342·25
$4\frac{3}{4}$	1·41	31	60·06	75	351·56
5	1·56	32	64	76	361·00
$5\frac{1}{4}$	1·72	33	68·06	77	370·56
$5\frac{1}{2}$	1·89	34	72·25	78	380·25
5·656	2	35	76·56	79	390·06
$5\frac{3}{4}$	2·06	36	81·00	80	400·00
6	2·25	37	85·56	81	410·06
$6\frac{1}{4}$	2·44	38	90·25	82	420·25
$6\frac{1}{2}$	2·64	39	95·06	83	430·56
$6\frac{3}{4}$	2·84	40	100·00	84	440·00
7	3·06	41	105·06	85	451·56
$7\frac{1}{4}$	3·28	42	110·25	86	462·25
$7\frac{1}{2}$	3·51	43	115·56	87	473·06
$7\frac{3}{4}$	3·75	44	121·00	88	484·00
8	4	45	126·56	89	495·06
$8\frac{1}{4}$	4·25	45·25	128	90	506·25
$8\frac{1}{2}$	4·51	46	132 25	90·50	512
$8\frac{3}{4}$	4·78	47	138·06	91	517·56
9	5·06	48	144·00	92	529·00
$9\frac{1}{4}$	5·34	49	150·06	93	540·56
$9\frac{1}{2}$	5·64	50	156·25	94	552·25
$9\frac{3}{4}$	5·94	51	162·56	95	564·06
10	6·25	52	169·00	96	576·00
11	7·56	53	175·56	97	588·06
11·31	8	54	182·25	98	600·25
12	9·00	55	189·06	99	612·56
13	10·56	56	196·00	100	625·00
14	12·25	57	203·06		

Of course the equivalent focus of a lens is lengthened by reason of the lens being taken nearer the object; and, if the focus be lengthened much beyond the principal focus of the lens, the calculated number would not apply, because, having lengthened the focus of the lens, we have increased the area over which the light is distributed, and the uniform system numbers are based upon the principal focus of the lens.

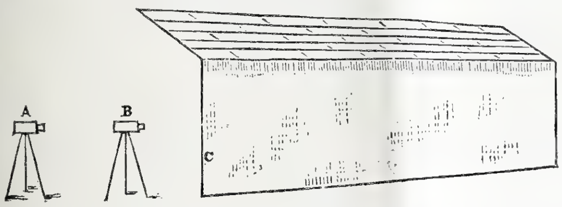
The Angle of View.—The last feature in connection with lenses that I shall deal with is the angle of view embraced by a lens. If we draw lines from the centre of a lens to the margin of the field or disc we shall include a considerable angle, but no lens can be used for photographic purposes up to the margin of its field; we can only use the more central portion, where the image is clearly defined. The brass tube or mount of the lens will cut off a great portion of the useless marginal rays that would otherwise enter the camera, and then in many cases the angle of a clearly-defined picture that can be used is not more than 40° or 50°, except in the case of some special lenses; so that the angle of a lens cannot be said to be greater than the angle subtended by the clearly-defined portion. If we place smaller stops in our lens we secure better marginal definition and get a greater angle of clearly-defined picture; but, of course, a larger plate must be used to contain it.

Perhaps the best way to understand the angles of lenses is to confine ourselves to one size of plate, and see in what manner the angle of view may be extended or lessened, and what effect this greater or less angle will have upon the picture. This can only be done by employing lenses of greater or less foci. A lens of short focus will give us a greater angle of view than one of longer focus, and with the larger angle of view we get an image of smaller magnitude, because, as we have seen, the magnitude of the image varies directly as the square of the focus of our lens; and in order to cover one size of plate with different angles of view we must use lenses of different focus.

Whilst the magnitude of the image varies directly as the square of the focus, it also varies inversely as the square of the distance the object

is away from the lens, and the linear dimensions of the image vary inversely as the distance. This will explain why it is necessary with a short-focus lens to bring the camera so much nearer our object, in order to get any desired size of image, than with a longer-focus lens; and it will also enable us to understand the reason why lenses of different foci give a more or less exaggerated perspective.

If a photograph of a block of buildings, such as C D, be photographed from a point—A being distant from C equal to the length of the block C D—it is evident that the gable D would be represented in the image by half the size of C, because it is twice the distance. Now screw on a



shorter-focus lens, and advance with the camera towards the end C until its image is of the same size as it was when using the short-focus lens. Let us suppose this happens at B, being half the distance A C: it is plain that the end D is now *three times* more distant from the lens than C, and that the image of D will only be *one-third* the size of C, and, therefore, give a more violent perspective. [Several photographs to illustrate this were exhibited.]

In order to secure the best views and the most pictorial and artistic effects, one golden rule must be observed—"Never let your point of view be dictated by your lens." I believe fully one-half of the inartistic photographs taken are owing to neglect of this. A landscape photographer should have at least four lenses of different focus, and his mode of procedure should be just to select the point of view; now draw an imaginary line or frame round the picture he wishes to take in, and then screw on the lens which gives him that picture on the size of plate he intends using. With respect to the angles of the four lenses, I think 20°, 40°, 60°, and 80° would suit best.

Before I conclude I will briefly sum up the points I have attempted to bring before you this evening:—1. That the longer focus a lens is the longer exposure will be necessary, unless the longer focus be compensated for by a larger aperture. 2. That the exposure will vary as the square of the focus. 3. That the linear dimensions of the image vary directly as the focal lengths of the lenses. 4. That the magnitude of the image varies directly as the square of the focal lengths. 5. That the exposure varies directly as the square of the number of times the diameter of the aperture can be divided into the focus of the lens. 6. That if the number obtained by this calculation be divided by sixteen, we obtain the uniform system number for the stop. 7. That lenses giving a wide angle on one plate may only be narrow-angled instruments if used on a smaller one. 8. That the linear dimensions of the image vary inversely as the distance between the object and the lens. 9. That the magnitude or area of the image varies inversely as the square of the distance between the object and the lens. 10. That wide-angle and, consequently, short-focus lenses give a more longer-exaggerated perspective than focus lenses.

S. A. Warburton.

"HOW IT'S DONE."

In Three Parts.—Part II.

Gelatino-bromide dry-plate makers have so cautioned their customers not to over-expose (to which almost every fault has been referred) that there is a danger of going to the other extreme and not exposing sufficiently—a worse fault by far than the other. If, out of a batch of plates having received similar exposures, one is tried and found over-done it is the key to the development of the rest, and indicates a less energetic or more restrained developer to secure good results on the rest. But with under-exposed plates no dodging whatever will make a rich printing negative. The negatives may have detail, but not of a printing quality, and intensification only makes a harder print without adding richness. To get quality and atmosphere a negative *must be fully exposed*, be it wet collodion or dry gelatine.

To be fairly well acquainted with the locality you intend to work in is important. If possible, go over the ground notebook in hand, jotting down the most suitable spots and their position as regards the sun before taking the camera; this will be a great advantage when the time comes for working. Sometimes, however, this is impossible or inconvenient, and the best has to be made of the first visit. Let us suppose a case. A certain locality is fixed upon, the map consulted, and the general features of the district conned over. A good survey map will suggest a fairly-correct idea of the views to be expected and the position of the sun with regard to them; anything else, of course, depends on circumstances, and must be decided on the spot. Suppose there is a river, probably more effective views may be had looking up rather than down the stream. The foliage, weeds, plants, and greenery generally have the more perfect and best appearance on the side that receives the most light; so in the selection of a foreground this may be borne in mind, for in many instances the beauty of the picture depends very much on this part of the subject. A good foreground is often a picture in itself, and is always of sufficient importance to merit the utmost care in selection. One very important matter, in my opinion, is the introduction of figures; they should always, if possible, be brought into the landscape somewhere or other. Nothing is more useful to vary the lines of a landscape and impart life to it than figures, either of human beings or animals, or both. Persons in ordinary fashionable clothing are, however, not so well, for two reasons:—Firstly, they are not sufficiently picturesque; and, secondly, they *date* the picture, as fashions change in course of time and look out of keeping with the surroundings, however well they may be supposed to have appeared at the time the negative was taken.

If you have no choice—either modern figures or none—try to render them as picturesque as possible. A gentleman may be prevailed on to take off his coat and hang it over his arm, or a lady may use a sunshade with advantage, as much as possible destroying the formality of a properly-dressed person. If, however, you can press into your service a genuine cottager or two, persons of the labouring class, they lend themselves to the composition of the picture better than any other figures. Female fashions of the present day are now, perhaps, as varied and unobjectionable, from an artist's point of view, as for many years past, and occasionally very little, if any, exception can be taken to the costumes; but the dress of cottagers is *sui generis*, and half-a-century makes very little difference, never seeming out of keeping, but always harmonious and pleasant to look at in any landscape whatever. And children, too, are exceedingly useful, from the artist's point of view; perhaps more so than their elders. What would the majority of Birkett Foster's charming sketches be without the children? As a rule, there is a naturalness about country children that is an important quality in picture-making. It, therefore, behoves the photographer to be pleasant and winning in his manner towards them; and, as a rule, he can get them to pose and arrange themselves with very little trouble, taking care not to ask them to remain still till the last moment, for they soon get tired and fidgety, and the fact of long trying to remain quiet has just a contrary effect, or produces a stiff, unnatural pose.

Any figures are, however, better than none if a long road or avenue form part of the subject; for I do not think that anything in photography is more unsatisfactory than a large expanse of empty roadway coming up to the foreground of the picture. I have found as a rule that persons, whoever they may be, are ready to assist the photographer if politely requested, and many take a great interest in doing so. There may be a spice of vanity at the bottom—perhaps there is; but it is not worth while investigating the cause if the effect be good. At the same time, I quite believe many submit to be photographed out of pure good-nature.

Figures at varying distances have always an excellent effect, taking care to avoid placing them too near the camera, unless it be intended to make them the principal points of attraction, and the view merely accessory. Nothing is more objectionable than a meaningless figure on a large scale. Figures so placed are rarely sufficiently sharp and defined in this prominent position, and invite criticism; in fact, the picture which was intended for a view loses its character and becomes more or less of a portrait with a landscape background, and as such requires all the study and arrangement of one to make a passable production, which, after all, is not wanted. These facts are sufficient to indicate the advisability of keeping the figures subservient to the landscape, so that a slight movement or wrong pose will not much damage the work.

In all cases give your models something to do. Do not let them range themselves in a row staring into the lens, as is a habit with the unconventional yokel. A word or two properly spoken will soon arrange little difficulties of this sort, and you may set to work exposing with satisfaction.

One great temptation when out for a day with the camera is to expose the plates whether the subjects are good, bad, or indifferent, or whether the light is right or wrong. It is a great mistake, although I must confess to having been beguiled into it more than once, knowing perfectly well that if the subject do not *look right it will not photograph right*. It may come out better than you expect—still just a little something else not there would have made a picture; and you have the questionable pleasure of looking at a photograph that has just missed being a good one. If the light had been different, if the foliage had been still, if just something that you knew perfectly well at the time was wanting had been present, you would have secured a gem; as it is, its a failure, neither more nor less. If you are making the trip to merely test different makes of plates that is another thing; but if you are intending to make pictures all I can say is—do not expose a plate unless you are satisfied with the subject.

There is some diversity of opinion as to whether the best results are obtained with sunshine or without; for my own part I think views taken with sunshine are incomparably the best, providing a sufficient exposure has been given. Many negatives are spoiled for lack of a sufficiency of exposure, for often a sunshiny subject requires a longer exposure than one without. You may rely upon it that if a landscape *looks* best in the sunshine it will photograph the best picture. A negative taken in a dull light requires a little more intensity than one

taken in a bright light, the extra density compensating in some measure for the lack of light. Care must, however, be taken not to overdo it, or a hard picture will result. EDWARD DUNMORE.

THE AUTOTYPE OR CARBON PROCESS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

It is not my intention this evening to occupy the time of the meeting long with matters of theory. The process is one very well understood, and besides there are many here to-night who were present eighteen months ago when Mr. Green, of Berwick, gave his paper and demonstration, and who, like myself, have not forgotten the pleasure it afforded us. To benefit, however, some who were *not* present then, or to whom the process may be new, and last, but not least, to fill up a gap, I come forward to-night.

I will briefly run over the derivation and principles of the process. The term "autotype" has been and is understood to mean generally the reproduction of a photographic picture in a permanent pigment, such as those used by artists in water-colour, crayon, or pencil.

Mungo Ponton first observed the peculiar action which light has upon the bichromates, especially those of potash and ammonia, when exposed to the actinic rays of light in contact with organic matter.

Becqueral showed that *sized* paper acted much more readily than *unsized* under such action; hence the association of gelatine or gum with the bichromates.

Poitevin found that if a pigment were mixed with the compound of gelatine and bichromate, and then exposed, the pigment became enveloped in that portion of the gelatine thereby rendered insoluble, and that it could *not* be removed by washing in water. By availing himself of this property he succeeded in obtaining the first photograph in pigment.

From these experiments, improved upon in detail and subsequent working by numerous eminent photographers—amongst whom should be mentioned the names of Swan, Johnson, and Sawyer—the autotype process has been derived and perfected.

Carbon tissue (so called from the fact that Indian ink, a pure carbon, enters into the composition of most of the tissues made) consists, then, of a paper coated with a composition of gelatine, pigment, sugar, glycerine, and water. Full directions for making the various tissues may be found in Captain Abney's work on *Photography;* also in an excellent paper by Mr. Annan, published in the photographic journals of January 19th of this year.

Tissue is sensitised by immersion in a bath of bichromate of potash, one part, and water twenty parts. It should remain three minutes, be then removed, and laid, face downwards, on a piece of plate glass. A squeegee must be past over the back to remove excess of moisture, and then the tissue suspended to dry in a pure atmosphere and in perfect darkness. A temperature of about 70° is required. Tissue sensitised at night should be dry by the morning. My own plan is to sensitise the last thing at night, after the gas has been turned off, and the room—preferably the kitchen—allowed to purify somewhat by letting a free current of air pass through for a short while. After the tissue has been squeegeed, I lay it, face upwards, on a sheet of white blotting-paper and place it on a cupboard shelf to dry. I have no arrangement for suspending the tissue. In the morning, before anyone else is up and while still dark, I go into the room, collect the tissue, now dry, and place it away in a safe place free from *damp, light*, and as far as possible free from *air*.

Before exposing, the negatives must be prepared. A narrow strip of paper is gummed round the edge of the negative to the extent of an eighth or quarter of an inch. This forms what is called the "safe edge." It is this which prevents the picture from being washed off the plate during development. I do not myself find it necessary to put any paper on my negatives, they not being of large size. I cut the tissue as nearly as possible the full size of the frames, and the width of the rabbet forms quite a sufficient safe edge.

The tissue, already cut to size, is placed in the printing-frame in the usual way, and exposed to light. As, however, the progress of the printing cannot be watched, as is the case with silver prints, an actinometer must be used. [One shown.] This is an arrangement which allows a very small piece at a time of silver paper to be exposed to the action of light. This actinometer, being exposed to the light at the same moment as the tissue, is watched, and when the piece of silver paper has arrived at the colour of the surrounding disc this signifies what is called a "tint." Some negatives requires six or seven tints, though I must say I have never met with such. Of course, in practice, a standard negative is chosen and tested. When the correct exposure by means of tints is acquired the negative is marked, and other negatives being compared with it for density, it is, comparatively speaking, easy to calculate the amount of exposure necessary.

As will be seen further on, under- and over-printed prints may be so developed as both to produce passable pictures, although in carbon, as well as in other methods of printing, correct exposure is necessary for the production of perfect pictures.

It is as well to remark here that bichromatised tissue is much more sensitive to light than silver paper. A negative requiring twenty minutes to produce a good print in a fair, diffused light, will give as good a print in from ten to twelve minutes in carbon. It must not be forgotten, also, that the action set up by light continues after the tissue has been removed from the frame. A picture under-exposed today will be found fully exposed tomorrow, and over-exposed the day after. Advantage is, of course, sometimes taken of this. I have a picture here which was exposed a very short time—three minutes only; the same time with silver paper would have hardly made an impression. It was developed four days after exposure, and was by that time fully exposed, yielding a passable print. I will show this later on.

Development.—If single transfer pictures are desired single transfer paper must be used. This is paper coated with a compound of gelatine and chrome alum. A piece of this paper cut a size larger than the exposed tissue is, together with the tissue, immersed in cold water, the two surfaces brought into contact in such manner as to prevent air-bubbles, the two removed as soon as the tissue loses its rigidity, laid upon a glass plate, and a squeegee passed over them—gently at first, then more strongly—in order to bring the two surfaces into intimate contact. After an interval of a few minutes they are placed in a bath of warm water—say of a temperature of 90° to 110° Fahr. In a minute or two the coloured gelatine will be seen oozing out from under the edges of the tissue; the paper must then be taken hold of by one corner and drawn off under water, leaving on the transfer paper a dark, soluble, and slimy mass, under which lies the insoluble picture. The soluble matter must be washed away, using water more or less warm, as occasion requires.

If the picture appear under-exposed, tepid water will be sufficient to finish the development; if over-exposed, hot water will be required, and the development may take longer time for completion. The picture is removed to a bath of alum one part, water thirty parts, and allowed to remain fifteen minutes. It is then washed in clean, cold water and suspended to dry. Photographs intended for book illustration may be developed on the paper direct, thus avoiding the inevitable cockling. The great objection to single transfer pictures is that reversed negatives are required. By the use, however, of the reversing mirror, devised by the Autotype Company, this objection is to a great extent removed.

In the double transfer process the tissue is squeegeed on to a piece of opal glass, or a piece of Sawyer's flexible support. In the former case a piece of opal glass is cleaned, and then rubbed over with a little French chalk, or a waxing compound may be used, which answers for glass as well as flexible support; or the plate, already waxed, may be coated with thin collodion. In any case, however, the support, rigid or flexible, must be immersed in water before affixing the tissue. Development is conducted in the same way as before described.

The picture, washed and dried, is spotted or touched up if necessary, and is then ready for removal to its final resting-place. Double transfer paper—prepared in the same way as single, but with less chrome alum in its composition—is used, and a piece cut a size larger than the picture and placed in hot water until the surface has a soft and slimy feel. It is then removed to a bath of cold water, where it may remain until required.

The plate bearing the picture is immersed for a second in cold water, removed, and the transfer paper laid gently, face downwards, over the print. A piece of india-rubber cloth is laid over the transfer paper, and the surface of the latter brought into close contact by means of the squeegee. When this is done the plate is reared up on end to dry thoroughly. When properly dry the print may be peeled off without difficulty.

It follows, of course, that if bare glass be used to develope upon, a transparency is the result. In this case the tissue should be a specially-prepared one, and the exposure should be nearly double that required for a print. Tissue may be developed upon a variety of surfaces, such as opal and ivory, as a basis for miniature painting; drawing-paper, as a basis for work in crayon or water-colour; canvas and panel, as a basis for oil painting; and on wood blocks, for engraving. It is thus, as will be seen, adapted to a variety of uses.

I had intended showing the development of some transparencies, but I found it would take more time than we can well spare in one evening.

J. PIKE.

ROUND THE WORLD.

No. II.

I HAVE found the air of New Zealand to be remarkably clear, even more so than that of Italy. I have often been struck by the wonderful distance at which sounds can be heard and conversation maintained in this country. People shout to each other when separated by distances that would entirely annul the air-vibration produced by the human voice at home, and the well-known colonial "coo-ee" can be heard in cases where I should have deemed it impossible. I suppose the actinic force of the light is equally superior to what it is at home, and even in Italy; but I have no means whereby to compare with any accuracy the different chemical effects, as I am using new batches of plates and giving proportionately longer exposures, modifying, of course, my development to meet such circumstances. One would expect to see some

arked effect on the general photography of the colony, but I cannot y that I see any great difference between home work and that oduced here.

In Dunedin I certainly saw some very fine small landscapes produced Messrs. Burton, and these were good enough for *anything;* but, king the general run of show-cases, I judged the work to be much e same as it is in the better-class establishments at home. Colonial otographers have taken most kindly to gelatino-bromide, and in any cases have adopted it to the total exclusion of all other processes. Auckland I found a firm (Messrs. Hemus and Hannay) making their n plates and developing them with sulpho-pyrogallol. The negatives saw were most satisfactory—fine density, clear shadows, and ample tail. I may have more to say on these matters as I proceed with y itinerary.

February 26.—We left Dunedin by train for Port-Chalmers. I was r from satisfied with myself in the matter of work in Otago. My ans had been frequently upset by rain, sometimes by wind, and gularly by the ill-health of my companion. Several newly-acquired unedin friends saw us off, and we went on board the Union Steamship ompany's boat "Hawea"—a small boat, but not at at all crowded; fact, we were most comfortable on board.

February 27.—Arrived at Port-Lyttleton, and took train for Christ-urch in order to see what was described to us as a delightful place. suppose we must have been unfortunate in the time of our visit, for seemed to us "dead-alive," and not at all prepossessing in situation appearance. I am, however, assured that it is a lively and pretty wn—I beg its pardon—city.

February 28, *Noon.*—We landed at Wellington, the seat of the overnment of New Zealand. Approaching it by the harbour we were once struck with the beauty of its position. The city lies along the aboard of a pretty bay, the back part consisting of villas standing on e brows or nestling in the hollows of a handsome and steep range of lls. The Government and Parliament buildings, as well as several urches and business edifices, at once catch the eye, as much from eir size as from the style of their architecture. The principal part of e city is but little above sea-level, having, indeed, been "reclaimed" one time or other from the domain of the waves; and on each side of e city are suburbs which, though honoured with distinct names, seem be really only parts of one grand whole. From end to end of the ty and suburbs must be (for a guess) two miles and a-half. The whole (roughly) half-moon-shaped, with a considerable inside depression. the right stretches the Hutt Valley. At the end of this many miles ay may be seen, if I mistake not, the fine Wairarapa range of ountains.

The matter that first attracted my attention was that, with very few ceptions, the houses, churches, and edifices of every kind were built wood. The Parliament House is said to be the largest wooden ection in the world; and a Roman Catholic church near it is not only rge, but built in a distinct and well-executed style of architecture—odern Gothic, I fancy—buttresses and all being carried out exactly if the building were of stone; in fact, till close to the church I could t believe but that it *was* of stone. The reason for all this wooden ilding is that at Wellington earthquakes are frequent, and have en—as in 1848—very severe, and wood is easily procured.

Almost all the buildings have roofs of corrugated iron, and not a few rge buildings, such as warehouses, seem to be built entirely of that aterial. Our first visit was to the museum, where we got a very fair sight into the mineralogy, zoology, ornithology, conchology, and any other "logies" of New Zealand. Of great interest to me were veral birds of which I had heard, but which I had never seen. ere is a leg bone of the gigantic bird—the Moa. The bone we saw s more like that of an ox than of a bird, and, indeed, this bird has en known to reach the height of ten feet. I also noticed specimens the "Kiwi" or Apteryx—a bird about the size of a chicken, without ngs or tail, and with plumage resembling stiff hair more than thers. This is an "eccentric little cuss;" its legs seem to be a long y behind where nature intended them to be.

In this museum, besides great numbers of things I cannot mention re, there are a lot of Maori curiosities, and photographs of very much ttooed chiefs and women. I may here mention that in the country it is t very easy to get an old Maori to sit for his portrait; they have not t quite got rid of the idea that Taipo (the devil) is inside the camera. rther: the rising generation have in a very great measure given up fashion of tattooing; so, up to the present, I have not been able to a proper Maori portrait. I certainly did achieve a good negative two Maori girls, but they are not ornamented at all as to the faces. *ropos* of this I heard rather a good story lately from the hero of the ry itself, or, rather, the victim of the story. On the 17th of every nth the Maories hold their "Sabbath." The chief ceremony seems consist in devouring an enormous pile of viands, and washing the nds down with a proportionate quantity of "wai-piro" (liquor, as posed to "wai-Maori," water). They heap up the food in a long k—pigs below, then shark, then potatoes; I believe that is the ler. On the occasion in question the bank of food was many feet g and four or five feet high. Our photographic adventurer was ing to get a view of this succulent pile of "sweetness long drawn out," when a native discovered his design and "made tracks" for him armed with a cooked shark, and the ambitious photographer had enough to do to get away with skin and camera whole. The native thought if the artist had his will of the food it would be bewitched and poisoned. This sort of superstition, however, is fast dying out.

There are among the Maori race a great many traits that I like. They are far superior in intelligence to some peasantry I could point out in Great Britain; the men still more superior in physique, and the women in "breeding." The hands and feet of many Maori women would not disgrace our noblest ladies either in size or shape, yet gloves are unknown, boots extremely rare, and hard work universal. The real Maori belongs to the brown Polynesian race; and they are probably correct in saying they came originally from some island of the Samoan group. Their colour is not very pronounced, but their lips are apt to be thick and their cheek-bones high.

Many of the men are of fine build, and they show a natural aptitude for horse-riding, but they never walk if they can avoid it. So far as my experience goes they are perfectly honest. A closed door is to them tantamount to a locked door; and, where dishonesty has been alleged or proved against them, a "pakeha-Maori" (stranger-Maori) has generally been at the root of the affair. These pakeha-Maories are mostly white men who have taken Maori wives for the sake of their property, and live among their wife's relatives. Property and money among the Maories descend through the female and not the male branch. A husband possesses property in right of his wife only, and the heiress of a deceased mother is her daughter. Young women do little or no hard work; old women are beasts of burden. All the work is done in summer. Once they have their maize stored or sold, and food collected for the winter, they seem to hibernate; at all events, they take life very easily during winter. Half-castes are frequently singularly handsome—I know several examples of this both in men and women; but mixtures of half-caste and white, or half-caste and Maori, are signal failures. However, this chapter begins to remind me of Mark Twain's *On his Ascent of Mount Vesuvius*, so I must "hark back" to Wellington and fix my attention on it.

After "doing" the museum we went to see what the Wellingtonians are pleased to call their Botanic Garden. If a hill side covered with "scrub" and a few plants and shrubs can be called a "botanic garden," then there is no mistake in the present case. I saw a good many plants that I recognised as growing in my own cool greenhouse at home: *hydrangeas, coprosma, mesembryanthemum, eliagnus,* and something I took for *poinsettia.* But the view from the top of the hill was magnificent: the white houses of the town glittering in the sun at our feet, the fine bay, and the Hutt Valley stretching away to the Wairarapa Hills in the distance. I regretted very much having left my camera in the hold of the "Hawea;" but before this reaches England I shall, I hope, have again visited Wellington with my camera and some good plates.

On March 1st we left Wellington, touched at Picton and Nelson, and, after a roughish night, got landed at New Plymouth, Taranaki; and with New Plymouth we reached what I may call the end of the first part of my journey. *The* object of the district is certainly Mount Egmont, an extinct volcano over 8,000 feet high, and, therefore, considerably higher than any hill in Britain. Taranaki was, I believe, originally colonised by immigrants from Devonshire; the dialect of that county is distinguishable to this day. The province suffered severely during the Maori war, and is, consequently, rather behind the rest of the Island in advance; but land is, perhaps, cheaper in proportion to quality than in any other province of the country. New Plymouth requires no special mention; the most important point about it is a breakwater in course of construction about two miles from the town. Whether this is the proper situation for the breakwater or not is a "burning question" among the inhabitants.

On the 7th of March I left New Plymouth on horseback, rode ten miles to a small township (Waitara), met a brother of mine who has settled about fifteen miles from Waitara, and rode home with him next day to his mansion called "Pukekohe"—a wooden "whare" (hut), near the bank of the river Mimi, and commanding a sublime view of Mount Egmont and a long stretch of seashore and bush. I did not expect, and was prepared to dispense with, luxuries during our stay at an "up-country" station; but I was surprised to find the primitive, not to say uncomfortable, style of life at such a place. The "whare" was nothing like wind- or water-tight; it was unpapered and unpainted. There was no bed nor sheet in the establishment, we slept on stretchers, and for sheets used tent-canvas; for blankets, rugs; and for pillows our own clothes.

Our feeding was of a kind to disagree with an average alderman, consisting of mutton, mutton—always mutton; the said mutton being killed by my brother, and cooked sometimes before it was cold, sometimes after it was "high." We never had butter, and often no milk. Of course we did all the cooking ourselves; my brother usually played the *rôle* of butcher, his cadet—nephew of a Bishop of the English Church—did the cooking, while my *métier* was to dig and cook the potatoes. And I enjoyed it all! Mr. Arnold is quite right: *Fames optimum condimentum est.* Just as Mr. Arnold's adjective agrees with its substantive in case, so the food suited *our* case; as to the number

and gender of our sheep they made no difference so long as we had plenty and they were not *very* old rams.

We rise with the sun, and from daylight till eve
 We do what we have to do;
Most refreshing of fun, when our day's work is done,
 Is to bathe from a Maori canoe.

Such was the burden of our song. We had sheep and cattle to look after, ditches to dig and banks to put up, cows to milk, cooking and washing to do. A day of such work tends to give one a pretty fair appetite, and a pleasant heaviness of the eyelids after the evening meal, which, by-the-bye, cannot be called tea in particular, because tea is the standard drink at breakfast, dinner, and supper. Our luxuries were sardines and fresh eggs; which I used to carry from the nearest township on horseback carefully stowed away in pockets in various parts of my dress. More of New Zealand in my next.

I shall deliver this in person at Liverpool, so that by the time this appears in print I shall have completed my wanderings for a time. I have over 100 negatives to develope, and I beg the good wishes and sympathy of my photographic brethren during the next week or two.

ANDREW PRINGLE.

VIGNETTES AND VIGNETTING.

Of the various styles in which photographs are produced none approach in delicacy and neatness to the vignette, that is, supposing the said vignette to be a well and artistically graduated print from a good negative and with a suitable background. It is by no means pleasing, however, to gaze upon a harsh or badly vignetted print, the production of which is, unfortunately, only too common an occurrence. Not one-half of the vignetted prints in existence will bear any amount of aristic scrutiny. Here we find one with the vignetting partaking more of the nature of a medallion, so closely approximating to sharpness is the boundary between the background proper and the paper unacted upon by light. The next which draws our attention has one shoulder of the figure well defined, whilst the other melts into an imperceptible nothingness. Here is one which merely shows a head and neck, as though the model had kindly consented to decapitation "for this occasion only" prior to his being immortalised on paper; but the lack of body is made up for by an excess of background over the head, which does not, however, compensate for it—at least not to our ideas. Then we come across specimens vignetted too low and showing a dim and misty image of ghost-like hands resting upon equally ghost-like knees, and in many a case the careless vignetter prematurely ages his patrons by producing their portraits with the hair of a beautiful grey, which effect is, of course, caused by too small an aperture in the vignetting mask.

All these assorted samples of bad or defective vignetting, and doubtless numerous others of like nature, have often ere this forced themselves upon the unwilling (perhaps too unwilling) notice of the much worried and inwardly groaning photographer, and often has the printer paid the penalty of his carelessness and made way for another, who, in all probability, commenced at once to perpetrate the same kind of abortions.

Nor is it in all cases the fault of the printer that bad vignettes are produced by him, for much depends upon the nature and quality of the appliances handed over for his use and with the aid of which he is expected to produce unexceptional work. He who expects his printer to produce good and even vignettes with no other appliances than brown paper, a pair of scissors, a pot of paste, and an ounce of cotton wool is likely to be hugely disappointed; for, although occasionally a good vignette may be produced with a brown paper mask, it is a great rarity, and more owing to good luck than good management. It is, however, quite futile to continue any farther in pointing out the way *not* to produce good results, so I had better at once proceed and explain how *to do* it.

One of the very best arrangements for vignetting purposes is a frame made specially for the purpose and, I believe, sold by most dealers, though I cannot recall the maker's name. It is very much of the construction of an ordinary pressure-frame, but the sides rise three or four inches from the front of the *clichés*, and through slits in these sides is inserted a flat piece of board with a deeply-bevelled aperture. The high sides prevent side or raking light spoiling the symmetry of the vignette, whilst the deep bevel ensures perfect gradation; in fact, in vignettes printed in this frame, one will find it quite impossible to discover where the picture terminates and the white background commences. This is, without doubt, the best vignetter extant (the manufacturer may use this as a testimonial if he please); but it has one drawback—it is expensive. I do not think that the question of expense should be considered at all in the matter; but there are, doubtless, many whose capital in hand for outlay is not large, and they would, perhaps, prefer to use what I call the Brunswick-black process.

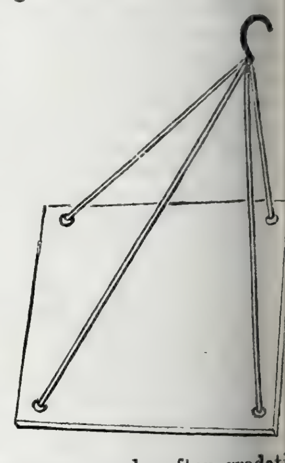
This is managed as follows:—Paste a square of white tissue-paper over the front of the ordinary pressure-frame, and when the paste is dry the paper will be found stretched like a drum. Put the negative in the frame, and, holding it up to the light, draw on the tissue-paper with a brush filled with Brunswick black the outline of the vignette, and block out the remainder of the paper with the same materials. Then with a piece of cotton wool lighten the black at the edges neares the centre, and you have a first-class vignetting arrangement which wil give fine gradation, and which will print equally as well in the sun a in the shade. In a very dull light the rapidity of printing can b increased by gumming the clear part of the tissue-paper.

The French vignetting glasses are in use in a great many studios but they have one or two drawbacks:—Firstly, the glasses are too small and, secondly, the yellow part of the same is not sufficiently opaque The better mode of using them is to glue the glass between two piece of cardboard, cutting out the centre of the card rather larger than th clear part of the glass, and, of course, having the card sufficiently larg to cover the whole of the pressure-frame. In some cases I have foun two glasses of different sizes superimposed one on the other to produc very good results indeed, as the graduating comes much softer an more even than when a single glass is used.

Re the vignetting papers, I will not say much. I have seen goo results produced with them, but, personally, I do not like them, an should not care to recommend their use. I may say here that I refe to the French papers, never having tried the English makes.

I have also seen splendid vignettes produced with a simple cardboar mask, with an aperture in the centre, from which a large number radiating cuts are made. The cuts should be made with scissors, an of a good length, care being taken to have them very close together; cut properly, the aperture will form a deep bevel by the very operatio of cutting, and if it do not it can easily be bent into one, and firs class vignettes can be produced by its aid. It is, perhaps, the simple of all the modes I have recommended, but the cards require caref usage, as if one of the long "teeth" gets broken off the mask practically useless—a thin pencil of light passing through the apertu and producing a peculiar, but not to-be-aimed-at, result.

With any of these appliances, *plus* a modicum of "*nous*," an average printer should be able to produce good and effective vignette but to further assist him in the matter and reduce all chances of failure to the minimum, I would strongly recommend the use of an additional piece of apparatus on which to place the frames whilst printing. No special outlay is necessary to procure this, as anyone can make it themselves, like the man's fiddle, out of their own heads, and, perhaps like him, have wood enough left to make another. The appliance in question consists of a square board with pieces of strong worsted, or even string, at the corners, and a hook at the top for affixing it to a beam or anything handy. The frames are placed upon the board and it is then given a twist, when it will continue rotating for a length of time, obviating the necessity of frequently turning the frames, and giving a more even and softer gradat than could be obtained by the ordinary method of shifting and turni



In a three-quarter vignette the gradation should extend further th in a bust; in fact, to the very edges of the picture, as a much nicer a more artistic effect is obtained thereby. The subject of greyed, cray or mezzotint vignettes, together with other modes of fancy vignetti I leave for a future occasion.

C. BRANGWIN BARNES

UPON COMPOUNDS OF NITRATE OF SILVER AN AMMONIA.

I. PRECIPITATION OF NITRATE OF SILVER BY AMMONIA.

A solution of nitrate of silver which contains a considerable exces of acid gives a clear mixture with any proportion of ammonia. But if the silver solution have a neutral or only slightly-acid reaction a distinctly-perceptible turbidity sets in with the addition of the first drop of ammonia. The colour of the precipitate is frequently white at first, but, under the influence of light or of a further addition of ammonia, it is very soon converted into a brownish black.

The quantities of the precipitates obtained under various conditions have been ascertained by numerous experiments. The brown precipitate was purified by prolonged washing with water, alcohol, and ether, and dried at a low temperature. It showed on analysis the following composition:—

Ag	91·38 per cent.
O (computed by silver)	6·77 ,,
H_2O (hydrating water)	1·30 ,,
NH_3 (qualitative)	—
NHO_3 (qualitative)	traces
	99·45 ,,

It is easy to see from the above table that the precipitation effected by ammonia in nitrate of silver solutions is always very incomplete. Even in favourable circumstances, when there is a molecule of $AgNO_3$ a

olecule of NH_3, only about six or seven per cent. of the silver esent is in the precipitate.

For the re-solution of the precipitate a little more ammonia is quired than is expressed by the proportions $Ag NO_3 + 2 NH_3$. The ucial point is, however, difficult to seize, as the solution at length pears densely turbid, and only clears up perfectly very slowly.*

If to a few cubic centimetres of a silver solution a quantity of nmonia be added which is insufficient to produce the maximum of ecipitation, and if one then filters off the precipitate produced, a ear solution is obtained which can no longer be directly precipitated ammonia.

With 15 c. c. of the silver solution and 2 c. c. of the equivalent nmoniacal fluid a filtrate is obtained in which no further precipitate produced by several cubic centimetres of ammonia. This observation so much the more surprising that previously every increase of the iantity of ammonia (up to the degree of maximum precipitation) was llowed by an increase in the weight of the precipitate.

II. Silver-Ammonium-Nitrate.

A solution of nitrate of silver, to which ammonia had been added ntil the maximum point of precipitation was reached, was filtered off om the deposit and placed on the water-bath to evaporate. The apour developed had no ammoniacal smell. A brown deposit ($Ag O$?) ıd a metallic mirror formed at the bottom of the porcelain dish. By ır the greater part of the silver salt remained undecomposed in soluon, but was very difficult to crystallise. By the experiments I made finally obtained a fluid which, with a weight of 116 grammes, occuied only a volume of about 37 c. c. This, however, stiffened when it ooled into a magna (*i.e.*, a thin paste) of colourless, shining, crystalline eedles, which were washed with alcohol and with ether and then ried at a low temperature.

The substance so obtained blackens when exposed to light. In water is only partially soluble, a certain portion of the silver being thrown ff as a brown deposit. It is pretty easily taken up by alcohol, but ther takes up but very little of it. So that if an equal volume of ther be added to a cold, saturated, alcoholic solution, a magnificent rystallisation of shining needles is obtained, which, when washed with bsolute ether and freed, by a current of dry air, from the washing nedium, represents the pure substance. These crystals are also only artially soluble in water, and become black when exposed to light, ut may be kept in the dark quite well. They usually occur as eedles, but by extension in a sideward direction they may also ppear as laminæ. When analysed they had the following composiion :—

	As found.	As computed for $O_2 NO NH_3 Ag$.
Ag	57·63	57·75 per cent.
NO_3	33·10	33·15 ,,
NH_3	9·15	9·10 ,,

The silver was precipitated from the nitric-acid solution of the subtance as chloride of silver and weighed.

To determine the ammonia, the silver in the aqueous solution of the ubstance was precipitated by neutral sodium chloride, and the alkaınity of the solution tested by means of normal sulphuric acid. If the ilver be left in the solution during this volumetric analysis, the colour eaction of the litmus tincture is very indistinct.

For the determination of the nitric acid the aqueous solution of the ubstance was precipitated with excess of normal potassium ley, and he silver oxide removed by filtration, and the ammonia by evaporation. The refiltered-off solution was then neutralised with normal sulphuric cid, and the nitric acid computed from the difference (c. c. ley, c. c. cid). The simplest formula which can be taken for the analysed salt s, of course, that of a silver-ammonium nitrate: $(N Ag H_3)—NO_3$. This view may, perhaps, be proved by the action of the new compound ipon ethyliodide.

III. Provisional Communication.

A somewhat concentrated solution of silver ammonium nitrate was ubjected to dialysis. On the under side of the dialyser, therefore, urrounded by water, white needles formed, which, when washed with lcohol and ether and dried at a low temperature, possessed 77 per ent. of silver contents. Argentic ammonium hydroxide attained to 76·06 per cent. I had only a very little of the substance at my disposal, nd that had become somewhat grey by exposure to light. Silver mmonium nitrate, in aqueous solution, immediately gives with conentrated aldehyd a white, crystalline precipitate of argento-aminaldeıydrate (?) The compound is very soluble in water, rather soluble in lcohol, and almost insoluble in ether. It becomes black when exposed o light, and is decomposed by heat under 100°.

* Commercial crystallised nitrate of silver was usually employed for working with. That salt contains 63·46 per cent. of Ag. As a check the experiments were repeated nd confirmed with nitrate of silver prepared from pure silver. The solutions given n the table as neutral really had a slightly-alkaline reaction. One drop of the normal cid (0·03 c. c.) sufficed to render 50 c. c. of the silver solution used distinctly acid. Finally, it may be remarked that the quantity of the precipitate does not depend xclusively upon the number of cubic centimetres of nitrate of silver solution and of mmonia that are mixed, but also to a certain degree upon the process. If the preipitant be dropped in very slowly while the solution into which it is dropped is contantly agitated one gets, for example, the following result:—20 c. c. of the $Ag NO_3$ olution + 20 c. c. of the NH_3 solution only give 0·0270 of a gramme of precipitate.

Two determinations of the silver gave :—

Found— Computed for—

$$\begin{array}{l} \quad CH_3 \\ \quad | \\ H—C\,OH \\ \quad | \\ \quad NH\,Ag \end{array}$$

Ag 64·26	....	64·29 per cent.
64·44	....	64·29 ,,

A solution which contains two molecules of ammonia to one molecule of silver nitrate forms, by the addition of aldehyde, crystals of the substance called ethylidenimid silver nitrate by C. Liebermann and A. Goldschmidt. This compound I have prepared with the theoretical silver contents, and found it stable in a dry condition at 100°.

—*Photographische Mittheilungen.* A. Reychler,

University Laboratory, Brussels.

OBITUARY.

THE LATE MR. COLIN SINCLAIR.

It is with the deepest regret we have to announce the death of Mr. Colin Sinclair, which occurred at his residence, 17, Randolph-crescent, Edinburgh, on Saturday last, the 17th instant, after an illness of only a week's duration.

In the death of Mr. Sinclair we have the breaking of another of the few remaining links which connect the past with the present of photography; as, although his practical connection with it was limited, he was one of the first, if not the first, to publish photographic prints, and so took a leading part in laying the foundation of what has now become a very extensive branch of trade. An enthusiastic and active member of the Edinburgh Photographic Society, he was largely instrumental in raising it to the position which it soon attained and still retains. Of genial disposition, and possessing a keen appreciation of humour, he contributed much to the pleasure and success of the outdoor meetings, which were for so many years a delightful feature of the Society's proceedings; and it may be said of him with perfect truth that he made numerous friends and no enemies.

The obsequies took place on Tuesday last in the presence of a large gathering of sorrowing friends. Mr. Sinclair leaves a widow, a son, and three daughters, who, we are sure, will have the sincere sympathy of all who knew the deceased gentleman.

ON THE ATTITUDE OF OUR SOCIETY—PAST, PRESENT, AND FUTURE.

[A communication to the Manchester Photographic Society.]

The newly-appointed Council of this Society having in the discharge of their electoral duties seen fit, very much to my surprise—and, I may also add, even after mature consideration, greatly to my regret—to place me in the position of President for the session on which we have just now entered, I think I ought not to allow the occasion to pass by without some introductory remarks bearing on what I conceive to be the part which a well-regulated society such as this may perform in the history of the art-science of photography. I also wish to indicate generally, to some extent at least, the nature of the duties and responsibilities of its individual members, in order to make both the present and future of a photographic society prosperous and progressive.

Sociality is one of the leading characteristics of the human species, and so we find in all ages on which recorded history throws her light that men of kindred tastes, and engaged in like pursuits, have sought out each other, and by a law of affinity much less mysterious than that which obtains in the chemical world grouped themselves into sections or societies, where, by the interchange of ideas and experiences, the more backward members may have opportunities for advancement brought within their reach, whilst those of superior attainments become additionally fortified in that which they have already acquired. Thus the advantages in regard to the acquisition of the special knowledge for which a society may have been established to spread become obviously mutual.

From 1839, when the processes of Daguerre and Talbot were first made known, down to 1851, when Archer perfected and published (and, to the honour of his memory be it said, freely gave to the world) his collodion process, photography was in the hands of a very limited number; but with the advent of the latter process the real activity of photographic work may be said to have commenced in earnest. The extreme simplicity of the process and the delicacy of the results it gave were of so captivating a nature that the rank and file of discipleship gradually but surely became augmented. The advisability of originating a photographic society began to be discussed. Many able men in various parts of the country and abroad were taking up the subject, and in prosecuting their researches the desirability of means for intercommunication soon became apparent. A society was consequently formed in London by the then leading experimentalists—if I remember rightly, in the year 1853—and it has steadily grown from a small nucleus to its present magnitude under its original and still adopted title—"The Photographic Society of Great Britain." Shortly afterwards (and, I believe, in the following year) the Manchester Photographic Society was established, mainly through the instrumentality of a few local influential gentlemen, who had taken up photography as an amateur pursuit, and were practising the art with all the ardour and enthusiasm of a first love. The Society was started under highly-favourable auspices,

The first Bishop of Manchester (the late Dr. Prince Lee) consented to become its President, and in that capacity attended many of the earliest meetings. He also continued to take a lively interest in photographic matters during the greater part of his remaining life. The founders were also singularly fortunate in having on the Council men of the foremost rank in science, amongst whom may be mentioned Dr. Joule, Dr. Angus Smith, Professor Roscoe, Sir William Fairbairn, Mr. James Nasmyth, C.E., with Mr. Joseph Sidebotham as Secretary, and Mr. Callender as Treasurer.

At that time I had begun in a small way, and with very mediocre appliances—including a cigar box and a lens of the spectacle glass family—to practise photography; but I was too young and inexperienced a student to aspire to the dignity of membership, and was, consequently, fain to catch all the inspiration possible to an outsider from the light radiated by this young society. My very kind friend, Mr. Joseph Sidebotham, one of its founders, gave me occasional invitations to these early meetings. I can well remember now, after the lapse of nearly thirty years, a most interesting and clever paper on *The Stereoscope*, communicated by Mr. J. B. Dancer, who treated the subject with the combined ability of a practical optician and an accomplished scientist.

The Rev. J. B. Reade and Mr. Arthur Nield were also prominent members at that early period, and both of them were gentlemen of great intellectual activity. If I remember rightly, it was the latter gentleman who, some time afterwards, in order to show how easily photography might in bad hands be made instrumental in perpetrating fraud, undertook, with the collusion of a local bank manager, a very curious and, as it afterwards turned out, successful experiment. At this distant period, and trusting entirely to memory, I may not be strictly accurate as to some of the details of this experiment; but, so far as I can remember, it was as follows:—At the bank in question the cheques issued to customers were simply printed in black on a white ground. There was no coloured band nor red numbers, and the paper contained no watermark. Mr. Nield's contention was that these cheques were too easily imitable, and engaged to photograph one, that should be filled and signed by a customer who had an account at the bank, so successfully that when presented the cheque would be duly honoured, without the least suspicion being excited as to the nature of the deception. The spurious cheque was to be sent to the bank anytime on a certain day fixed by the manager and Mr. Nield himself, the tellers, of course, not being taken into confidence. The time arrived, and when the business of the day was over, the cheque, which had been presented and honoured, could only be selected from the legitimate ones by the assistance of Mr. Nield himself.

I also remember an interesting paper by Mr. Nield, accompanied by successful illustrations, carried out before one of the meetings, over which the Bishop presided personally. The subject was the iodised paper process, then being largely practised amongst the members. The iodised paper was sensitised in an aceto-nitrate bath, and many beautiful specimens were printed from a collodion negative by exposure to a gas flame, and developed in presence of the members. Mr. Nield was then a young gentleman of clever parts and of great promise. I am grieved to say that some years afterwards he fell a victim to one of the most terrible of all diseases—brain softening.

Mr. Sidebotham, I am glad to say, still takes a lively interest in matters photographic, although his health, I regret to find, does not now permit him to take the same active interest in the subject he once did. I hope, however, his kinsman Dr. Sidebotham, of Hyde, who has recently come amongst us and has shown himself capable of doing good work, may prove a worthy successor.

The wet collodion process, however, though daily becoming better understood and more successfully practised, had serious drawbacks when outdoor photography was sought to be united with pleasure. For professional work, where a successful result was demanded and substantial remuneration in prospect, the *impedimenta* of bath, chemical bottles, &c., &c., was not to be taken into account; but to the gentleman amateur who had adopted photography as an instructive pastime, and to be a pleasant companion for his holiday rambles, it required an enthusiasm bordering on desperation to carry about with him—whenever he wished to ride his hobby—half the contents of a chemical laboratory, to say nothing of the risks he might incur in spotted clothes and soiled linen or a smeared face. Hence a successful method of preparing the plates beforehand to be kept stored up in a sensitive condition for future use became a general desideratum; but, whilst there was a strong consensus of opinion as to the immense advantages which a perfect process of making plates would confer, all were not equally agreed as to whether films in a partial or complete state of desiccation were most likely to realise the conditions sought after.

Thus, experimentalists prosecuted their researches in both directions, and very encouraging results were obtained, both from moist and dry processes; but the balance of opinion was, for obvious reasons, largely in favour of thoroughly-desiccated films. The waxed-paper process of Le Gray was being taken up by many of the early members of this Society, and the great success with which it was worked is amply shown in many of the large prints now in the Society's portfolio.

About 1857 a process of French origin, formulated by M. Taupenot, and since known by the name of "collodio-albumen," began to be recognised in Manchester as the most reliable process hitherto made known. It was taken up with great spirit by Mr. Sidebotham, Mr. Parry, and other able pioneers of that time, and for twenty years subsequently the annals of the Manchester Photographic Society abounded with references to the admirable work done by the various modifications of that process in the hands of such men as Mr. George Wardley, Mr. Sanderson, Mr. Leader Williams, Mr. Petschler, and others; and I need not refer to the charming productions by that process of recent date by Mr. Coote, Mr. Leigh, and Mr. Sefton. Manchester became the home of the collodio-albumen process, and the success which attended its practice stamps the past history of the Society with a position and a character ever to be perpetuated in the history of dry-plate work.

The gelatine process has now practically superseded collodio-albumen. It is vastly more simple as to manipulation, and the means it brings within reach of securing many of the fleeting effects in nature, as we[ll] as the incidents of everyday life—which, by the slower methods [of] working, were impossible of achievement—have by universal conse[nt] placed the process in the position of an undisputed rival. Its gener[al] adoption has brought about a large accession of strength to th[e] Society in its increased roll of members, and the work of the prese[nt] day is perhaps more uniformly good than it was in the past. The Societ[y] may not enjoy the same distinctive individuality it did during the previou[s] twenty years of its existence, because the gelatine process is now worke[d] everywhere; whereas the collodio-albumen process, although worked t[o] some extent in many other places, was worked much more exclusively b[y] the members of the Manchester Photographic Society than was the case i[n] any other locality.

But it is much more satisfactory to know that the present position of th[e] Society is one of unqualified prosperity, with every prospect of a hopefu[l] future, than it would be to know that it enjoyed an exclusive use of an[y] special process. We can now boast of unprecedented numerical strength but I rejoice to say we can make the nobler boast of "unity, peace, an[d] concord."

I have already been too discursive to enter into any speculative remark[s] as to the future position of the Society. It will undoubtedly be a pow[er] for good in proportion to the ability and energy of its members. It i[s] quite true that it is, and will be, the duty of the Council to do its utmos[t] in providing matter of interest and instruction for its meetings; but [I] sometimes think too much importance is attached to that duty. It is quit[e] as much the duty, in my opinion, of every individual member to do hi[s] legitimate share in contributing to the interest of the meetings; and bot[h] the present and future influence of the Society will depend quite as muc[h] on the performance of that duty as it will on the most strenuous efforts th[e] Council may make to accomplish that end. In the presence of, probably a considerable number of new members I wish to lay special emphasis o[n] that point.

My own connection with this Society—extending now over a period o[f] sixteen years—has been accompanied with very many pleasant associations It has been the means of forming many delightful friendships on which [I] can now look back with pleasure, although sometimes tinged with a feelin[g] of sadness when I remember the genial and enthusiastic Petschler, Joh[n] Hindle Young, and others, whose lives were cut down in their prime; an[d] I should also not omit to mention our late lamented friend, Mr. Noton whose ingenuity and goodness cannot be too highly praised.

In thus floating myself, so to speak, on these newly-assigned duties, [I] cannot conclude my remarks without expressing my sincere regret that m[y] predecessor, Mr. Leigh, is not still occupying the position of President, fo[r] which office his genial disposition and kindly nature so well fitted him As regards myself, I should have been much better satisfied to have re-mained in the position of a private member, doing what I could (as I hop[e] I have tried to do in the past, as far as my humble abilities enabled me), fo[r] the general welfare of the Society, than I can ever feel in occupying th[e] position I do tonight.

J. POLLITT.

RECENT PATENTS.

PATENT APPLIED FOR.

No. 5,464.—"Preparing and Producing Coloured Photographs, and Ar-rangements and Apparatus employed therefor." A. KEPLER, A. M. D' PREMION, and A. PIGEAU.—*Dated November* 20, 1883.

PHOTOGRAPHIC SHUTTERS FOR INSTANTANEOUS PHOTOGRAPHY.

UNDER this title the specification of patent granted to Messrs. REYNOL[DS] AND BRANSON, of Leeds, has just been published. The phraseology of th[e] specification is unfortunately so brief as not to convey an adequate idea [of] the nature of the shutter without giving the drawings by which the speci-fication is accompanied.

Our improvements (say the patentees) have reference to an arrangeme[nt] of shutter whereby the rapidity in the movement of the flap and dro[p] portions may be adjusted or timed independently of each other.

The flap is raised from the aperture in the shutter by means of a coile[d] spring provided with a suitable adjustable box on the shutter.

The drop portion of the shutter is caused to fall over the aperture b[y] means of an india-rubber band or its equivalent, so that the aperture is close[d] by such time as the flap has moved through about five-sixths of its distanc[e] thus all shaking of the lens is obviated during the time of exposure of the plat[e].

The flap is retained closed over the aperture by means of a suitable catc[h]. On this being released the flap instantaneously rises in the manner herei[n] before described, followed immediately by the falling of the drop.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 28 ..	Bristol	Studio, Portland-st., Kingsdow[n]
,, 29 ..	London and Provincial	Masons' Hall, Basinghall-stre[et]
,, 29 ..	Liverpool Amateur (Ann. Meet.)	Free Library, William Brown-s[t.]
,, 29 ..	Oldham (Annual Meeting)	Hare and Hounds, Yorkshire-s[t.]

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATIO[N]

AT the meeting of this Society held on Thursday, the 15th instant, th[e] chair was occupied by Mr. E. Twiss

Mr. A. L. Henderson said that at the last meeting it had been spoken as a sort of trade secret that one maker of photographic lenses used a be revolving at a high speed, and fed with emery powder, for cutting the ass for lenses out of a plate, so as to be ready-edged. He (Mr. Hender-n) did not think that there was much secret in the matter. He had for any years adopted the same plan in cutting out his enamels from the ate, on which a number had been fired together. One of the plates from hich several had been cut out was produced. Mr. Henderson then showed camera which he had borrowed from Mr. Godbold, of Hastings, who d had it for many years, to show to the members. This camera had a ck for carrying stores of plates somewhat similar to one that had recently en patented.

A discussion (introduced by Mr. W. T. Wilkinson) took place upon the erits of particular forms of lime-light jets and appliances; and, after ssing votes of thanks to Mr. J. H. Hare for a blackboard and Mr. E. urgess for an easel presented to the Society, and the election of the llowing gentlemen as members, the meeting was adjourned:—The mem-rs elected were Mr. J. Frankland, Mr. L. H. Kingdon, Mr. C. W. Lee, r. A. Sachs, Mr. J. Stuart, and Mr. F. York.

MANCHESTER PHOTOGRAPHIC SOCIETY.

he usual monthly meeting of this Society was held at the Manchester echnical School, on Thursday, the 8th instant,—Mr. John Pollitt, Presi-nt, in the chair.

The minutes of the previous meeting were read and confirmed.

The Chairman said the Council had met with the view of seriously con-dering the practicability of holding another general exhibition of photo-aphs, as suggested to the Council at the last meeting, and the result of eir discussion was to abandon all idea of another general exhibition for a ngthened period during the present session; but he was happy to say rangements had been made for a *soirée* and exhibition of photographs to held on the 18th December, at the Memorial Hall, for one night only, d it was very desirous to have a good show of members' work. In reply a question, he (the Chairman) said that members need not confine their hibits to this year's work, and in all probability an exhibition of lantern ides would take its usual place. Members were requested to send in eir lantern slides intended for exhibition to the Hon. Secretary, on or fore Tuesday, December 11th, 1883.

The following gentlemen were elected members of the Society:—Mr. rederick William Burt and Mr. James Davenport.

In reply to a question from Mr. Brothers it was understood that Mr. Vright, Librarian, would have the new roll of members ready at the next eeting.

The Chairman then read a communication *On the Attitude of our Society—ast, Present, and Future.* [See page 713].

Mr. S. D. McKellen, in introducing to the members a tourist's portable amera, said he had often thought that the cameras taken out by the mem-ers of the Society on some of the summer excursions were much too heavy nd cumbersome, and had noticed how much diminished was the pleasure hen working the larger size by reason of their great weight—say old lates and above. He had, therefore, set his mind to think out a amera which should combine all good qualities, including lightness, fficiency, strength, and, at the same time, no loose pieces, and he thought e had succeeded in producing such a camera. Although many experi-ients were tried, incurring considerable expense, before real success was btained, he assured the members that if there were any ideas in his amera which they considered of value, they were heartily welcome to ake use of them.

The camera was then handed round the room and very much admired. Ir. McKellen explained the various motions, extra-long focussings, &c.; nd, in showing how two half-plate pictures could be put on a whole plate y the well-considered motion of the back and front, an argument ensued etween Messrs. Rashton and McKellen, on the merits of swing-backs and wing-fronts. The lateness of the evening precluded the consideration the ubject was entitled to.

Mr. T. Chilton said he wished to give notice of motion that at the next eeting he would propose a presentation print be given to those members ho had paid their subscription.

Mr. J. Schofield also gave notice that at the next meeting he would ropose that the Society become possessed of a lantern screen, and better rrangements for exhibiting lantern slides.

In a reply to an inquiry from the question-box,

The Hon. Secretary said he thought there were very few of the members ho worked the collodio-chloride process, but that he believed Mr. Payne, f the firm of Mawson and Swan, had been very successful in that process, nd the firm were in a position to supply the emulsion.

Mr. J. Brier said he had some experience in the process many years go; and gave an outline of the manipulation, &c.

The usual vote of thanks was passed, and the meeting was adjourned ntil December 13, 1883.

Any further particulars respecting the *soirée* can be obtained from the Ion. Secretary, W. J. Chadwick, Prince's Bridge Iron Works, Salford; ut printed particulars and tickets will be ready in a few days and will e forwarded to the members.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

. meeting of this Association was held in the Religious Institution Rooms, lasgow, on Tuesday, the 13th instant,—Mr. Hugh Reid, President, in the hair.

After the usual preliminary business, Mr. Andrew Lithgow was admitted s an ordinary member.

Several questions relative to the exhibition were discussed, and the nomination of office-bearers for the ensuing session was proceeded with.

Mr. J. Y. McLellan then read a paper on *The Lens and Diaphragm*, which was illustrated by diagrams and sketches on the black board, and listened to with interest by the members.

Mr. T. N. Armstrong, while appreciating the importance of a thorough understanding of the diaphragm and its uses, considered the question of judging the intensity of light of primary importance, and inquired if Mr. McLellan could give any information on the matter.

Mr. McLellan said he had made no special investigation into the subject.

The Chairman remarked that he had used a Woodbury photometer for this purpose, but had difficulty in getting a sensitive paper to assume a similar tint to that on the photometer.

The Secretary, in proposing a vote of thanks to Mr. McLellan for his interesting paper, said he considered the subject dealt with a most impor-tant one, and asked the members to give it their attention with a view to the Society, as a body, adopting a definite standard. He called attention to the standards of the Photographic Society of Great Britain, and pro-posed that they be adopted by the members.

A fine print of Mayland's picture, *There is a Sorrow on the Sea*, was exhibited by Mr. G. G. Napier and much admired by the members.

After the usual votes of thanks the meeting was adjourned.

BOLTON PHOTOGRAPHIC SOCIETY.

The fourth annual meeting of this Society was held on Thursday, the 8th instant, at the Baths, Bolton,—Mr. Robert Harwood in the chair.

The Treasurer reported that after paying all expenses to date there was for the first time a balance remaining to the credit of the Society.

The Council having, in their report, remarked on the poor attendance at some of their meetings, a conversation ensued as to the probable cause. Every care was taken to provide an interesting programme, and the papers and demonstrations which had been read and given during the year, and particularly those read by Mr. R. Harwood, Mr. T. Parkinson, and Mr. John Taylor, were interesting and instructive. The poor attendance it was considered was not attributable to the meetings being in themselves unattractive, but rather to the place of meeting being very inconvenient. With the object of testing the correctness of this view, the Secretary was requested to take some more central room for the next two meetings.

The Officers for the year were then elected as follows:—*President:* John Hick.—*Vice-Presidents:* Robert Harwood, Thomas Parkinson, J. R. Brid-son, and E. N. Ashworth.—*Treasurer:* J. C. Sewell.—*Hon. Secretary:* John W. Hawksworth, 41, Mawdsley Street, Bolton.—*Council:* the above gentlemen, and Messrs. Haslam, Taylor, Banks, Knowles, and Dalton.

The Secretary was requested to revise the rules of the Society, and submit them to the next meeting for approval.

The meeting was well attended, and a general determination to make the Society a more decided success was evinced. Notices were given that a ballot would be taken at the next meeting for the admission of ten new members.

Mr. C. K. Dalton exhibited a number of silver and platinotype prints, which were much admired.

A very enjoyable evening was brought to a close by a cordial vote of thanks to the Chairman.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

The usual monthly meeting of this Society was held at the Masonic Hall, Surrey-street, on Tuesday, the 6th inst.,—Mr. Firth, President, in the chair.

After partaking of an excellent tea, provided by the Steward, to which full justice was done, the usual business was proceeded with. The minutes of the last meeting, and also of the Exhibition Committee, were read and approved of, and the following gentlemen were unanimously elected members of the Society, namely, Messrs. W. H. Bacon and E. L. Pearce.

Various details were discussed and adopted relating to the proposed exhibition, which is to be held the first full week in January, 1884, and it was decided to hold a lantern exhibition each night, to which the various Photographic Societies throughout the kingdom should be invited to con-tribute. The members present expressed their determination to do all in their power to make it a success.

Mr. W. B. Hatfield showed a very large portfolio of views, taken in California and the Yosemite Valley, from 22 × 16 negatives, which were extremely interesting, and almost technically perfect.

Mr. Davy passed round for inspection and criticism a large number of prints representing his work during the past summer.

Mr. J. Dakin brought to the meeting a 10 × 8 camera, which had been made by Mr. G. Hare, on his (Mr. Dakin's) new principle. The various ingenious features in the construction and mode of working the camera were fully explained by Mr. Dakin, who was complimented on the compact arrangement of his case, containing camera, three double-slides, three lenses, stand top, focussing cloth, shutters, &c. The case only measured 15 × 14 × 9 inches outside.

Votes of thanks to the above gentlemen closed the proceedings.

PHOTOGRAPHIC SOCIETY OF VIENNA.

This Society met, for the first time after the vacation, on the 2nd ult., Dr. E. Hornig, President, in the chair.

The Chairman intimated that during the vacation the Society had lost three members by death, and that a number of persons had applied for admission as members.

Major Volkmer called the attention of the meeting to the collections of prints, etc., exhibited at the Imperial Royal Military Geographical Institute, particularly to the heliographic reproduction of an engraving

by Schmutzer (1784), of a painting representing St. Ambrose, of Milan, preventing the Emperor Theodosius from entering the church after the massacres in Thessaly; also a series of nine sheets, 90 × 90 c.m., representing the mosaic floor of the church of St. Mark, Venice. He also mentioned that these exhibits would be handed over to the Society after the exhibition.

Some portraits taken by Herr Eggenweiler's system of lighting were handed round.

Herr O. KRAMER showed a compendious laboratory, all packing into a trunk, on M. Enjalbert's plan, which was considered very convenient for the use of amateurs. He (Herr Kramer) found that, owing to the customs and other restrictions, the bringing of the box from Montpellier was so troublesome and costly that it would be better to have one made on that plan on the spot. Herr Kramer further showed a number of articles, amongst which was a new kind of dropping-bottle.

Dr. J. M. EDER gave in a report about the International Electric Exhibition at Munich.

Captain PIZZIGHELLI showed an Enjalbert photo-revolver, and also a camera made from the design of an amateur, Dr. Roth.

Dr. HORNIG showed two gelatine negatives which had been stripped off the glass by an amateur, Herr Hennig, who also sent a short description of his method of stripping off negatives. These negatives were quite flexible, and might easily be transformed into thick films by superficial coating with gelatine.

The question-box only contained one question, which referred to the adaptability of a certain method of building a glass-house, and was accompanied by drawings. The question was referred to the committee, who will consider it and send an answer.

The meeting was shortly afterwards adjourned.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Society met on the 5th ult.,—Dr. H. Keyser in the chair. A fourth letter from Dr. Vogel describing his journey in America was read.

Herr ROLOFF described an attempt made some years ago by himself and Herr Quidde to photograph a scene upon the stage. It failed because plates were not then so sensitive as they are now, and the exposure was not right, yet the result showed that it would be quite possible to take such a photograph.

The discussion then turned upon the subject of re-sittings.

Herr VAN RONZELEN complained that a customer came, had a sitting by electric light, and ordered six copies; but when the first copy was sent to him he declared that they were unsatisfactory and would have nothing more to do with them, yet did not specify any fault. He (Herr van Ronzelen) now wished to know whether he could not compel the customer to take the pictures and pay for them.

Dr. VOGEL, who had been consulted as the person best acquainted with the legal aspect of the question, sent a report to the effect that for the last ten years it had been the custom amongst the higher class of photographers — to which the complainant belongs — when a number of pictures were ordered to send a specimen for approval before proceeding to the execution of the order, and then the customer might, if dissatisfied, either have a re-sitting or cancel the order. In the latter case the sum paid at the time of sitting would be considered as payment for the work done. Many photographers do not comply with this usage; others do not give a second sitting when the sitter cannot specify the fault. In the case in question the six marks paid at the time of sitting was considered a sufficient price for the specimen furnished, as the half-dozen was to be given for twenty-four marks.

Many of the members present objected to the above finding, and said that they would not conform to a custom which gave the sitter the right to countermand his order without assigning any reason for so doing after the photographer had performed the most expensive part of the work, namely, taking the plate and retouching it.

Herr ROLOFF declared he would never conform to such a usage, and denied that anyone had a right to dictate to him in what way he should carry on his business.

Herr QUIDDE thought that the sum paid at the time of sitting could hardly be regarded as equivalent for the first copy. Besides, so far as he knew, the amount prepaid was often left to the discretion of the customer, having usually no further purpose than to afford the photographer some assurance that the sitter really intended to order. In the case in question the prepaid six marks seemed to him really too little for the first copy, Herr van Ronzelen's terms being twenty-four marks for the first, and fifteen marks for the second, half-dozen, thus giving for the sitting and first copy about eleven and a-half marks; also, as this picture was taken by electric light, the expense connected with the sitting was greater than by daylight portraiture.

Herr van Ronzelen was advised to get a number of well-known Berlin photographers to certify that they did not carry on their business on the above principles.

Herr Kremer, of Gladbach, sent a description of a glass house which he thinks of building, and requested the opinion of the members upon it. The east and west walls are solid and so is the south wall, while the north wall is glazed. The roof consists of two zinc surfaces and two larger glazed surfaces. Nothing is said respecting the central flat roof. Herr Kremer thinks that direct sunlight can never shine into the studio—only pure north light; and he considers curtains unnecessary in a studio of this construction, or, at most, only in the form of a head-screen. The length of the glass house, from background to background, is thirty-eight feet, the greatest height twenty-one feet, and the height of the middle part nine feet. The steepness of the roof facilitates the running off of snow and rain.

The meeting declined to pronounce any opinion as to the advisability of constructing a studio on this plan, as in Berlin they had not had sufficient experience of its capabilities.

Herr Tscheutscher sent some medallion portraits pasted between two watch-glasses, the back one of which was painted black. Some further business of little general interest was transacted, and the meeting was then adjourned.

A MEETING of this Association was held on 19th ult., when the chair was taken by Dr. H. Kayser.

A further report from Dr. Vogel was read, in which he treated of American gelatine plates and their manufacture.

Herr GRIMM presented a copy of the concluding number of Professor Cohen's *Atlas of Microphotographs of Thin Slices of Stones*, the greater number of which were taken by polarised light, and the first part of a new work upon meteorites.

Herr SCHULTZ-HENCKE gave an exhaustive lecture on the nature of polarised light and the mode of producing certain phenomena, which might be utilised to distinguish between the different systems of crystals.

A couple of life-sized portraits of a lady and gentleman, taken by Herr Angerer, of Vienna, with a new Voightländer euryscope were shown by Herr Quidde.

Herr GAILLARD showed a specimen of the autotype process, invented by himself and Herr Hartwig, for producing *clichés* photomechanically, to be printed from in the printing-press along with letterpress. The process is said to be similar to those of Ives, Meisenbach, Mariot, &c., but the high-lights are quite clear, and not dotted, as in some of those other processes.

Dr. KAYSER inquired whether this process could be applied to the representation of scientific instruments and to the illustration of scientific works. If so, it would be very convenient, since at present such objects have first to be photographed and then cut upon wood or lithographed, and, in addition to the expense attending these latter processes, there is always the risk of errors creeping in.

Herr GAILLARD had no doubt his process could be turned to account for such a purpose; but remarked that, the process being so new, he had not yet had time to cultivate that field for its employment.

Herr Hameter, of Dordrecht, sent some instantaneous views of shipping.

A non-member inquired whether the laws which apply to artisan apprentices also apply to photographic apprentices; whether, like the former, they must attend some technical industrial school; and whether they must have work books.

It was replied that these laws did not apply to apprentice photographers, with whom the possession of a *livret* or attendance at an evening school was optional.

In repy to the inquiry whether the law demanded the covering up of photographic show-frames exhibited in the street during the hours of public worship, it was replied that such a rule was enforced only in the case of frames or windows containing goods exposed for sale.

Herr CHRISTMANN read an extract from the *Neuen Blatt* to the effect that spirit photography was a very flourishing branch of the trade in America. The *Neuen Blatt* was left to answer for the correctness of its statements unsupported by any member of the Association.

There was no further business, and the meeting was then adjourned.

Correspondence.

FERROUS OXALATE DEVELOPMENT.

To the EDITORS.

GENTLEMEN,—In your last issue there are two (to me) very interesting papers, both treating of oxalate developing—one by Mr. Norman Macbeth, R.S.A., and the other by Mr. A. Goodall. I will, with your permission, make a few remarks on them, more especially on the one on *A Ferrous Oxalate Developer*, by Mr. Macbeth.

I am one of the few professional artists who use oxalate developing entirely. I have I hope for ever discarded pyro. The very name is obnoxious to my ear.

Mr. Macbeth gives a very good method, but, judging from his own words—"I do not think it suitable for the professional photographer when time is a consideration," &c., Mr. Macbeth does not give encouragement for its use by the latter class. He then goes on to say:—"Having two or three baths, he can easily get through half-a-dozen plates in an evening." Of course this rate of proceeding would not suit a professional photographer. But I will now try and supplement his most useful paper by giving the method I have used for a considerable time, and, in fact, I do all my work by it.

We will start with the developer (Audra's), as given by Mr. Macbeth; but, instead of using upright baths, I use flat tin trays covered with Brunswick black. A very useful size is large enough for two whole-plates, or four half-plates, or nine quarter-plates. I always place the plates in *old developer*—that is, the developer I used for the previous lot of plates. After a few minutes they should be well out, but scarcely thick enough for bright printing. I now have another dish ready with (say) enough *new* developer to cover a half-plate or two quarter-plates. (Of course, if I am using larger plates I must have a larger dish, &c.) I now take the plate or plates from the old developer and place them in the fresh. Very soon they acquire the requisite density, and must be removed at once, washed under the tap, and placed in a dish of strong alum, remaining there some little time.

I use a dish large enough to hold several plates. I then take them out of the alum, wash carefully, and put into a vessel of clean water, there to remain till the whole are through and ready for the fixing. When all the plates are developed I pour the new developer into the bottle first, and then the old. When the bottle is full, of course there will be a surplus every time, and if not wanted it can be poured away. The bottle is then placed in a position where the sun, when shining, can reach it.

By this method I claim that I can develope with (say) a one and a-half pint bottle full at least twenty or thirty quarter-plates, and only have to use about three ounces of new solution, costing much less than pyro.—not only producing as good, but to an artist much better, work, giving every shade from the highest to the lowest.

Again, it possesses another advantage: the solution is always ready. I do not want to filter; it settles beautifully clear in the course of a day and night. All I have to do is to pour out what quantity I require and put my plates into it, and they will take care of themselves, within reasonable limits.

I think I have made out a clear case of the great advantages arising from using this method; but it will require a great amount of writing to make any but the few who have had courage enough to try it thoroughly believe it can be good. I see page after page of the photographic journals devoted to pyro., but it is a rare treat to me to find anything good said of the poor oxalate. I simply let the papers on pyro. be "taken as read," and go on to the next article. What I want to see is a thorough trial, by first-rate men, of poor snubbed oxalate.

I think this supplement to Mr. Macbeth's paper will give many a chance of using perhaps the very best developer there is known for gelatine plates—certainly the least expensive, and as certainly the cleanest.

I have only a few remarks to make on Mr. Goodall's paper, and these more of the nature of questions than anything else. I should like to know if the brilliant paper he mentions is obtainable, and whether it is similar to M. Hutinet's; also whether he has tried developing with a similar developer to the one I use for ordinary negatives. I find this does very well for Morgan's paper.—I am, yours, &c.,

Bridgewater, November 19, 1883. O. C. SMITH.

INTENSIFICATION.

To the EDITORS.

GENTLEMEN,—Some sentences in the last number of the Journal have puzzled me, and I fear the printer's devil has been allowed to run very wild during the last week, or else your correspondents have been caught napping, and allowed some incorrect statements to creep into their otherwise interesting communications.

At page 692, Mr. Jabez Hughes is made to say "Daguerre's was a positive photograph on *thick glass plates*," whereas I thought it was a well-known fact that his pictures were produced on polished metallic silver plates, which, for economy, were copper plates electroplated with silver.

At page 694, Mr. Parker is made to say his transparencies "were all done in the camera, as his negatives were all large, so that he could print the transparency by *superposition*—he had to reduce in all cases," which is very contradictory. So much for the P.D.

Mr. L. Macdona's letter regarding Mr. Brooks's method of intensifying is a greater puzzle, for he quotes Mr. Brooks as saying—"I have tried it, and the only result I get is a staining of the film (the well-known pyro. stain)." I cannot find where Mr. Brooks said this, nor do I think it likely, as the strong point of his method is the absence of stain. I have intensified several negatives with Mr. Brooks's formula, and find it works most successfully, but great care must be used to prevent unequal action on account of the repellent nature of the gelatine film. If this intensifier could be used in a dish it would be a great advantage; but, taking note of Mr. Brooks's warning, I have not used a dish. Another point is to be careful not to over-intensify, as the resulting colour of the negative is very non-actinic, and the eye is apt to be deceived by it.—I am, yours, &c., W. HORSEMAN KIRKBY.

Liverpool, November 19, 1883.

INTENSIFICATION OF GELATINE NEGATIVES.

To the EDITORS.

GENTLEMEN,—In reply to the Rev. L. Macdona, whose letter appeared on the above subject in your last issue, I am perfectly at a loss to understand the first paragraph, as in it he attributes to me statements that I must deny, or else the printer has made a mistake.

The sentence in inverted commas is apparently the writer's opinion and not mine. If the words "he says" were placed before the sentence preceding it would be a little more correct. I think the Rev. L. Macdona is mistaken when he says that he has followed out carefully my instructions; for, if he had done so, he would have succeeded and obtained the most perfect results, staining being out of the question. The only way he would get the staining all over would be by not taking care to get rid of the hypo. in the film. If the plate be taken out of the hypo. and merely rinsed under the tap, and then placed in the alum and citric solution at once, I can understand his failure. If the hypo. be not eliminated it refuses to intensify, and general staining is the result.

In reply to his query—"Is the effect to build up the image, or is it merely a universal staining?"—my answer is that, properly speaking, this is a redeveloper, as it *builds up* the image, and not only builds it up, but brings up certain fine details to printing density that were too weak to be seen by the eye. As to the latter part of his query: he is in error in supposing that the action of a redeveloper containing free nitrate of silver and a reducing agent (pyro.) is to stain the film generally. Its function is to build up the image by precipitating the metallic silver from the nitrate on to the image already formed to give a negative sufficient printing density.

I must ask the reverend gentleman to try again, following out my instructions more carefully, and let me know the result either through the medium of this Journal or by letter addressed to me privately as per address below. If he cannot succeed, and sends me by parcel post a negative which has been well washed from hypo., I will intensify it and return it to him.

The other day I was looking over a series of negatives of Lucerne, by Messrs. Frith and Co. There was one negative—the *Lion of Lucerne*—which on developing in the usual way came up too thin to be of any service, and my method of intensification was tried. It not only made it sufficiently intense, but brought out detail in depth of shadow that before apparently did not exist; and when it was finished it was considered to be of far better quality than an unintensified negative. The series are on 17 × 11 plates. Many others were done with the same result, and the firm has decided to use it instead of mercury. I never bother myself now in getting intensity with alkaline development. If I have not sufficient in fixing I always use this system; the negatives are more like wet plates than without it. I intend writing on the same subject for the forthcoming ALMANAC, with a few additions.—I am, yours, &c., WM. BROOKS.

Laurel Villa, Wray Park, Reigate, November 17, 1883.

[We shall be glad to receive at the earliest moment the article promised for the ALMANAC.—EDS.]

To the EDITORS.

GENTLEMEN,—I have used the pyro. and silver intensifier, as recommended by Mr. W. Brooks, most successfully ever since it was first so kindly recommended by that gentleman. With it I can get any amount of density.

I carefully carry out Mr. Brooks's instructions, with this exception:—After intensification I suspend the plates, film side downward, in a bath composed of hypo., five ounces; citric acid, a quarter of an ounce; water, one pint. Dissolve and filter. The film, after being in this bath for about three minutes *(even if it was very much discoloured)*, becomes most beautifully bright and clear. In appearance it exactly resembles a wet plate, and it is certainly by far the best intensifier which I have used.—I am, yours, &c., H. C.

November 19, 1883.

ERRATA.

To the EDITORS.

GENTLEMEN,—In my few words on *Fine Art and Photography*, to which you were good enough to afford a place in your Journal of last week, there appears a few errors, for which, no doubt, my writing has much to answer. In first paragraph, third line, for "literal art" *read* "liberal art." In the same paragraph, seventh and eighth lines, for "a thought prompted by feeling a passion" *read* "or thought prompted by feeling or passion." In the fifth paragraph, first line, I believe I correctly wrote the great pre-Raphaelite's name with double "s"—Rossetti. In the sixth paragraph, sixth line, for "sentiments" *read* "sentiment."—I am, yours, &c. C. W. CROSSLEY.

November 19, 1883.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely OFFERED FOR SALE, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* NOM DE PLUME *be thought desirable), otherwise the notice will not appear.*

For a large portrait lens I will exchange prism for reversing negatives, and some cash.—Address, D., 2, York-street, Covent Garden.

I will exchange a dolphin table, by Cussons, for a changeable chair; or what offers?—Address, HOLGATE, photographer, Curzon-street, Burnley.

I will exchange two sets of good, new burnishers and one portrait lens for a posing-chair or a good group lens.—Address, ALEXANDER WALKER, photographer, Larbert, N.B.

I will exchange a superior sliding-body camera, 5 × 5, with quarter-plate carrier, quite new, for a good half-doublet lens, or offers.—Address, THOMAS FORDE, 15, Nun's Island, Galway.

I will exchange a very old valuable violin, with bow and case, value £10, for a Dallmeyer's or Ross's $8\frac{1}{2} \times 6\frac{1}{2}$ wide-angle rectilinear lens.—Address, J. THOMSON, 11, Delaware-square, Meanwood-road, Leeds.

I will exchange a first-class gem camera and nine lenses, with shifting back, for nine, eighteen, or thirty-six on a plate, for a biunial lantern.—Address, A. BARNES, photographer, Studio, Orchard-street, Bournemouth.

For exchange, two first-class quarter-plate lenses, one double *carte* camera, four splendid Victoria lenses and camera, and very fine mahogany landscape camera and lens. Wanted, a 10 × 12 rectilinear lens, sciopticon lantern, or anything of value.—Address, J. P., 117, Great George-street, Liverpool.

I will exchange a Stanley's first-quality portrait lens and camera, for portraits up to 5 × 4, valued £3 10s., for interior or exterior backgrounds or useful accessories.—Address, J. GRIMSHAW, 16, Dale-street, Haslingden, near Manchester.

I will exchange a stereoscopic camera, bellows-body, twin lenses, Waterhouse diaphragms, three double dark slides, for a five-inch *carte* lens by any good maker. It must be 2 inches diameter.—Address, THOS. TAYLOR, photographer, Sinclair Town, Kirkcaldy, Fifeshire.

Half-plate bellows-body camera and one dark slide, second-hand, in good condition, excellent polished oak revolving table, studio camera stand, *carte* rolling-press, oxygen retort, large camera (by Meagher) for plates from 12 × 15 to 18 × 24, cost £13, never been used, and Seavey's boat; what offers in exchange? Wanted, a 12 × 10 portable camera, with one or more dark slides, by a good maker, instantaneous shutter for Ross's 10 × 12 rapid symmetrical.—Address, E. GRANT, Swindon, Wilts.

Wanted, a 8 × 5 or whole-plate portable dry-plate camera, with double swing-back, &c., in exchange for Shew's half-plate portable dry-plate camera, with rack and pinion, double-action front and extra front, side wing, one double back, with improved folding shutter, folding tripod stand, and a splendid No. 2 quick-acting portrait lens, two inches diameter, five inches focus, rack and pinion, Waterhouse's diaphragms, in case, by Tench, or offers.—Address, J. TUCKER, 4, Samuel-street, Woolwich.

I will exchange, for Seavey's interior or anything useful in photography, the following:—A bellows-body (leather) camera, by Moorse, nine and a-half inches square, one double and one single dark slide, with carriers for whole-, half-, and quarter-plates, rising front, folding tailboard, ground glass, adjusted with spring, a sliding-body (rack) camera, for long-focussed lens, repeating-back, for whole-plate, two cabinets on whole-plate, or two *cartes* on half-plate, double swing-back, wants repairing; also a grass mat, new; value of lot, £4.—Address, D. BORDLEY, Newport-road, Stafford.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

Robert Thomas Watson, Anlaby-road, Hull.—*Photograph of Captain and Miss Evans, Salvation Missioners.*

NOTICE.—*Each Correspondent is required to enclose his name and address although not necessarily for publication. Communications may, when thought desirable, appear under a* NOM DE PLUME *as hitherto, or, by preference under three letters of the alphabet. Such signatures as "Constant Reader," "Subscriber," &c., should be avoided. Correspondents not conforming to this rule will therefore understand the reason for the omission of their communications.*

O. JESSOP.—You are not misinformed; a small quantity of a solution of common salt *will* decolorise the printing bath. Try it for yourself.

W. F. (Dundee).—If the side lights be nine feet high, and the ridge thirteen or fourteen, the proportions will be very suitable for general work.

W. A. K.—You do not say by what process you are making your transparencies; hence we scarcely know how to reply. As a rule, however, they are toned after fixing.

R. W. S.—The films are composed of gelatine containing some pigment, probably barium sulphate. The mixture is spread on glass previously treated with ox-gall, and, when dry, stripped.

F. ALEXANDER.—1. Write to the publisher; we are unable to answer the question.—2. You may mix the paper cuttings with the dried chloride, and they can both be reduced in the same crucible without loss. You have been misinformed on the subject.

WILTSHIRE.—By all means avoid the bichloride of mercury as a toning agent, as pictures toned with it are of doubtful permanence. Some pictures toned with mercury, we are aware, have stood the test of time well, but they are the exception, and not the rule.

R. METCRAFT.—In our opinion the so-called "photo.-crayon portraits" when well executed, are far superior in artistic merit to the ordinary collodion transfer. As a cheap and effective picture we should certainly advise you to adopt it in preference to the collodion transfer.

H. BRAIN.—We have not seen the announcement you mention, and from your communication we scarcely grasp what you refer to. Why not write to the gentleman himself? You have used the solutions too strong. If you dilute them slightly you will no longer be troubled with the deposit.

ENGINEER.—A very useful varnish for negatives, when it is not required to preserve for any length of time, or which will not be subjected to rough treatment, is the common "white hard" of the oil shops, diluted with about twice its bulk of methylated alcohol. It can be easily rubbed up for retouching.

JOHN A. HODGES.—Yes; the plan of enlarging you suggest will answer quite well. The lens also will be very suitable for the purpose. The lenses in question have a very good reputation.

J. H. C.—The iodiser of that particular collodion was, we believe, simply iodide of potassium; but the manufacturer never published the formula he employed. For iron developer a bromide would have to be added to make it work satisfactorily.

A. PARKS.—The lens you mention will answer very well for panel portraits if the light be fairly good in your studio. But, during the winter months, unless you employ very sensitive plates, we are afraid you will find the exposure somewhat long. Its covering power will, doubtless, be quite equal to the size of the picture.

PYRO.—An excellent "white fire," which may be employed as an artificial light in portraiture, is composed of chlorate of potash eight parts, sulphide of antimony four parts, sulphur two parts, magnesia in fine filings, or powder two parts. The ingredients *must* be powdered separately, and mixed intimately afterwards with a bone spatula.

C. W. says:—"The illumination of dark rooms with a perfectly non-actinic light in these days of dry plates is undoubtedly of the greatest importance. Has the plan been tried of admitting to the room the red rays only, after passing the light—either sunlight or electric—through one or more large prisms? It seems to me the plans ought to succeed. It is obvious that by very simple mechanical means just as much light only as may be desired can be admitted."

O. V. T. D.—1. By the "larger view" do you mean the largest angle of view? If so, then the eleven-inch-focus lens will give it. But if you mean the objects of the largest size, then the fourteen-inch-focus lens will be the best for the purpose.—2. The terms "instantaneous" and "ordinary plate" are terms too vague upon which to form data. By "extra rapid *carte* lens" is generally understood a combination that will work in about half the time of the ordinary lens. We are now referring to the lenses of our best makers. Perhaps this may give you the information you desire.

RECEIVED.—W. E. Debenham; "Free Lance." In our next.

OUR ALMANAC.—We are requested by the Publisher to state, in reply to some communications received from former advertisers, that he will endeavour to make room for such advertisements as shall reach him by Monday next.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The next monthly Technical Meeting of this Society will take place on Tuesday next, the 27th inst., at eight p.m., at 5A, Pall Mall East.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club on Wednesday next, the 28th inst., the subject for discussion will be—*On the Preparation of Lantern Slides.* The lantern evenings will be resumed on this night for the winter season. Visitors are invited.

A NEW COLONIAL PHOTOGRAPHIC SOCIETY.—The first meeting of the Amateur Photographic Association of Victoria was held last evening at the Office of Mr. A. Flegeltaub, 216, Little Collins-street East, at which there was a large attendance, including amateurs from different parts of the colony. Dr. Browning occupied the chair, and after the adoption of a number proposed rules, the meeting adjourned to the following Monday, closing the proceedings with drinking success to the new Society in bumpers of champagne.—*Melbourne Argus.*

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,

For two Weeks ending November 21, 1883.

THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
8	29·73	W	42	41	—	50	36	Overcast.
9	29·70	W	50	48	77	56	40	Cloudy.
10	29·65	NW	42	40	69	47	39	Raining.
12	29·78	NE	39	37	67	46	35	Foggy.
13	30·01	NE	38	36	65	46	33	Foggy.
14	30·24	N	39	37	—	44	34	Foggy.
15	30·09	WNW	34	33	—	49	32	Foggy.
16	29·63	SW	49	48	—	51	32	Overcast.
17	29·84	SW	43	41	—	50	37	Cloudy.
19	29·93	W	47	45	—	52	36	Raining.
20	29·93	W	45	42	—	51	40	Cloudy.
21	29·98	W	48	45	—	—	40	Cloudy.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1230. Vol. XXX.—NOVEMBER 30, 1883.

LANTERN TRANSPARENCIES AT THE PHOTOGRAPHIC CLUB.

The season has now arrived when lantern transparencies are "the order of the day," and the Photographic Club wisely devoted last Wednesday evening to the subject. The production of these charming little pictures form one of the connecting links between the past and the present—between collodion, now suffered to fall into a state of comparative desuetude, and gelatine, which has obtained such a hold on the affections of the devotees of photography.

The *rôle* enacted by transparencies in connecting these two systems is discoverable in the advantages possessed by the latter in obtaining negatives, and in the former as a means of producing transparencies for the lantern. We are well aware that many pictures of this class possessing great excellence have been obtained on gelatine, and there are not wanting some who assert that albumen, as a medium in which to retain the transparent image, stands absolutely without a rival. It may, however, be pretty safely conceded that in collodion are to be found certain properties which will long cause it to be employed, at least, in many cases, in the production of lantern slides for commercial requirements. In the attenuated nature of the collodion film lies, from the optical point of view, one advantage; in the rapidity with which the whole photographic operations, from coating to washing, are conducted is found another, printing by the camera being the process supposed to be employed. The advantages arising from the collodion image being toned with facility to any required tint—from the brownish-red, which best serves to show an enlargement of the *Pulex irritans*, to the cold grey, most conducive to effect in the representation of architectural subjects—are also too important to be overlooked; and, for these and other reasons, collodion may still with propriety be considered as king, so far as concerns lantern transparencies. But by its agency have been produced some of the most unsatisfactory, as well as the most satisfactory, pictures of this class of which it is wellnigh possible to conceive.

At the meeting of the Photographic Club on Wednesday, to which allusion has been made, some transparencies were exhibited which had faded to such an extent as to prevent their subjects being readily recognisable. To show the influence of toning on durability one of the members exhibited a large and varied collection of lantern slides, embracing a period which dates back to 1850. Some of those on albumen were still good and suitable for a lantern exhibition of the first order; whilst others, also on albumen, had faded so badly as to be worthless. It was those originally the most beautiful which were stated to have suffered most, and in the opinion of the exhibitor it arose solely from their having been toned with sulphur or mercury. It was known that many fine albumen transparencies possessing high artistic value, had their original rich, deep browns superseded by a cold, inky hue. These, it was stated, could be restored to nearly their pristine beauty by mercury, but fading was the inevitable consequence after a few years. The heat to which they were necessarily subjected in the lantern, doubtless, hastened this decay. Several collodion transparencies dating as far back as 1853, and developed with pyrogallic acid, were shown to be quite vigorous and good, and were stated not to have undergone any change. Collodion pictures developed with iron and toned by gold—applied as a solution of the chloride, poured over the surface, and allowed to remain till the darkening of the deposit had extended through to the other side—were also found to be permanent.

A toning bath composed of a mixture of the chlorides of gold and mercury was found not to be altogether satisfactory, as the partial fading of certain transparencies made about ten years since was attributed to this cause. It was in collodion pictures toned by being first whitened by mercury and then darkened by the alkaline sulphides or analogous means that the most rapid and thorough amount of fading had been produced, and the exhibitor of these specimens (Mr. Taylor) was in a position to declare most emphatically that neither light, heat, nor atmospheric influence had been factors in their having faded to the terrible extent witnessed; for, as the members could perceive, they were well varnished, and they had been allowed to remain unused in a dark box ever since he purchased them, now nearly twenty years ago. Among this collection were several which were labelled as having been made by the Woodbury process soon after its invention; some by Mr. F. York, just after he had adopted this department as a leading feature in his profession; several by Mr. William England, made a considerable number of years back; and not a few by Mr. John Stuart, made in 1867. All these had remained unaltered, their pristine beauty being still unimpaired.

Now, while it is most satisfactory to learn that there is at least a reasonable degree of permanence inherent in collodion transparencies—and, by parity of reasoning, in those of albumen and gelatine also when properly treated in their preparation—it will prove of interest to our readers to learn the processes of toning to which these pictures of recognised permanence had been subjected. We are fortunately not left in ignorance concerning them; for, as every careful reader of The British Journal of Photography is aware, those of Mr. York are taken by the wet collodion process, developed with iron, and, after being fixed, are toned by being immersed in a solution of chloride of platinum. As respects Mr. England's method of transparency printing we stand, too, on sure ground in stating it also lies in wet collodion and platinum toning; while the secret of Mr. Stuart's fine tones is to be found in his immersing the transparencies, obtained by wet collodion, in a toning bath composed (as originally suggested by M. Selle, in 1864) of a mixture of solutions of persulphate of uranium and ferricyanide of potassium. We have heard of negatives which had been intensified by this preparation having slowly darkened in course of time by exposure to sunlight; but with this combined solution much depends upon the proportions in which its constituent parts are mixed. We are also aware that, after a suitable tone had been obtained, Mr. Stuart's pictures, having been subjected to a thorough washing, were then immersed in a solution of albumen. From whatever cause it may have arisen such of the transparencies as we have seen which were made by the gentleman named during the brief time he devoted himself to this business, remain unaltered and as beautiful as when first produced.

And how stands the transparency question with relation to gelatine? At the meeting of the Club which has elicited these

remarks were exhibited both the oldest and the newest achievements in gelatine. The former (which, however, was only shown us at the close of the proceedings) was represented by a beautiful transparency—a portrait—produced immediately after Dr. Maddox first directed attention to the capabilities of gelatine as a substitute for collodion in emulsion processes, and is, therefore, believed to be the oldest gelatine transparency extant; the latter was ably represented by a number of specimens exhibited by Mr. A. Cowan and others. Among these were a few in various tones by Mr. B. J. Edwards, who, beyond saying that they had been produced on gelatino-chloride plates and developed with ferrous-oxalate, did not furnish further details. We understand, however, that they are soon to be published.

It is not improbable that by the systematic adoption of one of the modifications of the developer described sometime ago by Mr. Cowan and used in combination with gelatino-chloride, this system of producing transparencies will eventually enjoy a large share of public favour. Some views on gelatine by Mr. William Bedford, which he informed us were prepared by Dr. Eder's formula, attested the perfection to which this artist has brought this system of transparency printing. As between collodion and gelatine, the pictorial merits of the results may be considered as balanced pretty evenly, and as each system possesses advantages peculiar to itself, both will probably be extensively employed in the production of lantern transparencies for some time in the future.

THE MOST SUITABLE COLOUR FOR TRANSPARENCIES FOR ENLARGEMENT.

In making enlarged or reproduced negatives, has the particular colour or tone of the transparency any material effect on the quality of the resulting enlargement or reproduction? This question is one well worthy of consideration, now that we have such ready means at command, by more processes than one, of obtaining transparencies in almost any colour.

By the carbon process it is well known that pictures of any colour may be produced according to the tint of the pigment employed; while by the gelatino-chloride process almost any tint from a bright (almost a vermilion) red to a cold, inky black can be secured simply by a modification of the developing solution, or a variation in the exposure in printing. This was admirably exemplified in the examples shown in the recent Exhibition of the Photographic Society of Great Britain by Mr. A. Cowan, who, it may be remembered, exhibited a frame containing about twenty or twenty-five transparencies from the same negative, all of distinctly different tints or colour. As it is by no means improbable that gelatino-chloride plates will eventually be extensively employed for transparencies from which to make enlargements, it may, therefore, be advantageous now to inquire which is the best colour or tint to adopt for the purpose.

We remember at the time that M. Lambert was in this country he produced some most successful enlarged, as well as reproduced, negatives, and that he laid particular stress upon the fact that they were produced from transparencies of a bright red colour by the "carbon" process. He also claimed for them that such good results could not be obtained from transparencies in the usual black tissue. So far as we are aware, however, this special red tissue introduced by him is not now an article of commerce—at least we have not heard of it for several years past—and this looks very much as if it did not possess any very material advantage over that ordinarily employed then and at the present time. Perhaps, however, it scarcely had a fair trial; for, if we remember rightly, the supply was restricted to a few privileged individuals who held special licenses.

Amongst some of the most successful enlargements we have seen were several in which the transparencies employed in making them were by the albumen process, and these were of a decidedly red or pinkish tint. Hence, we here have clear proofs that, at least, equally as good results may be obtained by employing transparencies of a red colour as when they are black; but, do they possess any decided advantage over the black or brown tones usually employed? In this opinions appear to differ, as we are aware many able photographers aver that it is impossible to obtain such satisfactory enlargements with transparencies in the ordinary carbon tissues made with China ink as when similar ones are used that are printed on a tissue of a purple or warm brown tone, as the latter yield softer and more harmonious negatives; and, for this reason, they always employ one or other of the latter tints in practice.

The essential requirements of a transparency are that the extreme high lights should be represented by clear glass, and, at the same time, that the deepest shadows shall be dense enough to obstruct the light sufficiently to yield clear glass, when the enlarged negative is developed up to the requisite density to produce brilliant whites in the prints that are taken from it.

Now, let us, by way of example, take an extreme case. Suppose we have two transparencies of the same subject—the one made in a black colour (say in China ink) and the other in Prussian blue, starting in each case with clear glass for the lights, and with sufficient thickness of pigment in the shadows to protect the collodion film from the light's action during exposure in the enlarging camera—will the one yield an enlarged negative with a greater range of tones between the highest lights and the deepest shadows than the other? That is, will the blue transparency produce a more harmonious negative than the black? This is the point. It may well be assumed that the blue, not only being a transparent colour to the eye, is also a very actinic one; therefore there may be a greater range in the actinic tints than in the case of the black, which is an opaque colour. Here the transition is from light to dark only, the transitions being about equal in actinic value to what they appear to the eye. If this assumption hold good in the case of the blue over the black it must do the same, to a minor extent, in the case of any other tints, whether red, purple, or brown.

The point is an interesting one, particularly at the present time, when considerable attention is being given to the gelatino-chloride process, by which such a multiplicity of tones and colour may be obtained; and the process promises at no distant date to be extensively adopted for the purpose of making transparencies for enlargements, by reason of its simplicity in working no less than for the excellent quality of the results obtainable by its employment. One of the superior features (it may be mentioned) of transparencies by the gelatino-chloride process over those by the gelatino-bromide or most other processes is that the shadows are so much more transparent. The difference is, in many instances, as great as that between the well-known albumen transparencies which used to be produced by Ferrier and those made with wet collodion.

This question of colour for the transparency, as we have just said, is an interesting—indeed, an important—one, now that so much is being done in enlarging, and all are aiming to obtain the best results possible; yet it is one very difficult to decide when so many diverse opinions appear to exist on the subject. If we attempt to arrive at a conclusion by judging of the work produced by the different advocates of coloured in preference to black transparencies, we are met with a difficulty, because in many instances the excellence of the results obtained by them is due rather to the individual skill of the operator than to any special tint of the transparency employed.

The subject, however, is one worthy of consideration, and, therefore, we commend it to the attention of our readers who are making their own enlargements.

SUPERSEDING RUBY LIGHT IN THE OPERATING ROOM.

The injurious influence exerted upon the sight by the prevalent use of ruby light in the dark room has for some time been hinted at; but the endorsement given to this idea at the technical meeting of the Photographic Society of Great Britain, on Tuesday evening last, by that experienced oculist, Mr. William Ackland, merits serious consideration. He stated that the proportion of photographers who had been professionally treated by him in connection with the fitting or adjustment of the glasses in their spectacles had greatly increased since the introduction of gelatine plates, which demanded a ruby light for their manipulation. He had observed that the modification required lay in the direction of an abnormal

reduction of the focal length, or an increase in the magnifying power. Into the physiological aspect of this question we need not here enter; the fact itself is all-sufficient. What are the chances of an ultimate deliverance from the ruby light? We are, fortunately, able to reply to this question in a manner that cannot fail to prove gratifying. At the meeting above referred to, Mr. W. E. Debenham—who has for some time past been engaged in making experiments with non-actinic glasses with a view to discovering one which, while equally safe with the deep ruby, shall be of a nature more pleasant and agreeable to work with—brought forward the result of his investigations. He exhibited a square lantern fitted with four different panes, some of which were ruby. But one, which by contrast with the ruby light seemed to give an almost pale yellow light, was found to greatly excel the others, not alone in the comfort induced in working by it—for that was self evident—but also in the exceedingly small action its light exercised upon the most sensitive plates, this quality being in excess of the ruby. This light is a combination of green and yellow, or, to speak, perhaps, more properly, a very pale orange. The pane through which this light was projected consists of a peculiar class of rough-looking green glass known as "cathedral green," of which, however, there are more tints than one. This was reinforced by two thicknesses of a fine, yellow paper, the combination forming a colour altogether indescribable, but one the non-actinic value of which may be deduced from the fact that a sensitive plate placed at a distance of eight inches from the light was exposed for a period equal to the time required in developing without sustaining any harm. By adding a third sheet of paper there was still a comfortable amount of light by which to work, and a plate exposed, at eight inches from the lamp, for half-an-hour was not found to have been fogged by the action of the light.

By Mr. Debenham's investigations a result has been obtained which is of great value to every practical photographer, for a three-fold advantage has been secured, namely, a light which is believed not to be injurious to the eyes; one which, from its colour, permits of the manipulation of plates under pleasanter circumstances than when ruby light is employed; and, lastly, a light to which the plates may be exposed for a considerable period without fogging being induced.

DANGEROUS CHEMICALS.

Considering the relatively small number of chemicals employed by the photographer in his business it must be admitted that, as regards risks to persons or property, they comprise a large proportion of substances the handling or storage of which is fraught with no inconsiderable amount of danger; hence, though we know that with the exercise of ordinary care these risks are reduced to a minimum, it can hardly cause surprise that, with a merely "rough and ready" knowledge of the "possibilities and potency" of such chemicals, the fire insurance companies charge an increased rate of premium for insuring photographers' premises.

The danger to health from inhaling the fumes of ether and acetic acid have in times past frequently formed the subject of discussion in our pages; so that, even if the use of these chemicals were not, as now, most restricted, it would serve no purpose to dwell upon the point. Our attention will, therefore, be given to other phases of their dangerous properties. The remarkable and painful accident to an American photographic dealer, mentioned in our last number, though it will be fresh in the minds of many of our readers, may yet be referred to again in the remarks we are about to make on a similar subject. This gentleman (Mr. Codman) lost his life through the effects following the inhalation of the fumes of nitric acid, a carboy of which—the first ever received by his firm—had been broken and its contents spilled upon the ground. Many years ago a death from an exactly-similar cause occurred in this country, the quantity spilt being smaller—the contents of a Winchester quart only.

It is not our province to point out how the oxidising action of this destructive chemical would disintegrate the delicate walls of the lungs, nor explain the actual cause of death. Suffice it that an accident such as might happen to dozens of photographers this day served in these instances to cause a sudden and painful death, and a forcible warning is given to use the utmost care in handling such dangerous liquids.

At the present time strong hydrochloric acid (for use with the platinotype process) is more likely to find a place in the photographer's studio than the previously-named chemical, and, fortunately, its fumes, though powerful and hurtful, are less distructive in their nature than those of nitric acid. At the moment of writing no case occurs to our mind where accidents with hydrochloric acid, such as we have been speaking of, have been attended with fatal results.

The dangers of ammonia have too recently been treated of in our columns to need further discussion; but there can be little doubt that, in case of a great breakage, asphyxia would result if any spectator of an accident had not a ready means of exit and did not at once avail himself of it.

With all these liquids, however, though fatal effects have been produced by accident, such results form but a slight percentage of the dangers to be feared. Many a one has either had his eyesight destroyed or injured, or his face or hands disfigured by minor spills or accidents. Thus, where acids are used in such quantities as to entail their storage in carboys, it is by no means an uncommon occurrence for the inexperienced hand, after tilting a carboy to fill a smaller vessel, to let it go back to its upright position with somewhat of a jerk, with the result of making a sudden splash inside the vessel, sometimes causing a small portion of its contents to be ejected with considerable force—perhaps into the eyes. How often this has happened and almost caused blindness it would be difficult to tell.

Unless corrosive acids are used in large quantities at a time—as, for example, in making pyroxyline—we very strongly advise our readers not to use them direct from the Winchester, but to transfer them into smaller bottles and use from them instead. The trouble of the occasional filling necessitated is well repaid by the increased immunity from accident.

Before leaving this branch of our subject, let us call attention to the minor but constant danger that occurs when removing the stopper—a danger that cannot be better exemplified than in the accident that occurred a couple of years ago to Lord Wenlock, while out on a fishing tour in Norway. In removing the stopper of a bottle of ammonia the liquid spirted out, and a drop entered his eye. He had to leave his companions and to return home, and for some time his eyesight was in great danger. Whenever the liquid in a bottle is of a higher temperature than at the time of closing it, there is danger of spirting in removing the stopper. To be aware of this should be sufficient to cause the experimenter always to turn his face aside when removing a stopper.

When the acid in use is sulphuric another danger is seen. If the bottle have been put aside for a while since it was previously used, there is danger in taking it off the shelf that a drop or two may fall from the neck, owing to increase in bulk from absorption of water by the small portion left adherent to lip and neck on the last occasion of use.

So far as to danger to persons; we have next to deal with danger to property. Accidental spilling of acids on a large scale, such as we have described, will, of course, lead to destruction of floors, &c., but that is scarcely what it is necessary to utter a word of warning against. The most insidious dangers arise from inflammable liquids, which may at any moment involve a whole building in destruction in a surprisingly short time. Most of these have at sundry periods been alluded to before; but we would classify them all at one time. Alcohol, methylated or pure, is simply an inflammable liquid whose vapour at ordinary temperatures is not inflammable, though when heated it is highly so, as many of those know who have attempted the solution of nitrate of silver in alcohol by the aid of heat. Hence, the only danger with these liquids is the risk of some ignited body coming into contact with them when, for example, they may have been spilled, the danger then being great from the liquid spreading and its easy inflammability. In the event of such an accident the readiest step would be the throwing of some inert substance—as whiting, ashes, soil, &c.—upon the liquid to soak it up and arrest its flow, and then to place a wet cloth upon the flaming mass.

With ether and, of course, through it, collodion the danger is more insidious, seeing that these bodies at the ordinary temperature of the atmosphere give off vapour which is capable of lighting, and, under some conditions, exploding, and which can spread farther, and is, consequently, of far greater danger than spirit. Great care, therefore, is necessary in handling such liquids that there be not candle or gas light or other flame within reach of the penetrating vapour. Further: the vapour of ether is heavier than air, so that it will, instead of ascending in the air, have a downward tendency, thus becoming much more dangerous. It will readily pass through crevices in floor and ceiling, when, if it come into contact with a light, an explosion is the result through the sudden combustion of the mixture of air and vapour, and the flame may travel to the stock bottle or to liquid spilled, if any such unfortunate accident should have occurred.

In thus calling attention to the dangers of personal injury from the careless use of corrosive chemicals, and to that of fire from inflammable ones, we trust that we cannot be called alarmists. We are equally hopeful that our warning words may be of use to those little experienced in the handling of the corrosive or inflammable liquids used in the pursuit of our art-science.

It cannot be doubted that, of the multitude of cheap cameras which have been sold to amateurs during the last year or two, a fairly large number will remain unused more than a few times on account of difficulties of manipulation, and, perhaps, want of patience, some persons entirely ignorant of the art believing that nothing is necessary to its practice than the purchase of the necessary machine. Such experimentalists may, perhaps, be better pleased with a little toy apparatus, called the *Photocalque*, lately brought out in Paris. It consists of a little cardboard box, which opens out and forms a kind of camera, with the ground glass lying flat, the image being thrown on to it by a small lens from a mirror placed underneath at an angle of 45°. When required for use it is set up on a sheet of tracing-paper placed upon the glass, and the image traced upon it. By simply viewing the drawing from the back of the tracing-paper a non-reversed picture is obtained.

Photography is about to subserve a new use, the teaching of horsemanship—not by means of the wonderful Muybridge photographs, where animals are shown with their legs apparently almost tied in a knot, and in most cases without a mount, but by a series of instantaneous photographs from life of the various movements by which a rider acquires a seat and controls his horse. As might readily be imagined, it is next to impossible in a verbal description to thoroughly explain the various motions required, and these photographic representations should afford a wonderful help. They are twenty-eight in number, and are intended to form the illustrations to a new work on horsemanship, by Mr. E. L. Anderson.

Professor Young, by means of his bolometer, has shown that the common idea of the distribution of heat in the solar spectrum is quite erroneous, and the old fable of actinism being confined to one end of the spectrum is quite exploded, the photographing of the red end being, as our readers know, a regular mode of investigation. But, according to M. van Assche, in a paper read before the Paris Academy of Sciences, the heating, lighting, and chemical rays can be separated by a thin film of selenium, formed by dropping a little melted distilled selenium on a glass plate, covering this with a slip of glass, and allowing the whole to remain at a temperature of 250° C. by placing it on a metal plate at that temperature. The selenium then spreads out into a thin layer, which, when a ray falls upon it, converts the luminous rays into electricity, allows the heat rays to pass through, and reflects the chemical rays. Surely, if such a wonderful plate can be made, there should be no difficulty in constructing a portable actonometer by its aid.

Mr. McDonald, of Kepplestone, Aberdeen, has set himself the task of collecting a set of portraits of living artistic celebrities. Some of the leading artists of the day will be included in the collection. It would be very interesting to know to what extent photography will be used as an aid in obtaining a likeness in these portraits, of which, by-the-by, about one-half will be painted by the originals themselves.

According to the Calcutta correspondent of *The Times*, the Prime Minister of the Llama of Thibet is a most intelligent man, the correspondent stating that, amongst a variety of articles, the Minister recently sent to Darjeeling for a set of photographic apparatus. Clearly he is an intelligent man!

We have recently on many occasions described to our readers the various successful attempts made in stellar photography—Mr. Common's magnificent success will be quite fresh in their minds—and we have now to record the success of the Rev. T. E. Espin in a similar direction. In a communication, entitled *Further Attempts at Obtaining the Actinic Light of the Stars*, lately read before the Liverpool Astronomical Society, he explained and described the results he had obtained, two plates—one of Cassiopeia and one of Taurus—showing the Pleiades and Saturn. He stated that, as a rule, the impression on the plates corresponded very fairly to the magnitudes, with, however, some very remarkable exceptions. He stated that the stars would fall into three classes:—"1. Stars whose chemical light was in excess of the light as apparent to the naked eye. 2. Stars where it was equal. 3. Stars where it was inferior, allowing a difference of 0·2 above or below the apparent eye magnitude to be due to errors of observation." From the Taurus plate, out of forty-one stars he had compared there were fifteen whose actinic magnitudes could not be made to correspond with the eye magnitudes, the differences in some cases amounting to a whole magnitude. The value of these observations will be better appreciated by our astronomical readers; but all may have an idea of the difficulty surrounding the reverend gentleman's work when it is stated that during the whole of the exposure he was keeping the telescope in position by keeping a star in the centre of the field of the finder, which necessitated his lying on his back all the time—an hour and a-half. The skill with which he directed the instrument may be judged when we learn that so truly was the telescope kept in position that the image of all the stars was round, and not, as is so often the case with such pictures, oval or elongated.

The wonderful arrangements and discoveries made by the outside press in connection with photography almost surpass belief, more especially during the season for big gooseberries, monster eggs, four-legged chickens, and suchlike. Perhaps the most prolific subject was photography in colours, which has been many times discovered—according to these gentlemen—and as often lost to view. The following, which we copy from a weekly journal, is, however, a discovery in a new direction, and deserves preserving:—"The best varnish for prints is a compound of benzol and almond oil. This gives no glaze, and is used by photographers for the preservation of photography upon plain paper." Perhaps somebody will try this on a valuable print or photograph, and note the result!

DISTORTION BY LENSES.

Every now and then it is found desirable to treat upon some one of the many applications of scientific principles to photographic practice, although there may be no new discovery to announce or new principles to enunciate. This observation applies, perhaps, with especial force to optical matters, as, although there are textbooks on optics generally, which are perfectly trustworthy and properly regarded as authorities, they would not usually be included in the photographer's library, and are commonly written for University students, or those who are supposed necessarily to be previously familiar with the mathematical language and formulæ used in their compilation.

The subject now proposed for discussion is the cause of distortion by photographic lenses, and I believe that it will add to the pleasure of every intelligent photographer who has not already made himself master of the subject to become acquainted with the properties of the instruments with which he is working.

In considering *Distortion by Lenses* it is not in the present article intended to include distortion caused by the want of uprightness of the camera back, or that introduced by the use of the swing back. These may come under another heading—*Distortion by the Camera.*

When a ray of ordinary light passes through a prism, or piece of glass, having its two faces inclined towards each other, two remarkable results follow:—First, a deviation of the ray from the path which it originally followed; and, second, a decomposition of the light into its constituent elements. This second result may be left out of the present consideration as affecting not distortion but chromatic aberration, or causing the lens to work not truly to focus.

A convex lens, such as is used in photography, acts by collecting rays of light to a focus and forming an image; and for those rays which pass through its centre this is the only action to be considered, as the axis of these rays is not bent aside. The action of a diaphragm or stop, however, is to cause the axis of certain rays—those from objects not in the centre of the field—to pass through a part of the lens more or less distant from *its* centre. Now, any portion of the lens not a central portion has the property of a prism in bending aside the axis of a ray of light passing through it, and the farther removed is the portion of the lens in action from the centre the more inclined are the faces of the prism it represents, and the more will be the bending-aside action of that portion.

Let L L (*fig.* 1) represent a convex lens with a diaphragm in front, and A A, A A, be two flat surfaces or planes called "tangent

FIG. 1.

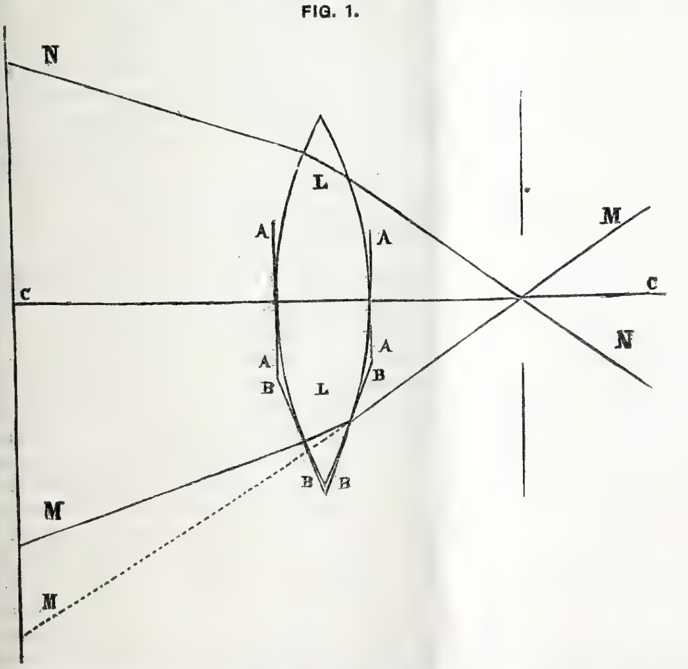


Diagram showing the identity of deviation of a ray N N at the margin of a lens, with the deviation caused by the prism enclosed by the tangent planes B B, B B.

planes," touching the surface of the lens where the axis of a central ray of light passes. These tangent planes are parallel, and the lens (so far as the axis of the ray of light is concerned) acts precisely as a piece of glass having two such parallel sides would do—allows the ray of light to pass with its axis unaltered.

Take, now, the case of the marginal ray, whose axis is M M. The tangent planes at the surfaces of that portion of the lens in action, B B, B B, are seen to be strongly inclined to each other, and the axis of the ray is bent on entering and again on emerging, precisely as it would be by such a prism as would be enclosed by those tangent planes. For rays coming from a direction between the centre and the margin of the field, the axis will fall upon a portion of the lens having its tangent planes more nearly parallel and, therefore, equivalent to a prism with side less inclined to each other. The deviation of these axes from the straight line will, in consequence, be less.

The marginal ray, N N, passes through a portion of the lens corresponding to that traversed by the ray M M, and its deviation is, therefore, precisely similar. It is introduced merely to show the identity of the path of the axis of a ray of light passing through a lens, to that of a similar ray passing through such a prism as is formed by drawing the tangent planes.

The effect of this deviation from straight lines, of the axes of rays of light not passing through the centre of the lens, is that the axis of the ray is more and more displaced as it falls upon a more wedge-shaped or strongly prism-shaped portion of the lens towards its margin, and this displacement *is* distortion. If the displacement were proportionally equal throughout, the result would only be that the image would be smaller but not distorted; but, as the inclination of the tangent planes continually increases towards the margin of the lens, the displacement increases also, so that the image of the *sides* of a square object being produced by an intermediate portion of lens, are not so much proportionally displaced as the image of the *corners* of the object, which there appears to be most bent in, or to assume the well-known barrel-shaped distortion.

A prism bends the axis of a ray of light not only in proportion to the inclination of its sides, but also in proportion to the inclination of the prism itself to the traversing ray. The minimum deviation from a straight line takes place when the angles at which the ray enters and leaves the prism are equal; in other words, there is less deviation when the prism is as nearly as may be "directly across" the path of the ray. Now, in the case of the bi-convex lens just considered, the prism enclosing the tangent planes is very obliquely situated with regard to the ray passing it, and the distortion is aggravated thereby. In the meniscus lens (*fig.* 2) it will be seen

FIG. 2.

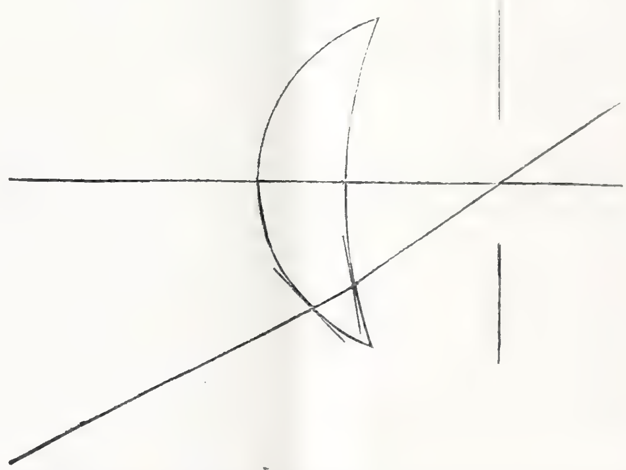


Diagram showing the wedge or prism enclosed by tangent planes in a meniscus lens. The prism in this form of lens is presented to the ray of light in such a direction as to cause the minimum of deviation or distortion.

that the prism is very nearly in its most favourable position, and distortion is, therefore, less. With a meniscus lens having its convex side turned towards the diaphragm, the obliquity of the prism to the traversing rays would be very great, and the distortion intensified accordingly.

If in *fig.* 2 the plate is supposed to be on the right-hand side of the diagram, so as to have the stop between the lens and the plate, it will be seen that the marginal ray shown, after crossing the axis at the diaphragm, reaches the plate at a point *more* distant from its centre than it would do if it had not been displaced by the prism-action of the lens upon the axis of the ray. This illustrates the case of pincushion distortion produced by a lens having the diaphragm behind the lens, such as the orthoscopic lens—now not often met with. As this same diagram represents two opposite kinds of distortion according as the plate is supposed to be the same side of the lens as the diaphragm or the reverse, it can be very easily understood that, by placing a similar lens to the one drawn upon the opposite side of the diaphragm, the two distortions will correct each other. Such an arrangement, in fact, constitutes the non-distorting doublet.

To conclude: distortion is caused by the action of a diaphragm in compelling marginal rays to fall upon a portion of the lens having its tangent planes not parallel, and being, therefore, prism-shaped. A single lens, of such an ordinary form that the whole of it can part in the formation of the image, when used without a diaphragm, therefore, does not give distortion. If this be tried as a curiosity it must be remembered that even the lens jacket is capable of acting to a certain extent as a diaphragm. The curvature of field and bad marginal definition, however, that exist with such an arrangement, even when the lens is very small in proportion to its focal length, make such a use of the instrument altogether unsatisfactory; and this fact is mentioned as one of speculative interest, and in no way to

suggest the use of anything, when all freedom from distortion is desired, but a lens, such as the doublet described, in which the deviations are made to balance each other. W. E. Debenham.

AN EASY METHOD OF INTENSIFICATION FOR BLACK AND WHITE SUBJECTS.

Taking for granted that the bath and wet collodion have not been quite banished from the studio, especially for subjects like the above, I venture to put forward a method of intensification I have worked very successfully for some years past. It involves very little trouble, and all that is desired is most easily obtained.

At times photographers are asked by their clients to copy an old engraving, and, as a rule, most photographers, in the ordinary way of business, would rather be without such work. If the customer be told that it is not worth the photographer's while to do it, perhaps he may find out some other who will; and my advice to all photographers is never to turn an order away, however small, or you may lose your client—not only for such an order as the one in question, but also for any other commission. As regards myself I accept everything that is offered and do it; and I think it well to be "coached up" in all matters as to the easiest and most simple way of accomplishing these little, difficult matters. I know well to my cost how at times I have missed some good negatives (gelatine ones) before I adopted the method of intensification I published in The British Journal of Photography in August last. I have found it remunerative, and many other photographers have adopted it as successfully as myself.

Years ago line engravings to copy were a great source of annoyance to me. I remember the time I adopted the pyro. intensification as practised with wet collodion, and, after working away for some considerable time to get sufficient density, I found on drying the negative that the collodion film had all split to ribbons off the plate, owing to the astringent properties of the pyro. contracting the film. Sometimes I used bichloride of mercury, iodide of potassium, followed by that odorous compound—hydrosulphide of ammonium. Most of the photographers of the present day have, fortunately, none of this beautiful compound to deal with, as it would just about "settle" anyone with a bilious attack.

Then, again, the uranium intensifier was put forward, but that was very short-lived. Then came the lead intensifying process of Eder and Tôth, which, to the best of my recollection, was a very troublesome affair, especially if there were the slightest deposit on any part of the tissue in the negative. This process I was obliged to abandon as unsatisfactory—at least, it was so in my hands—though I heard that some worked it successfully. I never like having to manipulate with either mercury or lead salts, owing to their having such baneful effects on the human system, especially with some constitutions. I have heard of a process in which bichromate of potash and sulphate of iron were used in some form or other to gain density, and I believe with great success.

With none of these systems have I succeeded as well as with my own, which is as follows:—Take the negative of the engraving to be copied in the ordinary way with wet collodion and the nitrate of silver bath, taking care not to over-expose, but give it sufficient exposure to preserve clear glass to represent the black lines. After it is fully out with the ordinary iron developer of the usual strength—say

Protosulphate of iron	15 grains,
Glacial acetic acid	15 minims,
Water	1 ounce,

well wash and intensify with the ordinary pyro. intensifier, namely—

Pyrogallic acid	2 grains.
Citric acid	1 grain.
Water	1 ounce.

Just get a little intensity, but do not push for it; fix with cyanide of potassium (not hypo.); well wash, and put into a bath of—

Bichloride of platinum	4 grains.
Nitric acid	1 drop.
Water	10 ounces.

Keep the dish slightly rocking to get even action over the whole film; allow it to remain until the film is black, which will be in about two or three minutes, and it will be noticed should there have been any *slight* veil on the lines in this bath they will have cleared and brightened up. It is very curious that it should have this effect, but it has. On taking it out of the bath, if it were fairly dense to start with, it will have increased in density on looking through it, and will be of a slate colour. If it have only been a ghost of an image at starting the image would almost have disappeared in this bath. Unless there was a certain amount of intensity this is sure to occur.

Well wash the plate and proceed to intensify with pyro. and silver as before. It will be found to increase very rapidly in intensity, and the lines will keep remarkably clear. There is no fear of them blocking up after a certain amount of intensity is obtained; when it appears difficult to get any more, wash it and place it in the platinum bath as before for about the same time. On looking at it the plate will be found to have gained considerably in intensity and to have become much blacker. After washing it, it can be treated with pyro. and silver again, or as many times as may suffice to produce the requisite amount of density.

One thing must be guarded against, namely, not to force it too much with pyro. and silver; that is, not to allow the pyro. to act on the film after intensity apparently ceases, as it will readily be gained after further treatment with the platinum bath. If this be attended to there is not the slightest fear of the film splitting up or drying. There is one precaution I take to keep the film from washing up, and that is to edge the plate with india-rubber solution.

I must not omit to mention that the platinum bath may be strengthened from a stock solution kept for that purpose. My stock solution is as follows:—

Bichloride of platinum	60 grains.
Water	10 ounces.

Before I discarded wet collodion for field work I found this system exceedingly useful when the light was very dull in winter weather, when, occasionally, I used to get a thin negative.

In reading this many may think it a very roundabout way, but in practice it will not be found so; there is no risk with it. My friend Mr. F. A. Bridge has been using it for some time, and is very successful with it. The use of platinum is far better than the old iodide in water to flood the plate with, followed with pyro. and silver. To those who have any line work to do my advice is to try it. William Brooks.

PHOTOGRAPHIC INDUSTRIES.

THE CHEMICAL WORKS OF MESSRS. HOPKIN AND WILLIAMS.

Having long made a specialty of manufacturing not only rare but also pure chemicals, the firm of Hopkin and Williams now reap the reward so richly deserved, their name being known in this connection throughout the world, and which, when attached to a chemical, immediately silences any doubt or cavil as to its purity. Rare, indeed, must be the chemical preparation they cannot supply; and when Mr. Williams courteously accompanied us over their Cross-street premises, directing our attention to rare alkaloids and other substances of almost fabulous danger and potency as poisons, we were prompted to inquire whether the firm had ever made that most deadly of all poisons—kakodyl. "Yes," said Mr. Williams, "I once made it; but the danger attending its preparation being so great, and the demand for it absolutely *nil*, we concluded not to make it again." We may here remark that the cyanide of kakodyl (a peculiar compound of hydrogen, nitrogen, carbon, and arsenic, discovered by Bunsen) enjoys the dangerous pre-eminence of being the most fearful poison known, a few grains vaporised and diffused through the atmosphere of a large room producing instantaneous delirium, quickly followed by unconsciousness and death.

The London premises of Messrs. Hopkin and Williams, in Cross-street, Hatton Garden, possesses rich, historical interest, inasmuch as the building formed at one time the chapel of the famous Edward Irving. Here in former days flocked both high and low—royalty included—to listen to the ministrations of that eloquent divine. Their places are now occupied by alembics, furnaces, crucibles, filters, jars, bottles, and other appliances of a manufacturing and refining laboratory, together with supplies of inorganic and organic preparations, the mere classification of which would far exceed description in an article like the present. Of acids alone we counted no fewer than a hundred different kinds always kept in stock.

For the benefit of hero worshippers—as the term "archæology" does not yet apply—we may state that the walls of Irving's church are still intact, and this applies to the quaint arched windows. The place where once stood the pulpit is now occupied by an elevator, or lift. The vestry is devoted to inflammable alcohols and oils, special precautions (in the form of closely-fitting iron doors) being taken against fire. Ether, of which a large quantity is used in the preparation of other compounds, is kept in a partially-covered yard

outside of the walls of the main building. Several large and well-protected shelves devoted to the storing of hydrocyanic acid were seen by throwing open the doors by which they were hidden from view, and disclosed such a supply of this potent acid as one ignorant of the demand made for it might have imagined would supply the whole world for the next decade.

Although the Cross-street establishment is not supposed to be a laboratory, in the usual sense of that term, but rather a warehouse and distributing centre, yet at the time of our visit we saw many chemical operations going on—one "wind furnace," in the rear, alone subserving the preparation of at least half-a-dozen entirely different bodies. The intimate knowledge displayed by Mr. Williams of the precise contents of each vessel, and the stage at which ebullition or evaporation was or should have been reached, indicated the watchful care of the master chemist, and the frequency with which the operations of the various assistants were supervised.

Situated at the junction of the Wandle and the Thames, in Wandsworth, is the principal laboratory or factory of the firm. Here, under the same guidance, we were privileged in witnessing chemical operations carried on on a more extensive scale. In one building devoted to that purpose is carried out the preparation of pyrogallic acid from the galls—a large tank of which, extending across one end of the building, was undergoing fermentation. Although all chemists know, yet some of our readers may not be aware, that gallic acid is obtained by mixing powdered galls with water and allowing this to stand for some weeks, when a species of fermentation takes place, oxygen being absorbed, carbonic acid given off, and gallic acid deposited in abundance; for, as every photographer is probably cognisant of the fact, this acid is soluble in water to the extent of only three grains per ounce. By subsequent boiling, digesting with animal charcoal, and recrystallisation the gallic acid is obtained pure. When heated to a temperature of 420° Fahr. the gallic acid sublimes, producing pyrogallic acid, which possesses some properties different from gallic acid.

In another room hydrobromic acid was being prepared. This is a substance of which the experimental photographer ought never to be deficient, as it affords such a ready means of making bromides on a small scale without much trouble. In the present case this acid was being prepared by the action of bromine upon red amorphous phosphorus with water. As old daguerreotypists are well aware, water with bromine present is of a very deep red colour; but in presence of the phosphorus it is colourless, or nearly so, being converted into hydrobromic acid. Several niceties in the way of manipulation have to be attended to, the final act being distillation. To prepare a bromide: add to the hydrobromic acid sufficient of the oxide or carbonate of the metal selected to nearly neutralise it; then evaporate it, and the bromide of the special metal employed is obtained. Mr. Williams informed us that in making bromides on such a large scale as they did, several of them—such as the bromide of cadmium—were made by the direct action of the one elementary body upon the other.

In the room in which soluble cotton or pyroxyline is prepared we saw two large Wedgewood vessels containing cotton in the act of undergoing digestion with the acids. High-temperature pyroxyline was made in another part of the works by the manager himself, as it required special care in its preparation. In reply to a question, we were informed that the firm never made photographic collodion, as they conceived it would be inimical to the interests of those of their customers in the trade who made a speciality of such collodions. They confined themselves to the preparation and supplying of the raw materials out of which it was made.

Introduced to the manager of the works, we found him engaged, in his private laboratory, in the twofold operation of preparing methylal and a highly-purified oil of cloves. This latter was so much purer than anything of the sort we had previously seen in commerce that we inquired the *cui bono?* Mr. Williams informed us that it is employed in the hardening of nerve and other tissues by physiologists.

It would prove a tedious task to speak of the numerous chemicals we saw in process of being made or rectified. We may, however, mention a large vessel full of chromate of potash, the beautiful yellow crystals of which arrested attention. They were being dried preparatory to being put up for the market. This salt, we were told, is now much employed, with sulphate of manganese, in the manufacture of a bronze dye of a peculiar kind. The phosphorescent nature of nitrate of uranium, when breaking up its crystals, was shown by the beautiful flashes of phosphorescent light copiously emitted. Oxalic acid, dialysed iron, carbonate of iron, and a thousand other things having names more or less familiar were witnessed in various stages of preparation.

Special precautions were taken against the inhalation of noxious fumes, the strong upward draughts and well-encased chimneys forming a security against danger from this source. The strictest injunctions had been given to every man in the place that in the event of any accident, such as the bursting of a retort, their personal safety was to be consulted first of all by instantly rushing out of the place, no thought being bestowed upon any loss of material.

Observing the freedom from smoke by which both the Cross-street and Wandsworth works were characterised, Mr. Williams informed us that it was caused by their using anthracene coal and coke alone in their chemical operations.

The firm was established in 1850. In the year following they exhibited certain preparations in the Great Exhibition, for which a medal was awarded to them. They soon afterwards devoted much of their attention to the preparation of chemicals for photography, which at that time was beginning to make rapid advances; and in this, as well as in several other departments of chemical science, they have ever since retained a foremost position. The commercial business of Messrs. Hopkin and Williams is exclusively wholesale.

PHOTOGRAPHIC BOOKKEEPING.

I HAVE occasionally noticed hints in your pages upon the manner of keeping books and cognate subjects, and have in time past on more than one occasion derived benefit from them myself. In the course of a considerable experience in various reception-rooms I have naturally had the opportunity of becoming acquainted with many systems; and that under which I now work, and have done for some few years, appears to me to possess so many points of excellence that it would be worthy of description, and capable of affording hints both to the experienced and inexperienced.

Although the style of bookkeeping which I am about to describe is not of my own devising, yet it is in so many ways superior to that of any of the other studios in which I have filled the post of secretary that I feel sure, if I only have the ability to do it justice in my explanations, your readers will undoubtedly acknowledge it to be most complete, and as simple in practice as it appears complex in description. I do so with the full concurrence of my principal, and his expressed satisfaction with the manner in which his system and arrangements are carried out.

When I first glanced at the books I thought they seemed very complicated, and to involve an amount of repetition that to me seemed of very little use; but before I had been a week in the studio I was ready to acknowledge my mistake, and agree that I could not wish one particular altered, although I had the power to do so. Before proceeding further I should say that all our books are kept on a *check* system, so that the smallest detail can be followed throughout from the date of receiving the order until its completion. I have a set of six books—receipt book, day book, ledger, order book, printer's slip book, register book, and, of course, several small books, such as petty cash book, &c.; but, as everyone's method of keeping the latter is much the same, I do not think it is necessary to enter into particulars regarding them.

For the sake of convenience I will divide our system under four heads, beginning with that most important element, cash, and follow with receipt of order, progress of the work, and despatching of the finished pictures. Our rule is payment at time of sitting, but in many cases we cannot obtain this, as, when an entire family are to be taken, coming as it may be convenient for them, or when a client "forgets his purse," &c., &c.

Cash Book.—All cash received is acknowledged on a printed form the "receipt book" being after the style of a banker's cheque book, with corresponding numbers on receipt and counterfoil. In case of an account being brought for payment the receipt is written out and attached to the invoice, my principal allowing no money to be signed for on the account itself. At the close of the day these counterfoils are written up, the amount paid, and number of counterfoil being placed opposite payer's name in day book or ledger, as the case may be, thus making it almost impossible to have any errors in the day's cash, or of committing that most humiliating mistake, sending out an account when it has already been paid. These books, when the receipts have all been used and only the counterfoils remain, are carefully put away in their order, a number being placed on the outside of each, so that in a very few minutes—should any question arise as to a payment—we can turn the whole transaction up, whatever the length of time that may have elapsed since the amount was paid.

Order Book.—Every order received is at once entered in this book, with full details of what is wanted, and at the close of the day each item is transferred to the day book (which is really much more than an ordinary day book, as space is left opposite every entry for the date of despatch); but, to facilitate description, I will give an example of one or two entries, and show how the different classes of orders are treated, as every transaction, great or small, must pass through this book—

sitters, re-orders, enlargements, copies, &c., &c.—and all in a manner as clear as anyone could desire :—

Date.	Payer's Name.	Address.	Style.	Subject.	No. Ordered.	Register No.	Deliveries.								No. of Receipt.	Price.			Paid.		
June 1st..	Lindsay, Hon. George,	St. Mildred's Crescent, London, W.	Vig.	Self	—	34,569	1	5 6	—	—	—	—	—	—	74,986	—	—	-	1	1	0
,,	St. Clair, Mrs. Arthur,	18, George's Square, Bath.............	Cabt. Vig.	Miss St. Clair..	24	8,917	1	6·6	12	13·6	12	19·6			—	2	12	6	—	—	—

The first entry in the above transcript, which is about one-half the size of the original, is that of a sitter newly photographed; the second, an order complete. In re-orders the letter "R" is written against the number ordered to indicate the difference from fresh sitters, that being necessary on account of the difference of charge. In all other respects the book is filled up the same. After a sitter is photographed, before leaving the studio he is given a slip of paper, taken from a book kept there for the purpose, on which is pencilled the name, the number to be given to the negative, and the style in which he has been photographed. This he is requested to give to the secretary, who takes down the address and instructions for delivery, and receives payments. This slip I find particularly useful. It saves all the objectionable talking through speaking-tubes that is necessary when a sitter cannot make up his mind to the kind of picture he will have till he has seen the principal, and then cannot give any particulars when he comes into the reception-room.

These slips I put aside until the following morning, when the negatives are brought to me to be numbered. This I do from the slips, and then proceed to enter them into the day book in the manner shown in the example, and also into the

Register Book.—We retain a print of every picture we take, large or small. Two proofs are always printed—one to be sent to our client, the other to be pasted into the space allowed for it in the register book. The name of the individual—or place, if it be an outdoor subject—and the index number of the negative are written underneath each. We can thus, on applying to the index books—which are separate volumes—refer to a picture taken ten years previously as easily as to one taken the week before. These books as they are filled are numbered consecutively, and placed in a rack so as to be within easy reach when required.

I know all this sounds formidable when one thinks of the quantities of pictures passing through our hands in the course of a year; but, when it is done regularly and methodically (and regularity and method I might almost say is our motto here), it is astonishing how easy and simple it becomes; and the convenience of having these pictures for reference is worth all the trouble, especially in a business like that where I am engaged, which depends to a great extent on "connection."

Progress of the Work.—Our rule is to give out every morning all orders for work to be executed by printers, &c., and here the

Printer's Slip Book is invaluable. It is a book with alternate leaves of perforated slips (nine on a page) and plain sheets of paper—the former for tearing out and sending to the printer, and the latter for receiving a duplicate (by means of black transfer paper), which is always there for reference in the event of the slip being accidentally lost. On these slips I write the date, name, and register number of the negative, and the quantity and style required. The printers, mounters, and spotters, in their turn, as the order passes through the various stages towards completion, write in on separate headed lines the date it leaves each hand, so showing, if there have been any delay in completing the order, in what department it has occurred. In due course the slip is returned to me attached to each batch of finished pictures, when they are brought before the principal for his inspection previous to

Despatching.—This, I think, requires very little description, as the example from the day book shows the method quite plainly. I have only to write in the spaces marked "deliveries," the number of photographs in one narrow space and the date in the other, as shown in the second entry, which, as I have previously said, is that of an order completed but not paid for, the first being that of a client who has paid at sitting but has not yet ordered.

At stated periods all unpaid items are transferred to the ledger, the folio to which each account is transferred being marked against the entry in the day book, and the day book entry then crossed off.

With this I finish my explanation of the whole round, which, as I stated at the outset, is to facilitate the despatch of work and to avoid discrepancies or errors in cash. If this system be properly carried out —I believe I do so carry it out—I might, for example, give up my post one day and my successor take it up on the next without need of note or explanation.

M. Jane Campbell.

ON THE REPRESENTATION OF COLOUR BY TONE.

Part III.

I will now endeavour to show how I think we can best get "breadth" —that is, a harmonious balance of effect in the proportionate quantities of light and shade. In portraiture the first question will be—"What tone will the sitter's dress show in the photographic print? because the various shades in the picture from light to dark must be arranged from that as a starting-point. Of course, the eye will not aid us in answering the question. We must learn the translation of colour into tone, or, in other words, the depth of tint each colour produces on the sensitive film or print. I think the best way for the portrait photographer to gain this knowledge is to procure from a wholesale draper some of his old pattern books of dress buttons. I saw some a short time ago; the buttons were half round and covered with different-coloured dress materials. There were about sixty on each card, with the numbers printed over them. By putting the card where the sitter stands, photographing it, and then taking a print from the negative, we shall have a key always at hand showing the equivalent tone to each colour; and, on account of the buttons being half round, we shall get the tone equivalent of the colour in both light and shadow.

On the arrival of a sitter, find the tint that the dress will show in a print. If the shadows of the dress will only give a half-tone it will be necessary to have a non-actinic accessory close to the figure, or the picture will look flat. By having a gradation of tones in the background—from the high light of the face to the lightest tones of the dress—the various shades of the dress will complete the scale of tones to the deep dark of the accessory. In the case of a sitter in a black dress, the background and accessories must be arranged so that by their *light* half-tones a gradation of tones—from the high lights of the face to the dark dress—will be secured. With the aid of a few different-coloured accessories, and a movable background so as to vary the gradation of half-tones from the face to the darker shades of the dress and accessories, we can get an artistic photograph of a sitter in almost any coloured dress. In the studio a picture must be built up so as to secure about a quarter of its light, another quarter as dark as possible, and the remaining half a scale of half-tones from one to the other.

In landscape the photographer has much more difficulty to get breadth in his pictures than in portraiture, even though he has more control over the subject than is generally supposed. Usually the sky constitutes a great part of his picture, and on the tones he gives to the clouds depend to a great extent the success of his work. Some photographers simply paint out the sky, while others print from cloud negatives (usually from a negative of some fine effect of the sun breaking through a bank of clouds). The first method requires no opinion of mine. The second, as a rule, draws the interest too much from the landscape.

Those who visit the photographic exhibitions have, no doubt, noticed exhibits which had this defect. The bright masses of light among the clouds were equal in size and interest to those in the landscape. There was no part of the picture which gave a feeling of repose, and the effect of the picture suffered in consequence. If the interest be intended to be in the landscape, the cloud tints are only required to act as a background would to a portrait, viz., by their depth of tint bind together and complete the scale of tones required by the picture—from high light to deep dark.

One of the great difficulties in landscape photography is to get secondary lights among the dark tones of the picture. When there is any water in the foreground the reflections from the sky will generally give capital secondary lights; but, if there are only grass and trees, the sympathetic companionship of a wife or sweetheart in a light-coloured dress will be the most useful addition to the photographer's belongings possible. But—I must say it—it must be to take a secondary place in the picture (unless a portrait with a landscape background be required). We all know what a woman will sacrifice at the call of duty, and if it be carefully explained to her that, by standing back among the heavy shadows under the trees, her bright presence will have the same effect in the picture as her beaming smile has on the darkness in the world around her, &c., &c., it will generally be found that one can get a most willing and interested—accessory. I beg the lady's pardon, but I am "hard up" for a word! Mr. H. P. Robinson, in his beautiful pictures in last year's exhibition, found the use of women's help, even if they were artists' models.

I know the professional photographer often has to take a negative of a subject of which it is impossible to make an artistic picture. I would advise him to put the print on a plain mount without name or address, as it is impossible to calculate the bad effect on a photographer's reputation caused by an inartistic picture. The public are almost sure to lay the blame on his workmanship, as not one in a dozen can see the

cause of a picture not pleasing them; they only know they do not care for it. The amateur photographer has not this difficulty, as he can always choose his own subject, and if it do not make a satisfactory photograph it is only so much wasted material, and his reputation stands on his good work.

Beyond all questions, in connection with pictorial effect, and one which it is often impossible to explain by any fixed rules, is that of "individual taste." Shee once wrote of an artist who had no taste as "the best of workmen in the worst of trades," and how true that is of some photographers. A few amongst us have such an inborn artistic feeling that their pictures look as if nature had grouped and posed itself purposely for them, and it is only by the study and dissection (so to speak) of such works as theirs that others less favoured can hope to obtain equal results. HERBERT S. STARNES.

NOTES ON PHOTOGRAPHIC PRINTING.

As a sequel to my remarks on the negative nitrate bath, I wish to say a few words on the sensitising of paper for the printing of positives. In one most important respect this is a less complicated matter than the other, inasmuch as in printing we are not troubled with the double silver haloid compounds, which cause so much inconvenience in the negative bath by originating pinholes. But in other respects photographic printers are frequently at a loss to determine the strength of silver solution best adapted for the particular sample of paper which they are about to sensitise. All this uncertainty arises from their ignorance of the proportion of salt to albumen which has been used in the preparation of the paper they are about to sensitise.

Many years ago, when pyrogallic acid was generally adopted for the development of wet collodion negatives, these were sometimes so dense that, in order to secure even moderately-rapid printing, the paper was so highly salted that it required to be floated on a silver bath of some eighty or ninety (or even more) grains to the ounce of water in order to convert the whole of the soluble chloride within a reasonably short time of floatation.

Now, I think we may take it as a photographic axiom that the longer a sheet of paper takes for complete sensitising the less is the image imprinted on the surface. In other words it is, to some considerable extent, in the texture of the paper below the albumen; in fact, the silver has had time to permeate in appreciable quantity the whole fabric. The same takes place if paper be *slowly* dried after removal from the silver bath. To prove this, float a piece of ordinary albumenised paper on a solution of silver nitrate, and immediately smear a portion of the back with solution of hyposulphite of soda. In the course of three or four minutes or less the portion touched with hypo. will turn yellowish-brown from the formation of silver sulphide, thus proving conclusively that the silver solution, even after it has coagulated and passed through the albumen, will still, in appreciable quantity, permeate the whole texture of the paper. Here I may add, parenthetically, that this penetrative or diffusing power has been utilised for printing pictures to be viewed by transmitted light. This is effected by simply placing the reverse side of the sensitised paper next to the negative in the printing-frame, exposing to light, and then going through all the subsequent operations exactly as in ordinary printing. Finally: when dry the picture is rendered translucent by treating it with bees'-wax or Canada balsam, paraffine, &c. Scarcely any image should appear on the surface, the picture being inside the paper.

Nowadays the character of our negatives has altered very materially, and in order to meet this change we are obliged to modify the preparation of the paper for printing from them. Given a good sample of paper as a foundation, the following materials for albumenising and sensitising ought to render it eminently suited for the gelatine negatives of the present day:—For the preparation of the paper the albumen of fresh eggs only should be used. For a rather highly-glazed paper three parts of albumen and two of water will be found sufficient. These, when mixed and measured, are salted in the proportion of seven or eight grains of chloride of ammonium for each measured ounce, and one ounce of acetic acid for every twenty ounces, of the mixture. The whole is then beaten into a froth with a "whisker" or a bundle of quills, and allowed to stand for several hours. Before use it is filtered through a jelly-bag into the flat dish used for floating. Make sure that the right side of the paper—that is, the side not having fine wire markings—is laid on the albumen. In order to be completely successful the whole operation of albumenising should be conducted in a warm and very dry room. The albumen should not be kept for more than three days, otherwise it might begin to decompose, and that means the photographer's great enemy—sulphuretted paper. It will give one some idea of how much albumen he should prepare if I state that three gallons are sufficient for two reams of paper (22 × 18 inches), and that a moderately-active girl can float one ream each day. Stale albumen gives a brighter surface to the paper than fresh, but paper prepared with this discolours quickly after being sensitised.

For paper prepared as above, and indeed for what is at present generally to be found in the market, a silver bath of fifty grains in summer and sixty in winter, with two minutes' floatation, are amply sufficient. A little bicarbonate of soda, shaken up with the silver before filtration, is very useful; so also is a little alcohol, but the quantity of this should be taken into account and provided for when weighing out the silver.

In preserving this bath in good working order—seeing that we have nothing to fear from the pinhole-disease, as in negative work—it is only necessary to keep up its strength and quantity to the required standards, and to preserve it from contamination with foreign matter, which might be injurious. For the estimation of its strength use a *previously-tested* argentometer, bearing in mind the fact that the more a printing bath is used the more it becomes charged with the nitrate of the salting base, whatever that may be, which is generated by the double decomposition taking place during the act of sensitising. This newly-formed salt, of course, adds to the specific gravity of the liquid, but does not injure it; still when testing for strength by a more accurate standard, namely, the precipitation method, I have never found the indications of a previously-tested argentometer to be more than three grains per ounce wrong, even in a much-used silver solution.

After having been used for a short time, this silver solution generally becomes highly coloured by organic matter derived from the albumen. A little kaolin or disintegrated felspar kept in the bottom of the stock bottle, with a little shaking up, discharges this colouration, which, if high, will perceptibly stain the paper floated on the solution. A little bicarbonate of soda answers the same purpose, although it weakens the silver to some slight extent. Best of all is oxide of silver, which not only discharges the colour, but, if acid be present, neutralises the solution by being dissolved, and thus helps to keep up its strength.

As to filtering: that should be done immediately before use. A double filter made of Swedish filtering paper is the best, and, being very strong, will last for many occasions, thus affecting a considerable saving in silver. Of course it must be kept for this purpose exclusively and not used for the negative bath, inasmuch as the dissolved iodides and bromides in the latter injures the former.

I may as well add that, in removing albumenised paper from the sensitising bath, it should not be drawn over a glass rod, as I have seen some operators do, but raised gently so as not to take up much superfluous solution, which is not only wasteful but retards the drying of the paper very considerably. Drawing over a rod is, moreover, apt to spoil the bath and injure the surface of the paper.

I have been somewhat terse and jerky in the above observations, but I was desirous to comprehend the gist of what I had to say within the limits of one reasonably-long article. GEORGE DAWSON, M.A., Ph.D.

P.S.—I must acknowledge my obligations to Mr. Ayres, who has made the subject of printing a special study, for much of the information contained in the above.—G. D.

ON THINGS IN GENERAL.

EVERYONE admits, now that the Exhibition is closed, that it has been one showing a marked advance on its predecessors; and its finances, I suppose, have likewise been successful, the receipts this year surpassing all previous experience. That is rather a droll episode about the catalogue and Mr. Davies' exhibits, Tennyson's familiar lines, ending with "Men may come and men may go, but I go on for ever," being made such a hash of in spite of corrections. One is inclined to ask whether it is really the exhibitor or the catalogue printer who makes the hash, which is further complicated by one well-known gentleman writing that in his "revised" catalogue it is all right, when really it is all wrong—as wrong as in the first edition.

It was quite a pleasure to see the name of that veteran, Mr. George Dawson, in the pages of this Journal again dealing with a topic he had so well studied years ago as to make it almost his own. If the rising generation of photographers to whom he alludes will really give some study to the subject it will be all the better for them, for wet-plate photography has a distinct place at the present time, fashionable as gelatine has now become. There is a fear that the "rising generation" in the majority of studios will learn nothing but gelatine, so that if an apprentice or learner, when he goes out in the world, happens to engage at a place where wet collodion is made use of, he will find himself very awkwardly placed. I was talking to a cabinet-maker the other day, and he said they had recently engaged a young man from a "shop" where machinery was employed as much as possible, and this new hand, though expert enough with it, did not know how to handle an ordinary hand-saw properly. Of course he had to "go." This hint may, perhaps, not be lost upon some of my younger readers. Let them learn wet collodion, though in the studio where they work it be not practised, lest when they get a first situation elsewhere their case may be similar to that of the apprentice of whom I speak.

Another series of articles in THE BRITISH JOURNAL OF PHOTOGRAPHY, being of great interest, is that referring to the photographing of microscopic objects—I really can scarcely persuade my pen to write the word "photomicrography," as my tongue utterly declines to utter it. I will

undertake to say that there is not a more cacophonous or difficultly-pronounceable word in the English language. "Microphotograph," as used in this Journal in the old days, is a great deal nicer, and quite as correct logically and etymologically. Who is responsible for the invention of the former horrible compound, I wonder? now in use for a number of years by some writers.

After reading Professor Donkin's eulogium on changing-boxes and double dark slides I feel inclined to reconsider my own views; for, hitherto, while according a very large tribute of admiration for the ingenuity displayed in their construction, I have had an undisguised—not to say violent—preference for slides over changing-boxes. But there cannot be a doubt that the opinion of a man who has been up a big mountain and taken some fine views is a practical grain of judgment worth more than the traditional pound of theory.

While speaking of apparatus, I should like to inquire what is the true meaning of the various opinions given on the "triumph ventilator." Mr. Edwards joined the rest in saying it prevented down-draught, and for the drying of gelatine plates that is unquestionably a *desideratum.* Still, one would look for a ventilator that would also encourage up-draught, which this one is stated not to do. Cannot the two conditions be combined?

Amongst the little contrivances of great use there are few that will surpass Mr. W. E. Debenham's plan of sticking a label at the back of each plate, and allowing a short piece to project beyond the edge. It will be capital for "changing" in the dark; and then the tearing off the projecting portion forms an ample safeguard against using the same plate twice over.

I was much interested in reading in my Journal for the same date an account of Mr. A. Cowan's experiment with gelatino-chloride plates. It is singular that more notice is not taken of a process of such beauty. What an indefatigable experimentalist that gentleman is! For practical work involving results of great importance to the working photographer it would be difficult to find a more valuable contributor than Mr. Cowan.

If the number of occasions that photographers appear in the law courts is to be taken as any test of the popularity of a process, surely our art-science is getting wonderfully popular; for we have been treated to a considerable number of photographic lawsuits of late. There is generally a racy tone pervading accounts from the court over which Mr. Commissioner Kerr presides, and a recent photographic dispute is no exception to the rule. A photographer sued for thirty shillings as the value of a coloured enlargement from a *carte* supplied. The defendant's solicitor said he had a boy in court who knew the defendant very well, and when the portrait was sent home he did not recognise it. To which the Judge replied—"That may be, but recollect that five years have elapsed;" and he gave judgment for the plaintiff. People are very apt to bring a *carte* to be enlarged and painted, and then compare the results with the original instead of the *carte.*

I quite agree with Mr. Stillman in his estimate of anonimity, though, from having had my periodical corner in this Journal regularly for a number of years past, I may consider myself to carry a letter of credit. As to authorities for my statement, I did not think it necessary; for when we read, for example, as is most common, of a "mechanical art," there is very little credit in photography being classed as an "art." I adhere to my statement; but, in place of referring to what I have read of the opinions of many artists, I will give two instances of depreciatory comment, where, in a left-handed manner, photography is contemptuously accorded *a* place as an "art," but not a *fine art.* Mr. Hamerton speaks of "this photography as an art so imperfect," and in another place says—"It is not a fine art at all." This is all my contention as to Mr. Stillman's actual words. But if it be true that *de gustibus non est disputandum,* far more truly may the assertion be made of art, and I always feel angry with myself when I take part in any such argument; for, art, artist, artistic—what are they? The cult gives them an entirely esoteric signification. What are the passwords?—palette and pigment, marble and mallet. If you do not bear the magic symbols and show the products of your intellect you are to them—anathema! maranatha! I do not write as one untrained in pencil and brush, though it is many years since I touched either; but I feel—nay, more, I know—that, *in a most limited degree,* photographs can do all that "art" (as Mr. Stillman has it) calls for. Muller says—"art is a representation—that is, an activity, by means of which something internal or spiritual is revealed to sense." I have before me as I write a most touching picture—a little woodcut by Millais, a figure study without a visible face—which tells a whole story of pathos, and needs not Tennyson's words—

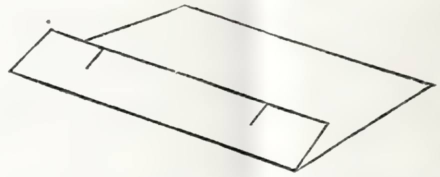
"I am aweary, aweary,"

to interpret it; yet I do not hesitate to say that there is nothing in it that could not be executed by photography, so that one could not be told from the other. Nor is there any reason why an educated photographer should not invent, or conceive, such a *tableau.* Where is the boundary line here betwixt fine art and mechanism? As to mere imitation to the print of deception, Mr. Stillman must have been young in art to have imagined such a quality to possses its *imprimatur.* One of the most popular pictures (in the sense of attracting the multitude) ever painted was the *Death of Chatterton,* which, at the Manchester Art Treasures' Exhibition, was always guarded by police and always surrounded by a mob. Yet it was decried in the strongest terms by the "artists." And thus it is the argument cannot be taken out of a circle. A man shows his palette or his chisel and at once is yclept "artist," let his mental or spiritual calibre be what it may; yet when emotion, passion and pathos, or playful fancy are combined with proportion, design, and clever composition of light and dark mass and line—as can be done and has been done in photography—the producer is denied entrance, for he cannot utter the password, while, inside, the partakers of the mystery are all wrangling amongst themselves, almost everyone denying the possession of the divine ichor by anybody but himself and his following. Let an authority give his decision as to what constitutes art qualities in a work, and let him admit that if it possess them it is a work of "fine art" and its possessor an "artist." I assert that photography will be equal to the task. FREE LANCE.

A SIMPLE MODE OF MOUNTING PRINTS.

THE mounting of prints, although it seems to be a simple matter, is yet one of those things that causes the amateur a good deal of trouble, as it very often happens that this process inefficiently carried out spoils the result of all that has gone before. In dealing with this difficulty I have devised a very simple mode of working, which saves time, trouble, and temper.

I use gum for mounting; and, as two decided requisites are a very even layer of mountant and the minimum of expansion in the print, I gain these points as follows:—I assume that the bulk of the prints are the same size, and to be mounted on cards of a fixed size. Take one of the mounting cards, and by measurement find out the place the print ought to occupy. Say the prints are 5 × 4 and the card 7 × 6, to show a clear margin of one inch. Turn up one side of the card one inch deep, and fold it over, so that the turned-up edge just comes up one inch, and when smoothly folded over mark on the underside, which is now uppermost, a short line exactly one inch from either side. A reference to the figure will explain this. It will be evident that if the card on which the print is to be mounted is laid on this folded card, and pushed down into the angle of the fold, the piece that is turned over will indicate the base line for the print, and the two marks on each side indicate the place of the print on this base line.



The next process is to gum the print. To accomplish this I take another piece of stiff cardboard, larger than the print, and with a stiff brush lay all over it an even layer of gum. Then taking the print I lay it back downwards on the gummed cardboard, running the finger all round and over it to ensure its touching everywhere. I lift it off carefully, when the whole of the back is found to have a very thin and even layer of gum all over it. If the mounting card be now slipped into its place on the folded card, it is the work of a moment to press down the folded portion and adjust the print to it between the two marks, and then giving it a gentle pressure from the centre outwards the position of the print is fixed. All that remains to be done is to lay a piece of blotting-paper over it, and either press it down by hand or, better, roll it with a round ruler. This latter operation would, in ordinary mounting, spoil the edges of the mount by causing the excess of gum to exude all round the print, but in this case there is no excess to exude.

The resulting cockling is of the most trifling character, and can be altogether avoided by first laying the mounting cards between pieces of wet blotting-paper, carefully avoiding any excess of water.

H. NORWOOD ATKINS.

FOREIGN NOTES AND NEWS

HERR SCHUMANN'S EXPERIMENTS WITH EOSINE.—PARTIAL INTENSIFICATION AND REDUCTION OF GELATINE EMULSION DRY PLATES.

HERR V. SCHUMANN has prepared a special batch of gelatino-bromo-iodide of silver plates, half of which he intends to stain with eosine alone and half first with eosine and then with methyl-violet. These plates are to be exposed in the spectrograph separately and conjointly, and then compared with unstained plates. Since the publication of About and Clayton's results, this active experimenter has already made some experiments with these two dyes and published the results.

Herr Eckert, of Prague, had recently occasion to take a photograph of a hunting lodge belonging to one of his customers. It was an old castle built in the *renaissance* style, white-washed as white as snow, and flooded by the most brilliant sunshine. To the right and left of the foreground stood artistic groups of forest giants clothed in the softest green, throwing deep, cool shadows, and in the near foreground

a number of young ladies in bright, light-coloured summer toilets had clustered round a spring well.

The gelatine emulsion negative appeared wonderfully-well worked out when developed. The details extended even to the deepest shadow parts, but yet, in order not to have too powerful, unprintable whites, Herr Eckert had to arrest the development before the details were sufficiently powerful in the deepest shadows. When fixed it was evident that the trees and shadows required intensification, while the faces, clothes, building, and the mirror-like surface of the water were absolutely unable to stand any such intensification.

Herr Eckert then made the following attempt, which turned out quite successful, at partial intensification:—When the negative was quite dry, but unvarnished, he went over all the parts that were sufficiently powerful with a coating of asphalte varnish, taking care to follow the outline as nearly as possible. This varnish should not be used too thick, otherwise the coat would be patchy, owing to the varnish not flowing; nor yet should it be too thin, else it would be apt to overflow the outlines. When laid in a warm place this varnish should dry in about a couple of hours, after which the negative may be intensified as much as it requires in the usual way, the effect of the intensification now only extending to those parts which are not covered by asphalte varnish. After being carefully washed and dried the asphalte varnish may be removed by means of a rag of cotton wool dipped in benzine, and then the further treatment of the negative proceeded with as usual.

Of course the reduction of negatives is effected by covering those parts which are weak with the asphalte varnish, and leaving the overpowerful parts exposed. When thus doctored many a negative will furnish brilliant instead of only middling-good prints, and the effects of too harsh contrasts of light and shade may easily be overcome.

Exhibitions.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE first Exhibition of this Society was held in the Art Institute, Sauchiehall-street, Glasgow, on Friday and Saturday, the 16th and 17th instant. This Exhibition showed on the part of the members considerable enterprise and enthusiasm. The Society has only been in existence for one season, so that to attempt a public exhibition of pictures at all required great courage. The display made far exceeded our most sanguine expectations, when we take into consideration that the time for preparation was so short and the weather so extremely unphotographic.

Amongst the exhibits sent in "not for competition" Mr. J. Parker's held the first place, both for variety of subject and careful, artistic execution. Amongst many other charming pictures he showed two interiors, which were specially fine and received considerable attention.

There was no lack of prizes for the members who were open to compete, and a large proportion of them embraced the opportunity. All round, the work was above the average; but special mention must be made of that of Messrs. E. Smithells, T. N. Armstrong, R. Cutting, and A. J. W. Reid.

Two prizes were given for the best pictures taken from negatives held by the members previous to the formation of the Society, and some six prizes for the best pictures made from negatives that had been taken since the Society was constituted. In the first-noted competition Mr. E. Smithells took the first prize, and Mr. W. Snell Anderson the second prize. In the competition for the various sizes and classes of pictures made from the season's negatives Mr. E. Smithells took the first prize for large landscapes. This was a whole-plate picture, and he also obtained a prize for a figure subject.

Amongst all the competitors Mr. E. Smithells' work was certainly the finest, and the awards, which were decided by the votes of the members themselves, did full justice to the merits of his pictures.

Mr T. N. Armstrong's photographs come next in order of excellence. His subjects showed most judicious and artistic selection, the work all through bearing the stamp of careful manipulation.

Mr. R. Cutting and Mr. A. J. W. Reid each obtained two prizes. Mr. Cutting's work was conspicuous for its delicacy, and Mr. Reid showed some very effective pictures. Mr. W. Smith also gained a prize for an instantaneous picture taken on the Gare Loch.

A great deal might be said in favour of many of the exhibits which must be omitted from this merely cursory notice. The Society, however, must feel highly gratified at the success which has attended this, their first, essay at publicity, and the public indicated their appreciation of the Society's artistic exertions by visiting the Exhibition in large numbers, despite the unpropitious weather that prevailed.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE second Exhibition of this Association was opened in the Central Exchange Art Gallery, Newcastle, on Friday evening last. The Mayor and Sheriff attended, and, after the usual formalities, declared the Exhibition opened. It consists of a very fine collection of over three hundred frames, contributed largely by members of the Association, and in part by photographers, both amateur and professional, from various parts of the kingdom. The Association is certainly to be congratulated on the success which has attended this, its second, Exhibition. It is a very great advance on the one held last year, and, indeed, need not fear comparison with any photographic display which has been held recently, the average quality of the pictures being very good.

The Council of the Society, with a liberality rather brave in so young an institution, offered one gold and eight silver medals for competition; a member gave a special medal for the best picture taken at any of the Society's outdoor meetings in 1883; and, in addition to these more substantial tokens, diplomas of honour were placed at the disposal of the Judges. The gentlemen who officiated in this capacity were the President (Colonel Sheppee); Mr. Jobling, the painter; and Mr. George Bruce, of Dunse, the well-known photographer and collodio-chloride worker. Though there is not an entire absence of criticism, the justice of their awards seems to be generally recognised.

One of the first frames which met our eyes on entering the Exhibition was Mr. T. G. Whaite's *Breton Studies*, and we were somewhat surprised to find that this, a medal frame in London, had received no mention from the north-country Judges.—Mr. Robert Faulkner's admirable and appreciated red-chalk studies of the Princess of Wales' three daughters hangs near; but it is to his other frame—his well-known *Studies of Expression*—that the medal label is affixed.—Mr. H. S. Mendelssohn has a frame of very clever portraits (No. 11), to one of which, a most elegantly-posed young lady reclining in a chair, is awarded the silver medal for the best figure study by a member of the Association. Mr. Mendelssohn gains another medal with a very fine red-chalk study of a group of children, which is rightly adjudged to be the best figure study exhibited.

Messrs. W. and D. Downey exhibit some very fine panel portraits, which are quite up to their usual standard of excellence.

Mr. J. P. Gibson, of Hexham, is a large contributor of very fine landscape work; he also shows a splendid interior of *Hexham Abbey*, which deserves careful study. To a set of three of his landscapes the silver medal, open only to members of the Association, is awarded.—Mr. George Borrows gains the medal offered for the best photograph taken at the Association's outdoor meetings, with his well-rendered study of an *Old Tree on the North Tyne* (No. 36).—Mr. J. W. Robinson gained a diploma for four whole-plate prints of *Bywell Castle*. This frame, being hung in a very dark corner and printed in platinotype, cannot be properly seen. The same gentleman (Mr. Robinson), working in conjunction with Mr. Dodds, received a second diploma for his picture, *The Castle Garth, Newcastle* (No. 18), and a third diploma for some quaint records of the older architecture of the *Canny Toon*.—Mr. Lyddell Sawyer's *Comin' Through the Rye* received the second medal in the members' class for figure studies.

In the class for the best single landscape by a member, Messrs. Dodds and Robinson, Mr. J. Pike (Hon. Secretary), and Mr. M'Liesh receive diplomas, while the prize is carried off by Mr. J. B. Payne with a very excellent carbon enlargement, about 18 × 14, of *Tabley Chapel, Cheshire*.—The second medal in the class for three landscapes by a member is gained by Mr. William Galloway, whose nineteen frames form a valuable contribution to the exhibition. His winning picture is a very well-arranged river scene, entitled *On the Wansbeck* (No. 145).

Diplomas in the same class have been awarded to Mr. Auty, of Tynemouth (whose sea studies would, we think, be better if they were not printed so deeply), and to Mr. A. A. C. Swinton for some photographic gems from the Isle of Skye, in addition to those mentioned before.

Lastly: the gold medal for the best picture in the exhibition was awarded to Mr. H. P. Robinson's ever-fresh *When the Day's Work is Done*, the second medal being gained by Messrs. G. West and Son's *Yacht Racing in the Solent*—apparently the same frame which gained a medal in the Pall Mall Exhibition this year.

Among the more striking pictures which are not named above are a very fine carbon enlargement, by Mr. P. M. Laws, of *Earl Grey's Monument* (No. 52). The great difficulties inseparable from a picture of this class have been dealt with in a masterly manner. Mr. Laws also exhibits some photo-ceramics of a very good class, which attract a great deal of comment.

Mr. Richard Keene, of Derby, is an exhibitor of some very interesting landscape work on beer plates, the artistic and technical qualities of which are very high.—Mr. Galloway shows that hydrokinone, in capable hands, is a good developer. His six *Studies*, untouched (No. 85), are very fine work.

In addition to his medal picture, Mr. H. P. Robinson shows several of his well-known compositions, including *A Merry Tale* and *Under a Haycock*, which attract a great deal of attention.—Mr. Pae shows some bromo-paper enlargements, which, however, are hardly so satisfactory as some of his direct portrait studies.

Messrs. England Brothers contribute excellent lantern slides and some very interesting continental views from their well-known series.—Mr. Edgar Goold sends very fine photographs of some of the castles

and seats of the North of England gentry, most of them being of large size and, we believe, direct photographs.

Mr. Alfred Pettitt, of Keswick, exhibits some of his exquisite Cambrian views, which lack nothing of his usual taste and delicacy of manipulation.—Mr. Henry Piper shows us once more that, for pluck and sparkle, our old friend, collodion, is not easily excelled, his pictures of *Guisbro' Abbey* and some others being remarkably brilliant, while some of his other landscapes demonstrate that he is as deft in the management of gelatine as of pyroxyline.

Mr. Andrew Pringle exhibits one frame of landscapes, aptly entitled *Here and There*, the subjects reaching from Bonnie Scotland to far Yosemite; while Mr. George Bruce, though his office of judge precluded him from taking a prize, shows ten or twelve pictures of great merit, some of which appeared at the recent exhibition in London.

The Exhibition will remain open till December 8th, and, judging from the great interest taken in it and the large attendances on the first days, its success is, as it deserves to be, assured.

RECENT PATENTS.

GERMAN PATENTS.

No. 24,985.—"Obtaining Coloured Metal Pictures by Pasty Oil Paints." R. Falk, Berlin.—*Dated May* 8, 1883.

No. 25,168.—"A Developing Frame for Photographic Dry Plates." A. C. Mohns, Wittenberg.—*Dated April* 17, 1883.

No. 25,278.—"An Instantaneous Screen for Photographic Lenses." R. Klein, Zürich.—*Dated March* 21, 1883.

No. 25,292.—"A Photographic Camera Obscura with a Cross-Focus." M. Marco, Trieste.—*Dated June* 21, 1883.

PHOTOGRAPHIC POSING-CHAIRS.

The specification of a patent obtained on behalf of Mr. W. S. Liscomb, of Providence, U.S.A., for a posing-chair, having been published, we are enabled to give the following account of its nature and construction, adhering to the language of the patentee:—

Chairs as heretofore constructed for various special uses, including such as have been adapted for use in the studios of artists and photographers, have not had rigid and unyielding backs or back-rests capable of a vertical adjustment, coupled with a capacity for such an angular adjustment as would afford a variable depth of seat from front to rear of the chair; or, in other words, no chair has heretofore been provided with a rigid or unyielding back- or back-rest, capable of being variably located forward of the rear line of the chair seat, so as to thereby practically reduce the area of the seat, by lessening the distance between the front edge thereof, and the vertical plane occupied by the back-rest, the latter at the same time being capable of a corresponding depression toward the surface of the seat.

I am aware that head-rests have heretofore been so constructed as to enable them to be adjusted vertically as well as angularly, and that their head-pads have been pivoted to their standards; but they are so organised as to be applicable in all cases to chair-backs, and as hereinafter indicated many of them may be applied, if desired, to the rigid back pad standard or to the back pad of the improved chair. I am also aware that such head-rests have had standards composed of slotted plates and clamping bolts, and also that spring chair-backs with non-pivoted back pads; have heretofore embodied base-blocks in which the spring chair back standards could be vertically and angularly adjusted; but it is obvious that a photographer's chair should have a firm, rigid, or unyielding back in order to ensure good results. I am also aware that piano-stool backs have been so constructed as to be capable of being located and adjusted at various points over the seat, forward of the base-block; but in a piano-stool a spring back is essential, and that feature is provided for mainly by means of a base-block backed up by a spring, and partly by an additional spring between the back pad and standard.

According to this invention the chair has a back-rest pad pivoted to a standard, which is in turn pivoted to the chair seat at the rear edge thereof, and each of the said pivotal connections is provided with a clamping or locking device by which the back-rest pad and the standard are locked rigidly together and to the chair, affording as firm and reliable rear ward support as any good chair back of ordinary construction. For affording extremes in adjustment the standard and back pad are vertically adjustable.

The improved chair enables a small child to gracefully occupy a portion of the seat, but to nevertheless have a firm and comfortable rearward support. By a variation in adjustment it can be readily adapted for use by a full-grown person, because the distance between the front edge of the chair and the vertical plane occupied by the back pad can be varied at will, and also because the said back pad can be located near the surface of the seat for a child, and properly elevated and even rearwardly inclined for the largest persons, and in both cases the pad can be made to conform to the proper rearward inclination of the body, because the said pad is pivotally connected to the standard.

In the use of the improved chair by a lady, her dress will offer no obstruction to the proper contact of her back with the back pad, and it, therefore, cannot prevent a comfortable rearward support, because, although the seat may be fully occupied from front to rear, the back pad can be moved forward beyond but above her bustle and caused to firmly bear against her back, without unduly crumpling or disarranging the skirts of her dress.

The chair seat is also capable of use as a foot-stool, in which case the back pad serves as a seat for a small child, thus affording an extraordinary elevation, as is sometimes desirable; and the said back pad can also be covered with drapery to serve as an elevated arm-rest or standard for persons desiring pictures in a standing position, in which case the chair proper serves as a mere base for the standard.

The specification is illustrated by several drawings which we do not require to reproduce. These show a chair having a back composed of a single pillar-like support, at the top of which is a broad pad, the arrangement being such that this pad can be slidden up or down, backwards or forwards, and thus be brought to bear upon any part of the back of a sitter, whether he be tall or short, or be leaning backwards or sitting well to the front. It is as if the pad of a head-rest, made unusually large and adjustable by slotted stretchers and screws, were rendered capable of being brought in contact with the back of a sitter, quite irrespective of his or her tallness.

The "claim" is as follows:—"The combination, substantially as hereinbefore described, of a chair-seat, a pivotal base-block rigidly secured at the rear edge of the said seat, a rigid back-supporting standard pivoted at the said base-block and united and combined therewith and with the chair substantially as described, to permit it to be vertically adjustable, and also angularly adjustable forward of the said base-block and over the chair-seat, a back pad pivoted to the said standard, and a locking device for rigidly connecting the standard to the base-block, whereby the back pad can be located and rigidly held in varied vertical planes between the front and rear edges of the seat and correspondingly depressed or elevated, as set forth."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 3	West Riding of Yorkshire	Godwin-street, Bradford.
" 4	Sheffield	Freemasons' Hall, Surrey-street.
" 4	Halifax	*Courier* Office, Regent-street.
" 5	Benevolent	181, Aldersgate-street
" 5	Edinburgh	Hall, 5, St. Andrew-square.
" 6	London and Provincial	Masons' Hall, Basinghall-street.
" 6	South London (Annual Meeting)	Society of Arts, John-st., Adelphi.
" 6	Bolton	The Baths
" 6	Leeds	Mechanics' Institute.
" 6	Glasgow	172, Buchanan-street.
" 6	Dundee	Lamb's Hotel, Reform-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The technical meeting of this Society was held on Tuesday last, the 27th instant,—Mr. H. Baden Pritchard, F.C.S., in the chair.

Mr. W. E. Debenham said that in a recent article Dr. G. A. Herschell* had called attention to the injurious effect upon the eyes of the red light in use in photographic dark rooms. It was probable that if it were generally known that red light was not, in proportion to the luminous effect to the eyes, so free from fogging influence upon a sensitive plate as a light of a pleasanter and healthier colour, its use would be abandoned. The question was not which coloured light produced absolutely the least effect upon a sensitive film, but what colour did so relatively to the amount of rays producing sufficient luminosity to the sight. Some months since he (Mr. Debenham) had made experiments by exposing gelatino-bromide plates under various combinations of coloured glasses and papers, and the result he had arrived at was that the best effect was obtained with a combination of green glass and orange paper. The paper was of a light orange, rather resembling a very deep yellow. If a red orange were used the combination of this with the green glass would obstruct the visual light very much. The glass was rather light yellowish-green, of a make called "cathedral." He had fitted up his dark room with a sheet of this glass and two thicknesses of the paper. Sliding inside the frame containing this was another frame fitted with another sheet of paper and a glass of the old orange pot metal—not the kind recently made of a deep red orange. With this combination, which was used during the stage of development, he could see far better than with his old window of two thicknesses of ruby glass and orange paper, and he had not been troubled with fogging from the light from the window, which formerly occasionally happened. He knew of seven dark rooms which had now been fitted up after the same plan, and in each case the operator found the advantage of the change. Commercial plates of different makes were used in these dark rooms, and all with the same result. In order that the members might judge of the agreeable character of the light and of its safety, Mr. Debenham produced a lantern having four sides fitted as follows:—No. 1 side with the green glass and two papers. No. 2 with two red glasses. No. 3 with ruby flashed on orange pot. No. 4 with red glass and orange paper. Plates were handed round which had been simultaneously exposed under similar negatives for twelve minutes at a distance of eight inches from the lantern. The plate exposed to the green-yellow side showed only a trace of an image, whilst that exposed to the side fitted with the two red glasses was strongly printed, the other two results being intermediate. It might possibly be supposed that the results obtained would only occur with plates containing iodide. He had always been of opinion that if iodide did at all modify the colour-susceptibility of emulsions it was only to so insignificant an extent that it might be disregarded in the question of dark-room illumination. To put this to the test of experiment he had exposed pure bromide plates and found the results similar to those produced upon the iodo-bromide films. With an additional thickness of paper an exposure to the lantern

* See our issue for November 23, page 706.—Eds.

for half-an-hour failed to give a trace of an image, whilst there was still light enough to work in, and coat plates by, with comparative comfort.

The CHAIRMAN would like to see photometric tests of the amount of visual light obtained with the different sides of the lantern. As to the effect of an infinitesimal amount of iodide in affecting colour-sensitiveness, he thought with Mr. Debenham.

Mr. DEBENHAM doubted whether photometric tests would apply when the colours to be tested were so different. The amount of iodide in the plates used was about three per cent.

Mr. A. COWAN considered that the light from the green and yellow sides was certainly stronger for working by than that of the two red glasses, whilst the plates produced showed that the effect on the sensitive surface was less.

Mr. V. BLANCHARD said that he had found his sight rapidly becoming worse, and he attributed this to the effect of the ruby glass of the dark room.

Mr. W. ACKLAND had noted recently that a larger proportion of photographers than of other people had found it necessary to have the glasses of their spectacles changed for those of higher power. This he had observed since the general use of red light in the dark room, and to that cause he attributed the circumstance.

Mr. W. M. ASHMAN said he had found the yellow light from a spirit lamp which had been treated with salt was safe for developing with at a distance of two feet. He thought that the safety of the light used by Mr. Debenham depended on the yellow paper more than the green glass.

Mr. COWAN showed some plates, two of which were green-fogged, whilst the others were free from it. He held that green fog was to be considered as produced by an unsuitable developer. The emulsion in all the plates was the same, but in the first two the ammonia was equal in quantity to the pyro. In one of the two the bromide was in the same quantity, and in the other one-third proportion, whilst the best plate was developed with no bromide and a small quantity of ammonia.

A dark slide, with doors of thin metal, sent by Mr. H. J. Burton, and a tripod head made of hoop iron riveted, light and strong, forwarded by the same gentleman, were handed round.

Mr. DEBENHAM said he wished to give notice that at the next meeting he intended to bring forward a resolution with regard to the conduct of the Society's *Journal*. He had intended to do this at the last meeting, being the first regular one since the occurrence to which he referred; but the editor of the Society's *Journal* (Captain Abney) was not then present, and he had thought it better to defer it till the next meeting and give notice of his intention. The point that he proposed to raise was whether the Society would sanction that its *Journal* should issue a paper as having been read before the Society—a paper containing statements which were not contained in the paper that really was read.

The CHAIRMAN doubted whether the present meeting could have anything to do in the matter, and suggested either that notice should be given at the next regular meeting for the subject to be brought forward at the following one, or that notice be sent by letter to the Council.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AT the meeting of this Society, held on Thursday, the 22nd instant, the chair was occupied by Mr. Pollard Graham.

Mr. A. COWAN produced the camera that had been shown at the previous meeting by Mr. Henderson. He found it in working order. It now contained eight plates in the lower and seven in the upper or exposing half. There was a space under the actual camera which could be utilised for the storage of lenses or of a dozen or more plates. The plates, as the camera was now arranged, must have a strip of card or paper attached to each side to prevent them from chafing against each other. They also required backing to prevent the light from passing through one plate and affecting the film behind it. Both these inconveniences might be done away with by the use of carriers—either tin, such as employed by Mr. Samuels, or of wood, such as were used in the changing-boxes of Mr. J. H. Hare and of Messrs. Sands and Hunter.

Mr. J. H. HARE suggested that if the camera were at the bottom instead of the top of the dark back there might be greater extensibility without so much extra weight.

Mr. W. E. DEBENHAM said that the back might have a lifting instead of an ordinary hinge, and that then any required number of extra backs could be used.

Mr. J. J. BRIGINSHAW showed a photomicrographic negative of the ventricle of a fly. It was his first essay in this department of photography. In reply to questions he stated that he had used an ordinary paraffine lamp and a quarter-inch objective. The plate was about twenty-five inches from the lens, and the exposure was about one minute and a-half. The correction required for focussing was found by experiment, and was very simple.

Mr. COWAN did not remember to have seen a finer negative of the kind.

Mr. H. MOUL showed an enamel burned-in with powder colour. The powder had been fixed on the plate by the tackiness of a varnish made with piperine in benzole. The advantage of the method was that no washing or other treatment was required, as with the bichromate and gum method.

Mr. A. L. HENDERSON said that he had, a few days before, been surprised to see a photographer's studio lighted by a yellow material—canary medium. He expressed his astonishment, and had thought that a sensitive plate would necessarily be fogged in such a light. He had found, however, upon trial, that a plate might be exposed without any effect to this light for a time which with ruby glass was long enough to impress an image, and the light was far superior to the eye.

The CHAIRMAN had seen the same paper in use with perfect safety.

Mr. DEBENHAM said that he could corroborate the statements of Mr. Henderson and the Chairman as to the superiority of a yellowish over a red light for dark room use. Some time since he had experimented with various samples of glass and paper, exposing them simultaneously to light with a sensitive plate beneath. He had found the best result (that giving most light to the eye in proportion to the actinic effect produced) to be given by a combination of a greenish glass and orange paper—a yellow-orange, not a red one. Since he had fitted up his dark room with this combination he had not found plates fog during manipulation—a result which he had not always been able to avoid with a red light, even when working with very deeply-coloured glasses and paper. The comfort of the light was very great, and he believed that the continuance for a long time in a ruby light, or the frequent change from it to the light of the glass room, was likely to be very injurious to the sight.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE fourth general meeting of this Association was held in the Religious Institution Rooms, on Thursday, the 22nd inst.,—Councillor Robertson in the chair.

The minutes of the last meeting were read and approved of. Mr. W. Chambers was proposed as a member and duly elected.

The CHAIRMAN then called upon Mr. J. G. Tunny, of Edinburgh, to read a paper, entitled *A Few Notes from Maine to California*.

Mr. TUNNY gave a very interesting account of his eleven months' tour on the other side of the Atlantic, and described a number of the studios he had visited. He said nearly all the American portraits were printed as vignettes, and were remarkably soft, although printed in direct sunlight. The vignetting mask was covered with tissue paper, and was fully an inch from the surface of the printing-frame. He also said that there were no blinds used in the American studios, small hand-screens and reflectors being used instead. By this means parts of the body were either lightened or darkened as occasion required. For instance: when the shadows on the face were too strong a small reflector, about eighteen inches square, was used, thereby lighting up the face and, at the same time, leaving the shadows in the dress dark and brilliant. [The lecture was illustrated by a large series of views of the Yosemite Valley, taken direct on twenty-four-inch plates. They were remarkably fine and clear, and were very much admired.]

The CHAIRMAN and other members made remarks on Mr. Tunny's communication.

Mr. SLOAN asked what length of exposure was required in America as compared with this country.

Mr. TUNNY said it was a strange fact that, although the air was very much clearer and the light brighter, the exposures were very much the same as in this country. He could give no explanation of the fact.

Mr. URIE then proposed a vote of thanks to Mr. Tunny for his paper, which was heartily accorded.

A camera by Mr. Geo. Smith, of the Sciopticon Company, was exhibited and explained by the Secretary.

Mr. J. PARKER spoke very highly of the camera, and proposed a vote of thanks to Mr. Smith for his kindness in sending it, which was passed.

The proceedings terminated with a vote of thanks to the Chairman.

THE POSTAL PHOTOGRAPHICAL SOCIETY.

A COMMITTEE meeting was held on Wednesday, the 28th instant. After the minutes of the previous meeting had been read and confirmed, the following gentlemen, provisionally admitted since the last meeting, were duly elected, each having declared himself a *bonâ-fide* amateur, and having sent a specimen of his work according to the resolution passed at last meeting:—A. Farnsworth (omitted from last list of new members), Charles Aldridge, M.D., G. Burn-Murdock, M.B., Commander Swinton, C. Holland, R.N., Andrew Pringle, John M. C. Grove, W. Wallis, and W. A. Collins.

Competition No. 2 having completed its first round, the voting book was examined and the prizes were declared as follows:—

Class I.—Landscape or view. 1st prize, G. Bankart, with 80 votes.
" " 2nd, Dr. Horace Day, with 13 votes.
Class II.—Portrait or group. 1st, W. Adcock, with 72 votes.
" " 2nd, G. Bankart, with 22 votes.
Class III.—Winter subject (view or figure). Prize, Mr. W. M'Martin, with 53 votes.

The Hon. Treasurer then presented his accounts, audited by Mr. Walter Withall, showing subscriptions received from seventy members, and an available balance of £24 14s. 6d. in hand. The Treasurer said that twenty-four new members had joined since the financial year commenced in July.

The pictures sent for Competition No. 5, for prizes given by private members in four set subjects, were then examined, and prizes apportioned in value:—

Class I.—Interior. 1st, entrance fees and donation, making £4; 2nd, the Society gives 12s.
Class II.—Instantaneous. 1st, entrances and donation, 19s. 6d.—the Society makes the prize £1; 2nd, Society gives 10s.
Class III.—Foreign view. 1st, entrances and donation, £1 1s.; 2nd, Society gives 10s. 6d.
Class IV.—Lantern Slide, any process. 1st, entrance and donation, 18s.; 2nd, Society gives 9s.

The donors of the prizes having provided £2 2s., the Society supplements their efforts by providing a similar sum, divided as above. The members were congratulated that this collection showed a marked advance on any previous collection. A simplified form of voting, it was agreed, should be tried for this competition, giving in each of the three first classes one vote for technical merit and one vote for pictorial, and in the fourth class one vote only for the best slide.

The advisability of limiting the number of members was discussed, and it was decided that the Society be limited for the present to one hundred members, in deference to the generally-expressed wish of the members.

A gratuity of 10s. was granted for assistance rendered in accordance with resolution 10 of the meeting of the 11th May.

ABERDEEN AND NORTH OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

At the invitation of Mr. J. McGhie (Messrs. McGhie and Bolton, Glasgow), one of the largest gatherings of professional photographers ever held in Aberdeen took place at Forsyth's Hotel, Union-street, on the evening of Friday, the 23rd instant, to witness a practical demonstration of printing and enlarging on argentic paper and opal, by Mr. A. Goodall (Messrs. Goodall and Steven, Glasgow). On the mótion of Mr. Anderson, Mr. A. Adams was called to the chair.

The Chairman said the company had met more for the purpose of seeing what Messrs. McGhie and Goodall had to show them than of hearing a speech from him.

Mr. McGhie, in introducing Mr. Goodall to the company, said that although great advances had been made during the last thirty years, and more especially during the last decade, in processes for the production of negatives in the camera, it was a strange fact that until recently comparatively little progress had been made in the equally-important department of rapid printing. Able workers, however, were in the field, and among them were such men as Mr. Goodall. Although it could not be said that he had fully succeeded in his efforts, he was there before them that evening to show what argentic paper and opals were capable of producing.

Mr. Goodall then first showed how to make an enlargement on opal by means of artificial light, using the "excelsior" lantern with triple wicks. A quarter-plate negative was placed in the lantern, and, after three-quarters of a minute's exposure on the argentic matt-surface opal, the plate was taken down and developed (in front of one of Carbutt's dark-room reflecting lanterns) with ferrous oxalate, to which a small proportion of citric acid was added. After fixation in hyposulphite of soda solution a clear and brilliant picture was the result, eliciting the commendation of all present. The whole operation occupied about five minutes. The successful result of the first experiment was followed by the taking of a print direct from a 10 × 8 negative in a printing-frame, with one second's exposure, two feet from an ordinary gas flame, the paper used being the enamel argentic recently introduced by his (Mr. Goodall's) firm. This experiment was also highly successful, all present seeming well pleased with the pure whites and warm blacks. The appearance of the print when dry, with its high glaze, was analogous to double albumen paper.

At the close of the demonstration,

The Chairman moved a vote of thanks to Mr. Goodall and Mr. McGhie for the manner in which they had conducted the manipulations of the various processes.

The motion was carried with the utmost enthusiasm.

The Chairman subsequently said he believed this was the largest meeting of photographers ever held in Aberdeen, and he would take that opportunity of making a suggestion—which he was sure would be warmly received by all present—for the formation of a photographic association for Aberdeen or the North of Scotland on similar lines to those in existence in other large towns.

Mr. Garey made a formal motion to that effect, and,

Mr. Dinnie having seconded, the proposal was unanimously agreed to. All those present gave their names as members of the newly-formed Association, and an interim committee was appointed for the purpose of making initial arrangements. Mr. Dinnie kindly consented to give the use of one of his rooms for the first meeting.

A vote of thanks to the Chairman, proposed by Mr. Watson, Sen. (Stonehaven), met with a hearty response, and brought a very interesting meeting to a close.

[We are indebted to the *Aberdeen Free Press* for the foregoing particulars.—Eds.]

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

This Society met on the 2nd instant, when the chair was taken by Professor H. W. Vogel, President.

The news of Dr. Vogel's return having been widely spread there was a very full attendance of members, who came to welcome him back. At the commencement of the meeting,

Herr Quidde (in the unavoidable absence of Dr. Kayser, who is librarian to the Physical Society, which happened to meet at the same time as this Association), addressed a few words of welcome, in the name of the Association, to the President on the occasion of his return from America.

The Chairman returned thanks for his cordial reception. He had met with kindness wherever he went in America, and he was glad to find that at home also he had no lack of friends.

A provincial member wrote to say that the electric retouching pen of Burki, mentioned in one of Dr. Vogel's American letters, was really a German invention. In the year 1872 a photographer, called Fritz Bopp, of Innspruck, had set on foot experiments in this direction which had furnished Prof. Pfaundler with the first idea of the retouching pen, which he exhibited last year at Munich.

The Chairman did not contest these facts, but merely remarked that Edison's stippling pen, which, perhaps, falls somewhat heavily, was known before Pfaundler's. Of the usefulness of the latter he could not judge. He had certainly seen it at the Munich electric exhibition, but as it was enclosed in a glass case it was impossible for him to try any experiments with it. He had tried Burki's pen, and was surprised at the ease wit which one could work with it.

Herr Milster did not doubt the possibility of retouching *quicker* b means of such a pen, but did not depend much upon such mechanical aids In order to produce a really artistic retouch he would prefer to work with out such machines.

Herren Graf and Joop agreed with him.

Herr Quidde, by request, again showed the two large direct portraits, b Angerer, which were exhibited at a previous meeting.

The Chairman said that to give a full report of his journey would requir several meetings, but that just now he would merely give an outline of hi route, pointing out the places visited on a large wall map as he mentione them. His tour in the American continent was, in round numbers, abou 8,000 English miles. He started from New York to Chicago and Milwauke After a short stay there he returned to the first place, and thence journeye to St. Paul, Minnesota; thence he went by the North Pacific Railway t Fargo, Dakota, Bismark, and Livingstone. Here he made a detour fo ten days to visit the celebrated Yellowstone district, and from there con tinued his journey westwards, by Helena Montana, until he reached th Columbia river in Oregon, and at last Portland. Thence he proceeded b steamer to San Francisco, where he stayed four days, and then proceede to Los Angelos, in South California. From this point he began his retur journey to the east coast, passing through the desert of Arizona to New Mexico. Here he visited Santa Fé (the oldest town in America), La Vegas, with its celebrated baths, and so through the mountains of Colorad He called at the mining town of Leadville, at an altitude of 10,000 feet climbed Pike's Peak, which is 14,400 feet high, and then visited Denver the capital of Colorado. Hence he went to Kansas City and St. Louis where the photographic congress met, and where he passed four pleasan days and met many friends. He then returned to New York, *viâ* Cin cinnati, Washington, and Baltimore. Having concluded this short outlin of his tour, he (the Chairman) showed some of the photographic treasure he had collected by the way, and described the photographic establishmen of Herr Taber, of San Francisco, whence the photographs shown came. A large business was done both in portraits and landscapes. The catalogu of landscape and architectural subjects contained several thousand number comprising views not only in the whole of North America but also in Chin and Japan. Many of the examples shown by the Chairman were of larg size—notably one of a Japanese temple and a series taken in the Yosemit Valley, and another taken along the course of the Columbia river, man-of war ship firing cannon, the Mormon city Utah, &c. The Chairma then showed the apparatus he took with him on this journey, and whic was prepared by Herr Stegemann. He first described the difficulties o landscape photography in America. Even the most firmly-put-togethe boxes could not long withstand the treatment accorded to luggage b American railway officials. The boxes in which he transported his dr plates had been several times shattered, and the plates they contained wer only partly saved from breakage by having, as an extra packing, bee placed in Schwartz' plate-boxes. Indeed, out of 150 plates about thirt were broken, and, unfortunately, some of these had been exposed. Her Stegemann's apparatus had, however, stood admirably; it had not take the slightest harm. The wood had neither warped nor cracked, thoug certainly he had taken it into the carriage beside him whenever he could The apparatus consisted of a wooden box with a linen cover, and fastene together by leather buckled straps. In it was placed the camera, th changing-box, and changing dark-slide, three double dark-slides, tw lenses and a carrier, a camera cover, the top of the camera stand, an some small tools and working utensils.

The meeting examined these with interest, and unanimously expresse their approval of the apparatus, which, though bearing evident traces o use, was still uninjured.

A matter connected with the *Obernetter Protocol* dispute was next sati factorily disposed of, and afterwards, instead of disposing of the othe matters on the order of the day, it was resolved to adjourn all further bus ness, and celebrate the return of Dr. Vogel by a supper, which kept th members together for a few hours longer, in the course of which D Kayser came in and expressed, in a humourous speech, his pleasure i resigning the chair of the Society to its former occupant.

Correspondence.

INTENSIFICATION OF GELATINE NEGATIVES.

To the Editors.

Gentlemen,—Allow me to suggest that if the Rev. L. Macdona, o others who have found difficulty in intensifying gelatine negatives wit silver, using alum and citric acid as restrainers, will try the method a first given by me instead of the more recent modification described b Mr. William Brooks, I think they cannot fail to meet with success.

The following is my original formula, as published in the July numbe of the *New York Photographic Times*:—

Alum	1 ounce.
Citric acid	1 ,,
Sulphate of iron	3 ounces.
Water	20 ,,

The above is the formula I have for some time used as a clearing solu tion, and, as stated in the article referred to, it only requires th addition of nitrate of silver to make a capital intensifier.

The negative to be intensified should be well washed after fixing an then flooded with the above solution, which is then poured off into

ɪasure, and, after the addition of a few drops of a twenty-grain solu- n of nitrate of silver, the mixture is again repeatedly poured over the ıte until the required density is obtained. I have used this method, ıen occasion required, for the past year, and, provided sufficient care ve been taken to wash out the hyposulphite, I have never known it to il.

The substitution of pyro. in place of iron, as recommended by Mr. ooks, I do not find to be an advantage. The ferrous solution works ıicker, and there is less liability to staining of the film arising from sufficient washing.

I can endorse Mr. Brooks's remarks as to the value of the power of cal intensification to regulate the density of imperfectly-coated plates. his difficulty is, however, with me a thing of the past. With more erfect appliances for coating with emulsion the "thin edge" no longer cists, the sensitive film being now always of uniform thickness all ver the plate.—I am, yours, &c., B. J. Edwards.

The Grove, Hackney, November 26, 1883.

HOTOGRAPHIC LENSES: THEIR FOCI, APERTURES, AND ANGLES.

To the Editors.

Gentlemen,—I have read with much interest Mr. S. A. Warburton's rticle, as above, in the last issue of the Journal. The subject is a ıost valuable one, and I feel sure that not only beginners in photo- raphy but also many older hands may derive much benefit from its erusal, and learn from it to know and understand various capabilities f their lenses of which they were before ignorant.

But to proceed to the point to which I would be beg to draw your ttention. After reading Mr. Warburton's article I turned to The British Journal Photographic Almanac for the current year, to ompare Mr. W. K. Burton's table of exposures (page 250 in the Almanac) with the U.S. numbers tabulated by Mr. Warburton. The differences between them appear to me to be great. I, of course, nly refer to the columns of Mr. Burton's table. In this column he leals with the U.S. numbers up to 9, and whilst for the numbers 1 and 2, expressed in terms of f, he agrees with Mr. Warburton's figures, here is from that point a great and increasing difference between the ables. For instance: in the one case is given $\frac{f}{11 \cdot 314}$ or No. 4, $\frac{f}{45 \cdot 255}$ or No. 8; whilst in the other it is $\frac{f}{8}$ or No. 4, $\frac{f}{11 \cdot 31}$ or No. 8. $\frac{f}{64}$ is Mr. Burton's No. 9, whilst $\frac{f}{64}$ is Mr. Warburton's No. 256.

I cannot think that I have misunderstood these tables, and freely confess that I am puzzled by the differences between them. For this reason I have ventured to raise this question in order to obtain useful information.—I am, yours, &c., G. D. K.

November 26, 1883.

AMERICAN AND ENGLISH DRY PLATES.

To the Editors.

Gentlemen,—In last week's Journal appeared an extract from Mrs. Fitzgibbon's, *St. Louis Photographer*, giving comparative prices of American and English plates, and congratulating their countrymen on the improbability of competition.

Kindly permit us to give equal publicity to the fact that our plates are on sale on the same terms as American plates by our agents, Messrs. R. D. Perry and Co., 60, Wall-street, New York, and that a constant supply of all sizes is on hand, and on a quality of glass seldom seen in the States.—We are, yours, &c., Samuel Fry and Co.

Kingston-on-Thames, London, S. W., November 28, 1883.

BRISTOL INTERNATIONAL EXHIBITION: THE JURY.

To the Editors.

Gentlemen,—I hasten to give your readers the earliest intimation of the names of the jurors of the above exhibition. They are as follow: —Mr. W. H. Barton, photographer; Mr. William Bedford, photographer; Mr. Valentine Blanchard, photographer; Mr. J. Jackson Curnock, painter; Mr. William Radcliffe, photographer, and member of the Association.—I am, yours, &c., H. A. Hood Daniel,
Hon Secretary.

Avonmead, Leigh-road, Clifton, Bristol, November 27, 1883.

VIGNETTES AND VIGNETTING.

To the Editors.

Gentlemen,—Being a printer and vignetter of ten years' experience, you may possibly allow me to pass a few remarks on the article by Mr. E. Brangwin Barnes.

In the first place, nine out of every ten vignettes which are badly produced are owing to defective negatives, and the printer is told to vignette them, as a last resource, to hide the glaring imperfections caused by careless operating. For instance, take a negative of a young lady, with waist and elbows posed as they invariably are for vignettes; how would it look vignetted to the extreme edge of the paper? I have had personal experience in all the methods of vignetting mentioned by Mr. Barnes, and have come to the conclusion that the vignette frame answers best; but, for some reason or other, employers never seem to adopt them.

It is not surprising that a printer turns out some bad vignettes (be he ever so clever) with the rough material with which most photographers expect him to do excellent work. Where it is impossible to get the vignette frames I have found that cardboard, with a hole cut the shape of the head and shoulders and notched round, is a very efficient vignette mask. Glasses seldom, if ever, give good, uniform results, and the blackened tissue paper is too fragile to allow of any ordinary use.

Then, again, there are the usual defects in the backgrounds. I have known operators too careless or indifferent even to change the background after taking a half-length picture; consequently we sometimes see parts of trees, pillars, &c., altogether out of place, and yet the very first thing they say on seeing a proof is—"Could you not vignette out that tree?" forgetting that to get perfect graduation to the edges the whole of the negative ought to print a little.

In conclusion: I would just draw attention to the abominable negatives turned out since dry plates have come out. One takes about three weeks to get a print from it; another is printed in about a minute in a poor light. How is it possible to get uniform results? I will merely add that if employers would see that their operators turned out better negatives there would not be half so many bad prints or complaints from—Yours, &c., A Printer and Vignetter.

"INTENSIFICATION."

To the Editors.

Gentlemen,—I am obliged to Mr. W. H. Kirkby for calling attention to the liberty the "printer's devil" has used with my remarks on transparencies at page 694, where he makes me say that as my negatives were all large "I could print the transparency by superposition." I said I could *not* print by superposition, but had to reduce in all cases in the camera.—I am, yours, &c., John Parker.

58, West Regent-street, Glasgow, November 23, 1883.

A CORRECTION.

To the Editors.

Gentlemen,—In to-day's issue of the Journal I notice a mistake in the report of the proceedings of the Sheffield Photographic Society. The camera exhibited by me at the meeting was on Mr. Hare's new principle and *not* mine, as reported. Kindly rectify this error in your next issue, and oblige,—Yours, &c., W. Dakin.

Sheffield, November 23, 1883.

Obscene Photographs.—At the Mansion House, on Saturday last, the 24th inst., William Smith, of No. 1, Vine-street, Minories, attended before the Lord Mayor, M.P., and Alderman Sir Andrew Lusk, M.P., to show cause why a great quantity of photographs seized upon his premises by the City police should not be destroyed. Evidence of the seizure having been given, Mr. Tickell, barrister, who appeared for the defence, observed that although some of them might outrage good taste yet the remainder were simply copies of paintings in the Royal Academy, the National Gallery, and the continental *salons*. It would be necessary to determine that they were obscene before the Court could order their destruction.—Sir Andrew Lusk said they were both obscene and indecent.—Eventually the case was adjourned.

EXCHANGE COLUMN.

No charge is made for inserting these announcements; but in no case do we insert any article merely offered for sale, *that being done at a small cost in our advertising pages. This portion of our columns is devoted to exchanges only. It is imperative that the name of the person proposing the exchange be given (although not necessarily for publication, if a* nom de plume *be thought desirable), otherwise the notice will not appear.*

I will exchange magic lantern slides for instantograph or posing-chair.—Address, Fred. Daking, 108, Bramford-road, Ipswich.

Wanted, a balustrade complete, in exchange for a good violin, bow, and case, and cash if required.—Address, N. Webb, Calne, Wilts.

I will exchange Lerebours' whole-plate lens and camera for anything useful.—Address, Bradshaw and Co., 37, Oxford-road, Altrincham.

What offers for a good, new burnisher, half-plate, cost thirty shillings? Wanted, presses, background, chair, camera, or anything useful.—Address, 46, Milkstone-road, Rochdale.

I will exchange a 19 × 16 camera, swing-back and folding tailboard, in good condition, good strong head-rest, five side-slips good as new, 10 × 8 and whole baths in tight top cases, in exchange for ten-inch wide-angle lens, by good maker, or balustrade, &c.—Address, Hudson, Bordesley, Birmingham.

I will exchange my skin rug, studio stand, nearly new, cost twenty-five shillings, and globe lens, 10 × 8, for a camera and lens, by best maker, for dry-plate work.—Address, 157, Halifax-road, Rochdale.

I will exchange a twenty-four-inch square camera, with three carriers on special stand, for half-plate bellows-body camera and fittings.—Address, T. E. W., 2, Sandringham-terrace, High-street, Ealing, W.

I will exchange a four-wheel dark carriage, suitable for pony, in excellent condition, large enough to work any size plates, fitted with sink, piping, &c., suitable for wet or dry process, cost £25, in exchange for anything useful in photography; cash adjustment.—Address, PHOTO., 18, Tacket-street, Ipswich.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

James Harrison, 28, Woodhouse-lane, Leeds.—*Photograph of Child, entitled "I'm Auntie Now."*

William Horseman Kirkby, 15, Adelaide-terrace, Waterloo, near Liverpool.—*Photograph of Child Asleep in Arm-chair, entitled "Tired."*

ERRATUM.—In the first leading article in our number for November 23rd, page 699, second column, line eight from top, for "light" *read* "light-tight," and in the tenth line, for "glazed" *read* "greyed."

FELIX.—Any artists' colourman will supply the pigments ready ground. You will then have to mix them to the tint required.

G. WESTON.—Probably it is only the varnish that has turned yellow. Remove it with strong methylated spirit and re-varnish.

OMEGA (Glasgow).—Add a few drops of carbolic acid to the solution. It will then keep free from fermentation for several days—perhaps weeks—at this season.

W.—If after ten minutes' exposure to the window, under the circumstances you mention, the plate only shows a faint trace of an image, you may consider the light safe for all practical purposes.

ANXIOUS.—The only advice we can give you is to lose no time in consulting a respectable solicitor. If your statement be correct you certainly have been imposed upon, and have, we imagine, a remedy at law.

S. A. BEANS.—Coat the inside of the wooden vessel with paraffine wax. That will have no injurious action on the silver solution. The substance you suggest will not answer for silver solutions, though it will quite well for the fixing bath.

I. S. J.—The reason the paper has not dried is that you have employed ordinary linseed oil instead of "boiled oil," as recommended. Try again with the latter variety. It is a good plan to add a little japanners' gold size to the oil before it is applied.

ONE IN DOUBT.—The law is very uncertain on the point. Although we are inclined to doubt the legality of the copyright we cannot advise you to copy the picture; indeed, we should advise you not to do so, or you may find yourself embroiled in a difficulty.

Q. E. D.—The paper can be rendered transparent with many different substances, such as paraffine wax, bees'-wax, Canada balsam, &c. Starch will answer well for cementing the picture to the glass. Apply to Messrs. Barnard and Son, Oxford-street, W.

F. J. MAY.—It is impossible to answer your question, as you do not say what class of business you wish to commence. Of course the cost of building a studio will be dependent upon the position it is to occupy—whether in a garden or on the roof of another building.

X. J.—In making slides for the lantern the high lights should be represented by perfectly clear glass. If they are veiled or fogged the slide will appear dull and heavy on the screen. You will find the gelatino-chloride process better than the gelatino-bromide for lantern slides.

A. SIM.—The most suitable pencils for retouching are Faber's HB, HH, and HHH. B is also useful for some purposes. The pencils you have been employing evidently contain gritty particles, which have scratched the negatives—that is, supposing the varnish be of the usual hardness.

DISSATISFIED.—Unless you retain some of the residues, from which an assay can be made, it will be impossible for you to prove whether or not you received a fair return for what you have sent. The bulk is no criterion whatever as to its value, as that must depend upon its richness in metal.

J. B. SLACK.—Yes; tissue can, of course, be prepared with plain gelatine without pigment. But you will be unable to employ it in the same manner as ordinary carbon tissue, inasmuch as the light will penetrate through the film to the paper, which will then become permanently adherent, and cannot be removed for the development of the image.

A. MARBY.—Employ the solution of gallic acid quite warm—say about 120°. If the picture be long in developing you may generally expect to get cold, inky tones, and the image will also be much more in the substance of the paper than on the surface. A few drops of acetic acid is sometimes an advantage in the developer, as it helps to keep the white pure.

PUZZLED.—Clearly the wax you have employed is an impure sample. Much of the bleached wax sold as "white wax" is adulterated. Get some good yellow bees'-wax; there is greater chance of getting that unsophisticated than the white. If you can procure it at a farmhouse in your neighbourhood you will doubtless get the genuine article, which is very essential for your purpose.

OXYGEN.—You had better write to the manufacturer who supplied you with the apparatus.

RECEIVED.—John Nicol, Ph.D.; Edward Dunmore. In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA STREET.—At the next meeting of this club on Wednesday, December 3rd, 1883, the subject for discussion will be the adjourned discussion on *The Alkaline Development of Gelatine Plates.*

SOCIETY OF ARTS.—The second course of Cantor lectures at the Society of Arts this year will be on *Recent Improvements in Photo-mechanical Printing Methods*, the lecturer being Mr. Thomas Bolas, F.C.S. The course, which will consist of three lectures, will be a continuation of that delivered by Mr. Bolas a few years ago on the same subject. The following is a brief syllabus of the lectures:—Lecture 1. New developments of the Woodburytype process.—Lecture 2. Type blocks from line drawings and half-tone subjects.—Lecture 3. Intaglio plates. Collotypes. Photo-mechanical methods, as applied to the decoration of pottery. Miscellaneous processes.—The dates of the three lectures will be Jan. 28th, Feb. 4th, and Feb. 11th, 1884.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.—The annual meeting of this Society will be held at the House of the Society of Arts, Adelphi, on Thursday next, December 6th, at eight o'clock p.m. Mr. C. Ray Woods will give a short lecture, entitled *Photography and Solar Eclipses.* Mr. W. Brooks will demonstrate his new method of intensifying gelatine plates; and the following (from the question-box) will be discussed:—*Is a Swing Back to a Camera Desirable or Necessary?*—The annual dinner will take place at the Holborn Restaurant on Friday evening next, December 7th, at half-past six, when it is hoped that as many as possible of the members and friends of the Society will be present. Application for tickets should be made not later than Monday next, to the Hon. Secretary, Mr. F. A. Bridge, 9, Norfolk-road, Dalston-lane, E.

SOCIAL REUNION.—On Saturday evening last, the 24th instant, upwards of sixty ladies and gentlemen, comprising the working and commercial staff of the firm of Messrs. W. and A. Downey, of Ebury-street, together with a few invited guests, enjoyed a sumptuous dinner at Anderton's Hotel, Fleet-street, Mr. W. E. Downey presiding. In the course of the evening several toasts appropriate to the occasion were given. These included the "Queen and Royal Family" (whose patronage, it is well known, this firm enjoys), the "Photographic Press," the "Profession," the "Newcastle Branch," the "Firm," the "Ladies," and the "Visitors." To these fitting responses were made. In the course of some remarks by Mr. W. Downey, the senior member of the firm, it transpired that the past year had proved the most successful, in a financial point of view, that the firm had enjoyed since its organisation, their export business having increased in a degree quite unprecedented. There being several excellent musicians among the *employés* of the firm, some fine music on the pianoforte, organ, violoncello, and violin, together with songs, formed an attractive element in this successful and pleasant annual *reunion.* The proceedings were kept up with unflagging interest until within a few minutes of midnight. From the various speeches made it was evident there existed a strong bond of friendship and good feeling between the employers and employed.

PHOTOGRAPHY IN COURT.—In the Preston Borough Court, on Friday last, the 23rd instant, a case of interest to photographers was heard before the Recorder, J. Addison, Esq., Q.C. James Thompson, photographic assistant, sued John Monk, photographer, of Church-street and Fishergate, Preston, for the recovery of £90 damages for alleged wrongful dismissal. It appeared from the plaintiff's statement that he was engaged for a period of twelve months, at a weekly salary of £2 10s. from the 1st June, to do such reasonable and becoming photographic work as might from time to time occur. An agreement was subsequently signed to that effect, and all went on well for some time, when the defendant commenced to complain of the character of complainant's work, and eventually, on the 24th September, the latter was summarily dismissed. The allegation for the defence was that up to the time of signing the agreement the plaintiff gave every satisfaction, but that as soon as the document was signed and he considered himself secure his work became very unsatisfactory, and defendant was compelled to dispense with his services. In reply to this it was urged that defendant dismissed the plaintiff at the close of the photographic season, when he had no further work for him to do. Mr. A. Vandyke, of Liverpool, and Mr. White, of Inverness, former employers of the plaintiff, were called to give evidence as to his competency, and in the end the Recorder decided the case in the plaintiff's favour giving damages to the extent of £50.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1231. Vol. XXX.—DECEMBER 7, 1883.

PHOTOMICROGRAPHY.

Photomicrographs Without the Use of Micro-Objectives.—The late Mr. Bockett, in 1865, employed for this purpose a small stereoscopic lens for obtaining photomicrographs of objects too large for the lowest-power microscope objectives. The lens mount was attached to the camera front by a long, fine screw, which formed the fine adjustment. The connected box camera was made to slide between guides on its base-board, and about four inches from the end of the board was placed a special object-holder for the objects, and to take also the ordinary microscope slides, so that the objects to be photographed could be raised or depressed, as required; whilst at the front end of the base-board was hinged a piece of board, 16 × 6 inches, covered with white cardboard, and having a guide with clamping screw at the side, by which it could be fixed at the requisite angle to regulate the reflection of the light, or to act as a ackground to the object. For opaque objects a magic-lantern reflector was so arranged as to receive the illuminating rays from the white cardboard, and reflect them on to the object to be copied. With ordinary daylight and one-eighth of an inch stop, using wet collodion, the exposure was about one minute and a-quarter. The particulars are given in this Journal, July 28, 1865, page 390. Locket lenses have been recommended for the same purpose.

In an editorial article in this Journal of October 27, 1871, a somewhat similar plan was brought forward. As the single stereo. lens gave too long a conjugate focus, the two stereo. lenses were placed together with their flat surfaces towards the object, but not quite close together, thus forming a two-inch focus doublet, enlarging an object, half-an-inch in diameter, to three inches at the distance of fourteen inches to the sensitised plate. If the single lens were used the stop end of the objective was turned towards the focussing-screen. The illumination was, by means of sunlight, reflected from a mirror or sheet of white cardboard, placed at such an angle and such a distance as to effectually illuminate the object, yet not to show any of the surface roughness of the card. The position selected for the apparatus was at a table in front of a window with a south aspect.

Semi-Opaque Objects.—Dr. Gayer says they are best photographed when the surface is illuminated by reflected light as well as the illumination by transmitted light. For photographing animalculæ in motion in the live cage when using sunlight, and to give an instantaneous exposure, "two circular holes, three inches in diameter, were cut in two pieces of wood, an india-rubber band attached to one of them, the whole screwed into the window frame, and not in any way connected with the microphotographic arrangement. When the exposure was to be made, the india-rubber band was put on the stretch by one piece of wood being drawn over the other until the two holes had passed each other, then the piece of wood being let go suddenly one aperture passed the other with great rapidity." See this Journal, January 24, 1873, and the *Mic. Journal*, 1876, page 258, with plate of photographs and figure of apparatus. The simple drop shutter could be easily fixed for the same purpose, and if of sufficient length and provided with a sufficiently long aperture, the time of exposure may be varied to suit the less instantaneous requirements. We have found some little difficulty in photographing animalculæ in motion if entirely unrestrained in their movements, on account of the depth of the fluid they are moving in permitting of considerable alteration of focus. We shall notice the way M. Neyt met this difficulty when we come to speak of special forms of apparatus.

As we are dealing more or less with the representation of objects of some size, it may be as well to state here that very lately we have tried one of Zeiss' a* adjustable low-power objectives of the improved form. These objectives are so made that the focus and magnifying power can be readily altered from an equivalent two-inch to a four-inch power by turning the adjusting collar which moves the back lens. The performance of the objective remains very good at the longest or shortest focus, or any point between. To experiment with this lens, a very difficult object was chosen—one of the brittle-stars. The object was simply mounted on a piece of dead-black paper, and left uncovered. The objective was set at the best visual focus, the illumination being made by means of the bull's-eye condenser, under the diffused light of a very dull day, the lenses being separated by the adjusting collar at their mid-point (5), and the distance from the object to the screen fixed at eighteen inches. The time of exposure was twenty-five seconds, using a commercial gelatino-bromide dry plate marked "16 to 20 times' wet collodion." There was a slight difference between the visual and actinic focus, which should be allowed for, if photographing very thin sections; but when the object has considerable thickness with great irregularities of surface, as in this case the objective performs remarkably well by focussing the plane midway between the upper and under surface. For ready adaptability this objective seems likely to be very useful to the photomicrographer when taking negatives of objectives requiring much *penetration* in the objective, as well as for the ready means of varying the amplitude without altering the distance of the screen.

To make these articles more complete, allusion will be briefly made to any methods that seem of importance, or which have been used for purposes out of the ordinary track, or may have in themselves some peculiar advantages. To Dr. Deecke, special pathologist of the State Asylum for Lunatics, in Utica, N. Y., is due the merit of making and photographing such large sections of the brain and spinal cord as enable him, by consecutive sections, to trace and picture the depth, extent, or course of any diseased part of these delicate nerve centres. Thirty-four photographs—their size being fifteen or sixteen inches in diameter—were exhibited in London by Dr. Clifford Mercer, of Syracuse, to whom we are in part indebted for the following remarks. Twenty-five of the prints were selected from 160 sections of the same medulla, each an entire transverse section, magnified from thirty to forty diameters. To meet the difficulty of making and readily examining the entire sections, Dr. Deecke had a section cutter so perfectly constructed as to enable him to cut 2,000 sections, vertically, from the whole human brain, without losing more than 1·5 per cent., the sections admitting of examination by a one-tenth-of-an-inch "W. Wales'" objective. For the purpose of examining surfaces of such dimensions, he had a large, heavy microscope with various traversing motions made, the stage being large enough to enable him to quickly pass in review the entire surface. Figures of this microscope will be found in the

Journal of the Royal Microscopical Society for this year, p. 268-9; also a short account of the photographic method employed.

Described briefly, the light reflected from the mirror of a heliostat is collected by a four-inch condenser of eighteen inches focus. He has a four-and-a-quarter-inch-diameter tube projecting outside as a sunshade, and projecting into the dark room another tube, fourteen inches long, gradually tapering from four inches to two inches. The object is focussed through an ammonio-sulphate copper cell, which is then removed and replaced by a potassium-sulphate copper cell for taking the photograph. The holder for the screen and sensitised plate can take a 4 × 4 or 18 × 20 inch plate, and travels on a car for the length of forty feet. The arrangement and coarse focussing are made near the window, and by pulley cords when the holder is at some distance from the object. Exposures exceeding one second are timed by a pendulum; if of shorter periods, by a guillotine shutter behind the objective, set for fractions of a second.

Dr. Deecke does not rely upon much help in the study of minute tissue changes by the aid of photography, but adopts it rather topographically. The photomicrographic apparatus, Dr. Mercer says, is very similar to Dr. J. J. Woodward's, and is described in the last edition of Dr. Beale's *How to Work with the Microscope.* The photographs of the entire section of the medulla were obtained by the use of a portrait combination as the objective, the amplification being made by the removal of the screen or sensitive plate from the object to the distance of thirty or forty feet. When larger fields have to be covered the object is divided by spider lines into small squares, each square being photographed separately, while the several prints are mounted so as to show the whole section as a single photograph. The methods of making and mounting the sections are given in the *Proceedings of the American Microscopical Society*, 1882, p. 275-7, and 279-80; also at page 449-50 in the *Journal of the Royal Microscopical Society* of the same year.

We had the pleasure of seeing these photographs, also nine others of healthy and diseased lung, and it was our intention to have early noticed them in the Journal; but, from their relating specially to medical subjects, they inadvertently escaped us. We here gladly find an opportunity of referring to them, and of testifying to their general excellence, and the patience and ingenuity employed to overcome the inherent difficulties.

VIGNETTES AND VIGNETTING.

A good deal has been written lately on the subject of vignetting, and the sum total of what is to be gathered from it is that, as a rule, the operation is not satisfactorily performed. This result may arise from difficulties inherent in the process, or from carelessness on the part of the operator or printer; but as to which is really the more likely cause we must confess we can scarcely form an opinion from what has been actually written. Speaking, however, practically, we are inclined to think that the chief onus rests with the workman, as with even ordinary care—combined, of course, with a due knowledge of the "how to do it"—it is as easy to produce a properly-graduated vignette as any other style of print.

No doubt there are printers *and* printers. One class will produce good work under any circumstances—at least within reason; the other under no circumstances whatever. The first are those who take an intelligent interest in their work and exercise a due—not necessarily an excessive—amount of care in what they are doing; the others are probably those who so thoroughly understand what the requirements are—or fancy they do—that they can afford to treat matters easily and trust to the chapter of accidents for a passable result. In the long run the one will get through a given quantity of work, not only with less waste and in a shorter time, but also with the expenditure of a less amount of trouble than the haphazard worker, and will produce, moreover, infinitely better results.

Comparisons have been drawn between the different modes of producing the vignette effect. The vignette glass, the perforated card, with and without the adjuncts of cotton wool, tissue paper, and other aids to the production of a soft graduation of the image, have been discussed *ad nauseum*, as if either one or the other means has any more effect, *per se*, upon the result than has the nature of the wood of which the camera is made, or the colour of the lacquer of the brasswork of the lens with which the negative is taken. It is the workman and not the tools that rules the quality of the work. It would be as reasonable to place in the hands of a complete novice the most perfect vignetting appliances, and expect him to do good work without the exercise of intelligence, as to arm him with lens and camera of the best construction and expect him to turn out good work under similar conditions. Indeed, we are inclined to think that he would be more likely to succeed in the latter case than the former.

Vignetting, of all the operations connected with photography, appeals to the common sense of the operator, and tries his power of adapting himself to circumstances and meeting unexpected emergencies. No doubt in the ordinary run of work the printer has to deal with negatives many of which, as a recent correspondent suggests, if simply placed in the vignetting-frame without any special care, will produce anything but pleasing or artistic results. Of course the negative is blamed, and equally, of course, in the end there is a conflict of opinion, to put it mildly, between operator and printer.

It seems to us that it is alike idle to discuss either the particular methods of vignetting or the character of the negatives to be vignetted. In the case of an intelligent and careful printer these are quite subsidiary matters; for, practically, any of the vignetting devices in vogue can be made to give first-rate results with almost any sort of negative, if used in combination with Sir Joshua Reynolds's hackneyed ingredient—"brains."

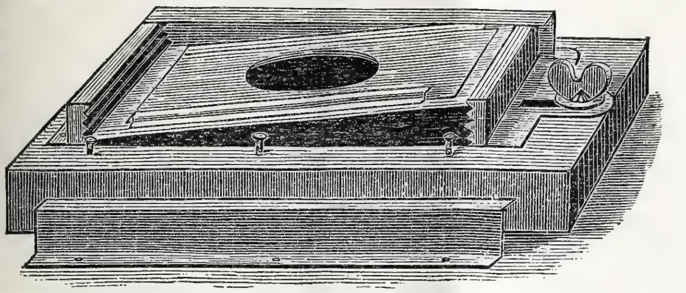
Without wishing to depreciate the value or the quality of the work produced by the best English artists, there can be no doubt as to the general superiority of the vignetted productions of American photographers, and this result can be clearly traced to the exercise of more care in the use of simple appliances than is usual with the ordinary printer in this country. The same methods of grading the print are employed by American operators—from the vignetting glass, vignette papers, perforated card with cotton wool, tissue paper, and perhaps many others equally simple; but the means by which the result is produced are suited to the effect required.

We had many opportunities some time ago of witnessing the mode of working of a printer who had been in practice for some years in America in various cities, and whose vignette productions were equal to any we have ever seen. His appliances were of the simplest, for he used nothing but plain brown paper for his vignetting mask, and very rarely employed the extra refinement of tissue paper. His method was to cut a special mask for each negative to be vignetted, using great care and judgment in suiting the aperture to the requirements of the particular figure and the effect he desired to secure. The aperture having been carefully made, the edge was serrated in the usual manner, and the paper then pasted on the front of the printing-frame at a distance of about half-an-inch from the glass, and when dry the negative placed accurately in position with a piece of tissue paper in contact with it instead of sensitised paper. Now, holding the frame to the window and watching the effect exhibited on the tissue paper, the serrated points of the mask were carefully but rapidly worked into position with the two first fingers of each hand, the thumbs holding the negative in position. In some parts the serrations of the mask would be brought closer to the glass and in others the reverse; in fact, the distance of the mask from the negative was arranged according to the softness of gradation required in every portion of the negative.

Here is one chief point of difference between English and American methods, the latter making great use of this system of varying the gradation at different parts of the figure; indeed, special "vignetting attachments"—one of which is shown in the diagram—are regular articles of commerce. By means of this it will be seen that the vignetting mask, instead of being fixed parallel with the negative, as in the ordinary English manner, can be inclined at any desired angle so as to cause the grading to be softer or sharper at either end of the picture—a power which is frequently indispensable and always of great use, especially in cases where, from the

use of a too dark background, it is desirable to limit the shading about the head without interfering with the gradation of the bust.

With such an arrangement as this it is possible to produce almost any effect without tissue paper, cotton wool, or any other aid; while



by keeping the frame in motion during printing the operation may be performed in sunshine, though obviously a softer effect is produced in diffused light. Without, however, resorting to any such elaborate means, a couple of minutes' trouble in properly making and adjusting the mask once for all will save an infinity of trouble and produce first-class results.

LOCAL INTENSIFICATION OR REDUCTION OF NEGATIVES.

Any practical method by which certain portions of a negative may be intensified, or the intensity reduced, without affecting other parts which are already of the proper density, must at times prove useful, although at best the method may only be a makeshift. It often happens that a negative may be satisfactory, so far as the major portion of it is concerned, but the extreme foreground, a corner, or a dense mass of foliage has not received sufficient exposure to bring out the details in the deepest shadows with vigour sufficient to cause them to print in harmony with the rest of the plate. The detail may be there, but too weak to show in the print, so that such portion is little better than a black mass when printed.

Sometimes the picture may contain some conspicuously-light object, such as a white building, surrounded by dark foliage, and, unless a very full exposure be given in the first instance, in endeavouring to obtain sufficient detail in the darkest portions the lightest ones (such as the building) become too dense. In all instances, when this is the case, the obvious remedy is to take a fresh negative; but this is frequently quite out of the question, as it may have been taken hundreds of miles from home, and therefore nothing remains but to make the best of what is already obtained. One of the most general plans resorted to under these circumstances is to coat the back of the negative with coloured or matt varnish, and then to scrape it away from the over-dense portions, leaving it only on those where the image is too thin. In doing this the image itself is not really strengthened; it is only shielded somewhat during the printing by the varnish obstructing some of the light, and in many cases this causes the print to lack vigour when finished.

Last week, in *Foreign Notes and News,* we gave a method of locally intensifying or reducing negatives, published by Herr Eckert, of Prague. The plan is very similar in principle to one practiced in etching, and known technically as "stopping off." In etching, we may explain, the metal plate is covered with a resinous coating. The design is then scratched through this coating with an etching point, so as to expose the bare metal. Dilute nitric acid or other corrosive fluid is then poured on, which dissolves the metal according to the time it is allowed to act. When the lines in the more delicate portions are judged to be bitten in sufficiently deep the etching fluid is thrown off, and the plate washed and dried. Then those portions are "stopped off;" that is, they are painted over with a resistant varnish, such as Brunswick black, and the acid is again applied, until the next grades are deep enough. The action is then arrested, the plate washed, the "stopping off" repeated, and so on until the strongest portions have sufficient depth.

Now, "stopping off," or protecting certain portions of the image while others are being subjected either to an intensifying or reducing agent, as the case may be, is precisely what Herr Eckert does with the negative. Supposing he has a negative in which some portions are of the requisite density and others too thin to print, although possessing a certain amount of detail: after the negative has been fixed and dried he paints neatly with asphalte varnish over all but those portions which require intensification. This varnish is simply bitumen dissolved in turpentine or benzole. Then the intensifying solution is applied until sufficient density be obtained, the varnish, of course, protecting the other parts from its action as in etching. After certain portions have acquired sufficient strength they may be stopped off, and the intensification can then be repeated on the still weaker parts. When sufficient density has been secured the plate is washed and dried. Then the bitumen is washed off with benzole, and the negative finished in the usual way.

If, instead of needing intensification, any portion of the negative requires reducing, the converse of the above plan is followed. All but the over-dense parts are stopped off with the varnish, and then the reducing agent is applied until sufficient reduction is produced. Now this plan, although only a "dodge" or makeshift, is one that may at times prove very serviceable; hence our reason for calling special attention to it. If bitumen varnish be employed great care will have to be taken that the whole of it is removed with the benzole; for, should only a very attenuated film remain, it will show in the printing as bitumen. Even in extremely thin films, by reason of its colour, it is very non-actinic. However it is by no means necessary to employ a black varnish at all, as the ordinary negative varnish will answer much better, and for several reasons:—It will protect the film quite as well as the bitumen; it is quite as easy of application; and, being transparent, the effect of the intensifying or reducing agent can be easily watched and judged by comparison with the other portions of the image, which it is impossible to do when they are covered up with the black varnish. Furthermore: it will not be necessary to clean off the protecting medium in this case, for the little extra thickness of varnish on some parts—if, indeed, it be not dissolved when the plate is varnished as usual—will be of no consequence whatever.

In stopping off, it need scarcely be mentioned that great care must be exercised that the varnish be neatly applied, so that it does not overlap those portions which are to be acted upon. In order the more effectually to avoid this it will be well to make the varnish slightly thicker than is used for negatives by the addition of a little more gum, as when it is tolerably thick it can be the more easily manipulated with the brush, and there will also be less risk afterwards of its running. The plate should be slightly warmed beforehand to prevent the varnish chilling.

It is possible that, in some instances, stopping off may be usefully practised in the development of the negative—when it is found that (say) dense masses of foliage cannot be brought fully out before the other portions are over-developed. In such cases the development should be arrested as soon as the details are secured in the more important portions of the picture, and the plate thoroughly washed. By immersing it for a few minutes in two or three changes of methylated alcohol, which will absorb the major part of the water, it can be quickly dried. Then those parts which are fully developed may be painted over with the protecting varnish, and the plate again immersed in the developing solution. By this means the detail which is lacking may frequently be forced out without overdoing the other portions. In this case it is scarcely necessary to mention that it will be imperative to carefully remove all the varnish with spirit before the negative is placed in the fixing bath.

STUDIO AND OUTDOOR EFFECTS.

When the photographic portraits of the present day are compared with their predecessors of a couple of decades ago the most striking element of difference will be seen in the character of the backgrounds employed. Then they were in the main simply absurd, some striking exceptions rendering the great bulk all the more conspicuously *outré.* Now the majority are most cleverly and picturesquely painted, and usually most unobtrusive in design and harmonious in power of adaptation to the require-

ments in the portrayal of the figure. But harmony between the lighting of the figure and the lighting of the surroundings is not too commonly seen. We may, perhaps, be spared the sight of a lady posed before a gorgeous window through which hills, trees, rivers, or ruined temples contended for mastery, while the lady's head illuminated by a light entirely guileless of any connection with that which it might be assumed would be streaming through the window, except that no trace of its effects is left behind. All this may be spared, and yet there remain a dissonance or want of keeping between the two—minor in degree, yet offensive to the artistic eye—and against this we would most strenuously caution the thoughtless photographer.

We must, however, say that the defect is not confined to works of photographic origin. We have but to scan the walls of any Royal Academy exhibition to see the same fault rampant there—a young lady standing in the midst of open fields, yet with a most beautiful arrangement of lighting that must have cost much anxious thought, and plainly telling of window sashes and blinds and screens, not the open canopy of heaven. Still, it is no excuse for photographic slovenliness that the painter does likewise, and, indeed, the latter sins less frequently than he used to do in this respect; whether or no it be that there are more studios built now with a top light capable of being used at will we cannot say. Where the photographer's background represents interiors he need not go far astray, the wretched, entire window with a foreign light for the model, and its kind, being almost bygone monstrosities. It is only where the figure is brought into competition with outdoor arrangements that failure may result. A "Rembrandt" lighting of the figure, with a dimly-outlined ruined *château* in sunlight and a hazy suggestion of a woodland walk, do not go well together, nor, indeed, does any arrangement whatever of delicately-modelled studio-lighted pictures with bright outdoor effects of landscape, &c. We may be sure that the cultivated taste of the critic will soon find out any such want of keeping.

Another fault which has been publicly seen before now is the "printing-in"—into a landscape, for example—of a few pretty figure studies that have evidently been taken in a studio. The effect is very graceful at first, but the slightest criticism shows the fallacy. Such a picture is open to the possible administration of very sharp raps from the critic who examines it, and who cannot admit that two entirely different classes of lighting can be allowed in the same picture. If figures are to be introduced in a picture they had far better be photographed upon the spot where the landscape lies, even if taken on a separate negative for printing-in, though we cannot refrain from pointing out that outdoor scenes with figures have been exhibited, and with *éclat*, in which it is stated that both view and figures were taken upon one plate; but only those who have essayed it know the difficulty of doing this successfully.

We once saw in the exhibition of paintings of a well-known society a very beautiful woodland scene, in which was a simple foreground of large-leaved burdock and a rustic stile, rendered forcible with strongly-drawn shadows from an afternoon sun. Through a break in the trees a delightful peep of the village church and its tower was seen, and the whole formed a most attractive picture. A short examination, however, showed that while the church was lighted by an eastern sun the foreground plainly indicated the sun to be shining from a westerly direction, and at once an element of unreality was introduced which completely jarred with the first impression of picturesqueness.

Such a picture would be an eloquent warning to photographers not to err in a similar direction; for photographs not possessing the charm of colour, imperfection in the arrangement of light and shadow becomes more prominent, and is more quickly detected by the spectator. The vagaries in the printing-in of clouds have often been alluded to; but too often, even yet, do we see clouds (pretty studies of themselves) rendered ineffective and absurd by being lighted from a direction exactly contrary to that shown by the view they are intended to embellish.

Turning to effects in single figures, the contrast of today and yesterday is most striking; and for variety, ingenuity, and effectiveness in illumination the "heads" that have been sent out from some modern studios are marvels of art and models of picturesqueness. Here, again, a danger is encountered. In the endeavour to show originality and variety we see methods of illuminating adopted which could no more be produced by any combination of light possibly to be found in an ordinary house than the chair upon which the model is "posed" could be found anywhere outside a photographer's studio or a photographic dealer's warehouse. Now, if photography is to take a high place, the greatest care must be exercised to prevent hostile critics being presented with opportunities such as these for showing the inartistic things its votaries can produce.

We do not ignore technical difficulties, which, at every stage, present obstacles to the carrying out to the full of the artistic conception of the photographer; but it is all the more creditable to those who master them. It is not our purpose in this article to give practical instructions, but we may, in conclusion, describe a photograph we saw a short time since, in which a simple technical difficulty was well overcome. The occasion was on the taking of a group of some forty or fifty figures. The photographer had arranged them carefully in the only available place away from the direct sun. When the plate came to be developed it was found that some very tall trees which flanked one side of the group had so diminished the light received upon the opposite half of the group that the whole was divided into two most unequally-lighted halves, and to such an extent as to spoil the picture. Shading during printing was tried, but without success; but at last the negative was rendered almost perfect by intensifying one half only. We were shown the negative and a print from it. No signs of any difference of treatment in the two sides were visible, and we were informed that the intensification was performed simply by rubbing with the finger a little of the mercurial intensifier made by a modification of the well-known formula that Mr. Edwards first described.

In conclusion: we would express a hope that in the most minute particulars photographers would use their utmost endeavours to ensure that every picture they produce is in entire artistic keeping in all its parts, and so help to elevate the status of the art and that of its professors.

We recently gave some statistics as to the import and character of borax—once in considerable repute as a toning solution ingredient. We may say that according to newspaper reports still further fields for its supply have been discovered. Boracic acid is the usual form in which it is found; but, as the European demand is for borax, the acid is neutralised with soda and so put upon the market, boracic acid when needed being made from the borax. This acid has been recommended to mix with the pyro. developing solution as a great retarder. Most probably, however, its action in this respect would occur from its neutralisation of the ammonia and consequent diminution of the developing power of the solution. It is, further, not very soluble in cold water, one ounce being stated to dissolve only eighteen grains of the acid, though, when raised to boiling point, eighty grains may be dissolved, this excess participating, however, as the solution cools. Those who wish to experiment with boracic acid may do so if they will dissolve it in glycerine, an ounce of which, when hot, will take up one hundred and eighty grains, and retain it in solution upon cooling.

Besides its photographic use, boracic acid may be further useful to photographers. Borax is well known for its soothing action upon the skin, and boracic acid is also recommended and might be exceedingly useful for the rough and painful state of the cuticle, often brought about by the repeated dabbling in water to which the operator has to submit. The formula for making a preparation of this sort is as follows:—The above preparation of glycerine one part, white wax one part, vaseline twelve parts. The glycerine preparation is to be added to the other two ingredients while they are hot, after being melted together, and the whole stirred till cool.

This vaseline, or any other similar petroleum compound (and there are many of them), is a capital lubricant for stoppers of bottles likely to become self-fastened through disuse—as, for example,

when used to contain ammonia or caustic soda—the stopper then often becoming so fastened as to defy all attempts at removal. These petroleum jellies, however, do not saponify, and when stoppers of such bottles are very slightly smeared with it they may be left for years without risk of becoming fastened. Corks, as we have before pointed out, form excellent substitutes for ground stoppers when well soaked with vaseline. They completely defy all attacks of acids or acid vapours.

NEW YORK should be a paradise of photographers. While in our own metropolis we have almost bid good-bye to the sun for the next few months, and only see it at most intermittent periods during the rest of the year, New York must, according to the report on the New York Metereological Observatory, by Dr. Daniel Draper, enjoy almost perpetual sunlight while the sun is above the horizon. In each year of 1878-9, we learn from this report that the number of hours the Sun could possibly shine was 4,449, and he did shine 2,906 and 3,101 hours respectively. At Greenwich, with only two less of possible hours of sunshine, the actual numbers were 1,245 in 1878 and 977 in 1879. Roughly speaking, therefore, New York has about three times as much sunshine as Greenwich every year, and from the data that we gave a few weeks ago as to the excess of the sun's direct rays at Kew over the quantity enjoyed in town, unfortunate London photographers have evidently to put up with still smaller solar accommodation. No wonder electric installations are beginning to become quite common at metropolitan studios.

THE comet is rapidly becoming more conspicuous, and may now be easily seen with the aid of a good opera glass. The increasing light of the moon will, however, be inimical to naked eye-observations for some time, though the comet will be increasing in brightness. During the latter part of this month it should be seen to great advantage, as there will then be no moonlight, and it will be above the horizon for three hours after the sun has set. In the middle of the month it will be visible in the milky way, and will form a most unusual spectacle.

PHOTOMICROGRAPHY has attracted more attention this winter and last than has been given to it for twenty years, and it continues to grow in attractiveness. Every experimenter has his own method of working and managing the light, &c., the same common principle naturally running through all. At a recent meeting of the Academy of Medicine, in Ireland, Dr. Dickenson read a note on the subject, exhibiting the apparatus he employed and the results he had obtained. There cannot be a doubt of the vast field of usefulness photography offers in medical science when aided by the microscope, and we hail with pleasure the advent of fresh experimentalists in the field. If it were more generally known how very simple the operation really is, particularly to those skilled in the use of the microscope, there would be a far greater number of votaries of the science. Dr. Dickenson's apparatus was very simple. It consisted of three parts—an inexpensive magic lantern illuminated by a triplex petroleum lamp with the ordinary combination of lenses, and an extra tube with a small bull's-eye condenser; next a microscope, placed horizontally; and, finally, a frame to hold the focussing-screen or a sensitised plate.

A CHAPTER OF PHOTOGRAPHIC HISTORY.

THE publication of Mr. Jabez Hughes's paper, read at the last meeting of the Photographic Society of Great Britain, affords us the opportunity of correcting a slight inaccuracy to which our attention has been called in the abstract of our report of Mr. Hughes's remarks, and at the same time of pointing to a false impression which might be created by what was actually said.

In our report the following passage occurs:—"About this time appeared the first organ of the photographic press—the present BRITISH JOURNAL OF PHOTOGRAPHY—followed shortly afterwards by the *Photographic News*." So far this is absolutely correct; but from the text of Mr. Hughes's paper we find he said, speaking of the *Transactions of the Photographic Society*:—"Our monthly *Journal* soon became a fortnightly one, and presently as an offshoot the startling innovation arose of a veritable photographic weekly newspaper, in the *Photographic News*. The Liverpool Society also determined to have its exclusive Journal, and that in due time so expanded as to become another weekly newspaper—THE BRITISH JOURNAL OF PHOTOGRAPHY." In explanation we may say that our reporter missed the point in connection with *weekly* journalism, and knowing that THE BRITISH JOURNAL OF PHOTOGRAPHY was the older of the two by a considerable period, the conclusion was reached that Mr. Hughes's reversal of the names was a *lapsus linguæ*, and so the correction came to be made. Had we been aware that the statement was intentionally made we should have permitted it to stand in the report, and at once taken the opportunity in another way of correcting the erroneous impression the statement is calculated to convey. As the matter has, however, now been brought to our notice, we may be excused if we give a fuller statement of facts than we should otherwise have deemed necessary.

So far as regards the first *weekly* journal Mr. Hughes is quite correct; but by implication he conveys to the minds of those whose acquaintance with the history of photographic literature is limited to modern times, the impression that this was the first photographic journal of any description after the Parent Society's organ, and that this Journal afterwards appeared, whereas, as a matter of undoubtable fact, it preceded it by several years, but as a monthly first, and, subsequently, semi-monthly.

The facts are briefly these:—On the 14th January, 1854, the first number of the present BRITISH JOURNAL OF PHOTOGRAPHY appeared, under the title of *The Liverpool Photographic Journal*. It was started by the then existing Liverpool Photographic Society, being edited by four of the members of that Society, and was printed and published by its present proprietor and publisher, into whose hands it very shortly afterwards passed by purchase. From its very first number it was a commercial journal, and as such purchaseable. In no sense was it the private journal of a single society like its only predecessor; but, on the contrary, it shortly became the recognised organ of nearly all the then existing provincial societies. Until the end of 1856 it remained a monthly publication; but with the first number of the following year it entered upon its new series as a semi-monthly, under the editorship of Mr. William Crookes (now F.R.S.), and in July, 1864, became a weekly, having in the interim adopted its present title. Throughout all the thirty years of its existence the Journal has been under the same management, and it has now reached its twelve hundred and thirty-first consecutive issue.

On the 1st January, 1856, the late Mr. Thomas Sutton, then resident in Jersey, published the first number of his *Photographic Notes*—first as a monthly and subsequently as a semi-monthly. This journal was incorporated in 1868 with the *Illustrated Photographer*, which collapsed after a career of little over a year.

On the 10th of September, 1858, Messrs. Cassell, Petter, and Galpin published the first weekly number of the *Photographic News*, under the editorship of Mr. William Crookes, who, as we have stated, gained his first literary experience in connection with photography as editor of THE BRITISH JOURNAL OF PHOTOGRAPHY. Messrs. Cassell did not long persevere with the venture, and it passed into other hands. Thus it is clear that the *Photographic News*, instead of being able to claim seniority, as would be gathered from the implication of Mr. Hughes's paper, is actually the youngest of the journals of any importance ever published in this country.

TRACING AND ETCHING PHOTOGRAPHS.

IN what follows I purpose affording photographers an opportunity of demonstrating to their own satisfaction, at least, and without doubt to that of their friends also, that they do possess that artistic taste and ability which of late appears to have been denied to many of our brethren.

It fell to my lot, not long ago, and under circumstances which need not here be mentioned, to have to produce a delicate etching from a photograph. If photographers could only realise adequately the pleasure there is in being able to convert by means of the needle point the tones and half-tones of a silver print into the free-looking, sketch-like lines of the etching, more attention would be bestowed upon this art. What fine, free, and, withal, truthful representations may not be made, conjoined as this art is with the ability to stop out altogether from the picture everything that is *outré*, offensive, in bad taste, or unrequired? For executing a work of art of the nature now being described there is no genius demanded save that which can be acquired; nor is the faculty of imitative drawing absolutely necessary, the essential requirement here consisting in

the ability to trace carefully, and represent tones, by a series of lines, the nature and direction of which constitute the truthfulness and demonstrate the skill of the artist. The acquisition of this skill is greatly aided by the attentive studying of some good examples of etching and line engraving, both of which are everywhere, happily, of easy access.

The ability to trace accurately and with a free hand and artistic grace being assumed, I now approach the consideration of the technical methods by which this peculiar acquisition may find a fitting outcome in photographic art. But in order to test one's ability to trace, with a finely-pointed needle, a photograph, so as to have the likeness retained, recourse should be had to the following piece of practice:—Print upon albumenised paper an easily-recognisable portrait of some well-known friend, and fix this print, taking the precaution of not toning it. Now, with a finely-pointed steel pen and suitable black ink, trace the portrait all over with fine lines and cross-hatchings where required, until satisfied that the whole of the tints are represented by lines. Then remove the photograph by floating the paper upon a solution of bichloride of mercury, by which every tint will disappear, leaving the paper white, except the ink tracings made by the pen. This will reveal the measure of success that has attended the effort. If the likeness and expression have been preserved, and the various muscles and folds in the clothing seen to be well delineated, the effort may be conceded to have been successful, and the way is paved for practising the following applications of the skill thus displayed.

A sheet of very pure gelatine is procured. It must be quite free from any defects, and have one side faced with collodion. A few sheets may be readily prepared by coating with plain collodion a plate of glass previously rubbed well over with powdered French chalk, or polished with a thin solution of bees'-wax in ether. The plate being levelled is now coated with gelatine in much the same way as emulsion is applied, only in order to ensure the most perfect clearness of the subsequent film the white of an egg, previously beaten to a froth, must have been added to and thoroughly stirred up among the liquefied gelatine, which up to this stage has been subjected to no more heat than has sufficed to liquefy it. Now apply heat to such a degree as to coagulate the albumen, after which the gelatine may be decanted into a bottle. It will then be singularly bright and pure. The degree of thickness I prefer to employ is that of ordinary writing paper, and if the gelatine has been clarified in the way I have directed the sheets obtained will be exceedingly fine. I have here taken for granted that everyone is aware of the method of preparing these films; that is, by coating the prepared glass with a sufficiently thick film, and, after the gelatine has become quite dry, removing it from the glass by the aid of a penknife to start the separation.

In making a tracing from a photograph, if lines of the finest quality be desired, the services of an etching-point must be had recourse to. The way I make these is to obtain a few wooden handles of steel penholders and insert in them the halves of broken needles, leaving the point projecting about three-eighths of an inch. The handle should be cut away to a point like that of a lead pencil. One or two of these I rub upon a hard oilstone, so as to bring them to a sharp, triangular cutting-point; the others I leave as they are. Having laid the gelatine sheet upon the photograph which is to be traced paste a strip of gummed paper along the upper edge of both to ensure correct register, and then proceed very carefully to trace the outlines. If it be a landscape with distant mountains, let the latter be traced lightly, making sure, however, that the surface of the gelatine is broken or cut into. Avoid anything like laboured work in the details; but let the ravines and crags be represented by a few effective, simple lines. There is here room for much display of taste. The true artist produces great effects by small means. In foliage the nature of the tree can easily be shown without having recourse to laborious, "niggling" work. The outlines of the masses having been drawn, the details are next given so as to show the character of the tree. If the artist has no experience to guide him, then let him have lying beside him a few examples of engravings or pencil drawings, from which he will ascertain by what means the various effects are produced.

To watch the progress made, provide some finely-produced plumbago mixed with lampblack, and, taking a little upon the point of the finger, rub it smartly over the surface, by which the etched lines will become black. Now insert a sheet of white paper between the photograph and the gelatine, and every touch made with the etching-point will be plainly visible. When completed a negative may be made by superposition, from which may, in turn, be produced either silver prints, photolithographic surfaces, or blocks for surface printing. A pen and ink may be employed either alone or in combination with the etching-point; but I prefer to use the pen and ink on the collodion side of the film, which does not seem to answer so well for etching on. For extreme delicacy the ink is inferior to the etching method, as it gives thicker lines; but if the pen be very fine, and the surface of the collodion moistened by applying the tongue and afterwards dried, then the finest touch will be registered. I have in this way made outline tracings from photographs for the magic lantern which, in the estimation of connoisseurs, were considered more effective than the pure photograph. When the production of subjects for lantern projection forms the aim of the operator, the gelatine may be spread upon plates of the requisite dimensions and allowed to remain there. But the thickness of the glass plate intervenes between the tracing-point and the photograph, and much skill will be required in preserving the outline accurately unless very thin French glass be employed.

HERBERT J. RIGBY.

A STUDIO CHRONOMETER.

LET not the reader imagine I am about to describe an elaborate piece of horological workmanship that will time exposures to the $\frac{1}{100}$th part of a second, and cost a small fortune. I use the term in its literal sense of a "time measurer" to describe a useful appliance I constructed to supply a special want in my own case, and which will, I have no doubt, prove useful for various purposes to others.

The circumstances under which the contrivance was designed were as follow:—In making lantern slides, in order to economise time, the plates employed being dry collodion, and necessitating exposures of from ten to fifteen minutes, I developed one plate while the next was exposing, but I found it inconvenient to leave the developing-room just at the moment the exposure should cease. I therefore conceived the idea of setting up an automatic arrangement for closing the lens at a given time, and resolved to combine a sort of sand-glass with a balanced lever. The details of the plan were simple, and my first attempt proved a success, but I have since improved upon it.

A piece of thin mahogany about three feet in length, three inches in width, and about a-quarter of an inch in thickness, had a hole about one-sixteenth of an inch in diameter drilled through its centre in the direction of its width, through which was passed a stout knitting needle. With a little adjustment, and using the knitting needle as the fulcrum, this formed a tolerably accurate scale beam. On one end I fixed a tin canister—an empty "condensed milk" tin—which in turn was counterpoised by means of a piece of lead at the opposite end of the balance.

This was the whole of the balance arrangement in the first attempt; but subsequently, to increase its efficacy, I added the following:—A piece of "barometer tube"—*i.e.*, glass tube of about half-inch internal bore, two feet in length, and which was about one-third filled with water, the ends being closed with corks. This was affixed to the wooden beam by means of wire, in such a position that when held perfectly horizontal the whole arrangement nearly balanced, but, of course, as soon as the horizontal position was disturbed, the water in the tube flowing to one end completely and effectually upset the balance.

I next drew the tube of a large glass funnel to a moderately-fine point, leaving an orifice of about a-sixteenth of an inch diameter, and this was fixed in a retort stand with its tube over the tin canister at the one end of the balance, which was placed with the scale pan "in the ascendant," and the water at the other end. The funnel was filled with fine, dry sand, which was allowed to run in a fine stream into the tin canister until a sufficient weight had accumulated to reverse the position of the beam. After a few experiments and modifications of the size of the orifice of the funnel, the conditions became sufficiently near for practical purposes to enable me to proceed to the next operation—that of adjusting the beam.

This I effected as follows:—Having "dumped down" the counterpoise end of the beam, thus placing the tin receiver *en haut*, the sand was allowed to run into the latter until it just caused the beam to change positions. This quantity of sand was weighed and a very slightly less weight of lead attached to the canister as a counterpoise to the other end. I may here remark that, if the respective weights of the canister and water in the glass tube were properly adjusted, possibly a single counterpoise would answer; but the method I describe appeared the easier, and was the one actually adopted.

Now, it will be seen that the beam is in a state that can scarcely be called equilibrium, for the canister end will always remain in the air, though a very small weight placed in the canister will reverse the balance.

Next came the operation of "timing the chronometer." This was effected as follows:—The "sand-glass," having been placed in position, was allowed to discharge its contents into the canister for exactly one minute, when, of course, the beam was reversed. A leaden weight was made of such weight as when placed on the opposite arm to just allow the canister end to be the heavier, or, rather, to reverse the balance, and that weight represents one minute of time. In like manner, *separate* weights were made to represent 2, 3, 4, 5, &c., minutes; it is necessary to make separate weights for each period, as, in using the smaller ones accumulatively, the ratio between the fixed and movable weights is disturbed, and the times rendered incorrect.

The description most probably reads as a very complicated matter; but the whole affair can be "rigged up," adjusted, and timed in an hour or two at the outside, and when once done is always ready for use. I may also remark that many details may, no doubt, be improved upon where a permanent instrument is constructed, but I have simply described my tolerably rough one. The movable weight (of water) I may say is useful as giving more power when the balance is once turned, enabling, as in my case, the trigger of a drop shutter to be worked by the movement of the beam.

The application of the apparatus to the purpose I have mentioned above was effected by means of a rough drop-shutter fitted with a light trigger which was attached to one end of the beam by means of a thin string in such a manner that when set the alteration of the position of the beam caused it to be released. I have found the affair most useful for the special purpose for which it was designed, and I have no doubt it would prove equally useful as an alarum when sensitising paper or similar operations. Tolerable accuracy of timing is needful, and yet it is tedious to wait and watch the whole operation. By arranging my chronometer so as to strike a bell in its fall, the operator would be enabled to go about other business until the signal was heard—a not unimportant advantage in a busy studio.

C. Beckett Lloyd.

DIRECT POSITIVES.

That we, as practical scientists, are too prone to pursue a beaten path, looking neither to the right nor to the left, will, doubtless, be generally admitted to be proved by our persistence in adhering to the wet collodion negative process for thirty years, and to silver as our method of printing for as long a period. And now gelatine, having distanced all competitors, promises in this order of things to content us for another half century or so. But the writer asks—Will not gelatine assist us in other directions? Will it not supply us with a rapid printing process as well as it does with our negative plates? and, further, will it not furnish us with that oldest and not least beautiful style of light-picture known by the designation which heads this article?

It may be objected that, supposing we could produce such a picture a direct positive as good in technical quality—say as the silver print of today—we should have but one picture for all our trouble, and the power of multiplying copies would be taken away from us. But the painter does not seek to duplicate his productions. Then why should we desire to do so, who are supposed, and rightly so, to take him as our model?

Of the extreme value of such a process there can be no doubt. To the amateur it would be a priceless boon, and greatly extend the popularity of our art as an amusement, to be able to finish a complete and perfect picture in (say) a-quarter of an hour. We should also have more time to study art in our productions, and not as is frequently the case at present. No sooner is a negative finished than we proceed to discuss its technical quality; then we strike off at a tangent into formulæ, process, rapidity, and soforth, instead of gravely asking ourselves the all-important question—Have the canons and rules of art been strictly observed? These distractions would be all eradicated if we could produce a good picture at once, and not something which is the means of a picture, more than which a negative is not.

The writer would urge upon his brethren the great desirability of experimenting in this direction, and offers the following as his contribution towards obtaining a starting-point. It is based upon the fact that iodine has the power of displacing bromine or chlorine in its combination with silver. This principle has been already utilised to reverse collodion negatives by Mr. W. Brooks three or four years ago.

Get some large sheets of the thin, hard, Bristol board, such as is used in the best class of visiting cards, enamelled or smooth according to taste, and give it a good coating by brushing it back and front with gelatine and chrome alum. It is now dried and coated with a porous plain collodion, washed until greasiness disappears, and dried again. It should then be immersed in a dish of ordinary gelatine emulsion and moved about for four or five minutes, and then hung up to dry. Upon cutting into suitable sizes, it is now ready for exposure in the camera. Develope the image rather fully, a suitable exposure being ascertained after a few experiments, and wash well, but do not fix. Then treat with a mixture of an equal bulk of tincture of iodine and water until the image has completely disappeared. Thoroughly wash and expose freely to light. Now, upon applying a developer again, our direct positive makes its appearance as an image of great delicacy and beauty. Ferrous oxalate gives a pure black tone, and alkaline pyro. a variety of warm browns, according as it receives an addition of one or other of the salts of soda—the acetate, phosphate, or citrate, the latter giving a nice lustre, very warm. It must now, of course, undergo fixation, and is then complete. In conclusion, the writer can say that such pictures on opal glass are finer than any silver print.

J. M. Carroll.

PROFESSOR HUXLEY ON PHOTOGRAPHY.

Photography occupies too important a position to be ignored whenever science and its doings are recorded, so that we may be sure it would meet with due recognition at the hands of the distinguished *savant* at the head of the Royal Society, who last Friday delivered his first address as President. It is not within our province to give an account of the whole address, interesting a *résumé* of the scientific achievements of the past year as it was. More particularly we would place before our readers Professor Huxley's utterances upon photographic topics. He spoke, in at least as sanguine a tone as the facts warrant, of Dr. Huggins's attempts to photograph the solar corona without the aid of an eclipse. He said:—

"Last December Dr. Huggins presented a note on *A Method of Photographing the Solar Corona without an Eclipse*, which had so far proved successful, under the unfavourable circumstances in which he had put it in practice, as to lead to the hope that, under better conditions of atmosphere and elevation, the corona might be photographed from day to day with so much accuracy as to preserve a clear record of the changes which it undergoes. And, as the photographs taken during the eclipse at Caroline Island show a condition of the corona intermediate between those exhibited by Dr. Huggins's photographs at periods antecedent and subsequent to the Caroline Island observations, there is reason to believe that this hope is well based, and that a new and powerful method of investigation had been placed in the hands of students of solar physics."

After, in that singularly-lucid manner that characterises Professor Huxley's utterances, having discussed a variety of scientific subjects that the society had a special interest in, he turned again to the results of photographic labour, and gave a very succinct account of the work done at Caroline Island during the solar eclipse of May 5th. He entered somewhat fully into the details of organisation and the difficulty of obtaining efficient observers to conduct the expedition. We may give in his own precise words the account (from details published by Mr. Lockyer) of the actual net results of the eclipse photographing:—

1. Six good photographs of the corona, exposures varying from two to sixty seconds, giving coronal detail from near the limb to end of streamers. That the limit of the corona has been photographed is shown by the manner in which the light of the sky has impressed itself on the plate. 2. Three large photographs showing the details of the corona close to the limb. 3. Good photographs of the spectrum of the corona showing a great number of coronal lines and very faint Fraunhoferic lines. 4. Photographs taken on a moving plate in integrating spectroscope from one minute before to one and a-half minute after totality, showing the most prominent lines of the reversion spectrum. These lines belong mainly to hydrogen. 5. Photographs taken with first-order grating before, during, and after totality. These show H and K, near the limb, throughout the whole of totality. 6. Photographs taken with a dense-prism spectroscope before, during, and after totality. These photographs also give some of the prominent lines of the reversion spectrum. 7. Two photographs taken in the prismatic camera on plates sensitive to ultra-red rays. Results comparatively indifferent on account of the absense of prominences.

"HOW IT'S DONE."

In Three Parts.—Part III.

Windy weather is, perhaps, of all atmospheric conditions the most objectionable if foliage has to be dealt with, and of all winds a gentle, continuous breeze is most tantalising. On a gusty day there are inter-

vals of quiet when, by closely watching the trees, sharpness may be secured, watchfulness and patience be rewarded; and on such days the light is generally in its best condition, as there is a luminosity and penetrativeness in it that lends itself admirably to fine photographic results. There is detail to be perceived in dense masses of foliage that under less favourable conditions would be simply a mass of shadow. Generally some spots are protected from the wind, however rough it may be. Such sheltered localities should be looked for; but, providing that it be found impossible to find the desired stillness, when one portion is at rest another is swinging about.

Notice must be taken of the most conspicuous pieces of foliage, either as relieving against a darker background or against the sky. When these are at rest make the exposure, leaving the other portions to come out as they will; the negative will often be more satisfactory than might have been anticipated under the circumstances. A little work on the negative, in the form of stopping-out, will remove some of the ruggedness of moved ends of branches and leaves and make a much more sightly print than by leaving them as they were. A blurred edge may be improved in a similar fashion. These are, however, little matters of detail properly belonging to the printing department, and can hardly be considered part of the occupation of a day's out; but inasmuch as such hints may act as a guide in taking the negatives I have introduced them.

One difficulty that frequently crops up is blurring when a dark object is relieved against the sky; very often the object that ought to be clear and dark merges into the light without any definition and spoils the picture. There are two plans that tend to prevent this effect—one is to have the plates backed, and the other to use a slow developer or a much-restrained one. The plates have something to answer for in the production of this defect, some being much more prone to blurring than others. I give the preference to an emulsion containing iodide, and some of the best pictures I have taken have been on such plates, as I think they are particularly resistant to this kind of action—a very important quality. To get small, dark objects, branches of trees, &c., clean and round, with a bright light behind them, is, to say the least of it, exceedingly useful. Unless the plates are suitable for such subjects it is best to avoid them, and confine the attention to those with less contrasts.

It is a good plan to wrap up the camera bodily in a focussing-cloth. It does not, perhaps, look so imposing as the display of French polish and brasswork; but it makes a safeguard for the plates, as on a bright, sunny day it is so very easy to spoil the work by accidental light. A cloth of about twice the usual size is necessary, with a few tapes sewn on—of sufficient length to go several times round the camera. With such a provision you may set a blazing sun at defiance, and work as safely as in your own dark room at home. Two thicknesses of black twill is a good material for it, taking up less room than velvet.

In the selection of a view the best point of sight is frequently much lower than the usual height of the camera-stand. It may be borne in mind that the majority of artists make their sketches sitting down on a camp stool and not standing; therefore, before deciding on the view, examine it from both high and low points of sight. There is more difference than would be perhaps anticipated, and very frequently the lower point is the better one; at anyrate it is very easy to look and see before exposing the plate.

Unless for special cases the plates should be all of one kind, and less trouble, with better results, may be expected than if three or four different sorts of varying degrees of sensitiveness are taken. It is easy enough *in theory* to work a number of different kinds in a day's outing, but not so satisfactory in practice. I might say it is very unsatisfactory in practice, and leads to no end of bother and confusion, even if you take the precaution of entering every view in a register and adopt all other methodical ways of going about it. If you could ensure a *uniform light for every subject* it would be another matter; but as, in a general way, every hour varies, the advantages otherwise of a variety of plates are neutralised, and instead of being another power for good in the hands of the photographer it is a deception and a snare. I think I shall be borne out in this by any practical man. I, perhaps, should say, for those who only take up photography out-of-doors occasionally, whether amateur or professional, with one kind of plate the development of the first is a guide for all the rest; and, as seldom more than a dozen are taken for a day's outing, the probability is there will be a greater proportion of good negatives made than if every two or three plates are different, requiring different developers and different management to get the best results.

The test for a good plate for landscape work is that it should give good *printing* detail in the shadows without overdoing the lights. With an even, dense film there is no fear of those under-exposed, botchy patches that disfigure so many photographs, and are produced, I believe, by hurriedly coating the plates with too hot an emulsion. Whatever the cause, unevenly-coated plates are fatal to good results.

In actual practice (whatever may have been said about the different rendering of colours by gelatine as compared with collodion and the different style of lighting required for the two processes) the only difference I have been able to discover is the extra rapidity of the gelatino-bromide film, permitting subjects to be photographed under conditions that would be very trying—or, perhaps, impossible—with wet collodion, either from the protracted time necessary or from the movement of the subject, both of which difficulties are reduced to a minimum with gelatine plates. When results are obtained so contrary to wet-plate experience as we occasionally hear of, the probability is they are owing to peculiarities or defects in the films used and not inherent in the process at all, and not to be repeated with another batch of plates. The very exalted sensitiveness of the gelatine films permits badly-lighted subjects to be rendered with a reasonable exposure; but a subject lighted as most suitable for a wet collodion film can be equally well rendered with the gelatine. Of this there is not the slightest doubt.

I question if sometimes the very idea of gelatine plates requiring a style of illumination in the object to be copied different to collodion has not been the cause of a good deal of the bad work made on them. In my opinion a nicely-composed and lighted subject will make quite as satisfactory a picture by one good process as another, if properly managed; and no process whatever is likely to make it otherwise.

EDWARD DUNMORE.

ROUND THE WORLD.

No. III.

UP to the point where I left my readers at the end of Chapter II. I had made but cursory allusions to photography, and I have a very decided opinion that, so far as possible, writers in this Journal should confine themselves to photographic matters, without unduly wandering from the subject in hand. Were the Editors of this Journal "hard up" for photographic matter proper, or were the object of these columns to present a lot of miscellaneous "padding," it would be another matter; but, almost weekly, articles bearing directly on one aspect or other of our art-science are "crowded out." Long may such a repletion continue! I shall try myself, and would beg of others, not to wander further from our common centre than necessary.

My brother's "wharé" was far from a promising position for a dark room, as there was not a water-tight—not to say light-tight—apartment in it. But I had my tent. Nor is rain water caught and kept in a corrugated iron tank a promising diluent for photographic chemicals, or abluent for gelatine plates. There was a spring about half-a-mile off; so I erected my tent and "humped" my water, and started to develope a few plates to see how matters were going. "All went merry as a marriage bell." Some groups and a couple of Otago Bay negatives developed nicely; so I felt happy as to the past and sanguine for the future. The view of Mount Egmont from the door of our "wharé" was very fine, and, as I thought, tolerably amenable to lenticular treatment; but on trial I found it extremely difficult, if not impossible, to preserve the distance while bringing up the foreground of rusty ferns and Karaka trees. The mountain would be about forty-five miles away, and there was always a gaseous mist between me and it; and, as a matter of fact, Mount Egmont, as seen from Pukekohe, "whipped" me.

My next attempts—taking no notice of negatives of the "wharé" groups, &c.—were more successful, consisting of views of some of the fine vegetation, fern-trees, bouquetaires, ferns, and so on, which abound in that district. Fern-trees frequently reach thirty feet high, and I have seen them up to forty feet. Bouquetaires are very tall trees naturally. Then in the Taranaki bush there is such a wonderful carpet—very thick pile, indeed—of undergrowth, that one can always get a "bit," if only the taste to choose be present and the *embarras de richesse* absent. Some of these excursions were made on horseback, carrying the camera and plates in knapsack, but somehow the straps did not fit me, and I thought I should have done better on "Shanks' pony." I have omitted to state that in winter and during rain the roads are impracticable for carriages of all kinds. In case any one wishes to know about the climate of Taranaki, I may say that it is my *beau-ideal* of climate—not too much rain, but enough to keep things from being burnt up, and genial days in their winter and cool evenings. On the day corresponding to Christmas at home we bathed in the sea, and found it cool, but by no means chilling.

Having achieved a few views, such as I have mentioned, I bethought myself of the real object of my trip, which was to gain health and strength, so I laid aside camera and tripod and took to spade and shovel. The hand that erstwhile did deftly raise the lens cap or delicately apportion the accurate drachm of pyrogallol now became the bronzed and blistered "fist" of the hedger and ditcher—of the "hewer of wood and the drawer of water;" the eye that but a little while before gauged the beauty of nature now searched the upturned drill for the fugitive potato; and the brain that once weighed exposures to the fraction of a second now turned its vigorous action to the concoction of a boiled rice and currant pudding. Briefly, I dug ditches, raised potatoes, and helped with the cooking. But I got splendidly strong, and, had I not damaged my right shoulder by coming to grief with a horse, I might have been digging to this day.

During my stay here (about four months altogether) I did but little photography. Among the negatives I did get was one of a couple of Maori girls—a very nice negative, but showing a very curious yellow-brown-green superficial fog, which I cannot in any way account for. I

remember the negative developed very slowly; but being certain it was fully exposed I did not force it, and at last my forbearance was rewarded by a good enough negative and a circumstance I cannot account for, as no other plates of the same make developed at the time showed the same appearance. At Auckland, later, using some plates made by Messrs. Hemus and Hanna, of that town, and a sulpho-pyro. developer compounded by myself, I got an effect very like my former one at Pukekohe, and I attributed the curious fog to the sulphite of soda; but what I used first was made by the Platinotype Company, and I have never seen a similar effect produced by their make of the sulpho-pyro.

For a good many weeks my diary shows no record of anything photographic. I find on the 20th March I made an excursion on horseback to New Plymouth. There I interviewed Mr. Collis, photographer. He seemed an intelligent worker, using gelatino-bromide, but hardly *au fait* in the development of his plates. He astonished me by telling me the price paid in New Zealand for all photographic commodities. I remember the price paid for albumenised paper nearly took away my breath. On my way home from New Plymouth I stopped a few minutes, and bought a six-year-old mare and a saddle and bridle nearly new, for the small sum of £7. Considering that the mare was not at all a bad one, and the saddle—of colonial pattern, with a lot of rings and straps for carrying saddle bags, a "swag" (valise or blanket, carried in front of the saddle), and various other adjuncts unknown at home—a first-rate one, I think my purchase was not bad. I was planning a tour in the lake district in the north of the island, and thought the mare would be useful.

On the 15th of this month (March) my companion, unable to stand the somewhat rough life, burst a blood vessel; so I determined not to take him with me in any of my future expeditions, and, in short, to get rid of him as soon as I could get him fit to travel. Accordingly I sent him to a small hotel at the nearest township, and bargained with the "boss," an old mess sergeant, to feed him up and get him ready to go to Auckland, whence I proposed to ship him to Australia; for it would have been wilful murder either to take him with me or let him return to Europe to face our winter, or even summer, climate.

On the 30th March I started from a small port called Waitara for Onehunga, which is the port on the west for Auckland, which lies on a magnificent bay on the east of the island, and about seven miles from Onehunga. The ride from Onehunga to Auckland was lovely, but the mare had no shoes on and was sick after her voyage, and I got exasperated at the slowness of our progress. However, after a stormy interview with a drunken ostler, I got the mare quartered, and landed myself at a very good hotel—quite equal to any good-class house in England.

Auckland is a finely-situated "city;" its harbour is one of the finest in the world—capable of mooring the whole British fleet, I should think. The planning of the streets, however, is atrocious; there are innumerable little lanes leading nowhere, or ending in *culs de sac*. The town has lately acquired a park, and from it the harbour presents a very good view. Of course I very soon went to inspect the photographic work as presented in show-cases, and the result was that I introduced myself to Messrs. Hemus and Hanna, who exhibited some very fine portraits. I found these gentlemen most anxious to show me kindness, and very well up in their work, both pictorially and technically. Like most photographers in this colony they pin their faith to gelatine, and, what is still more to their credit, they produce their own plates. Running out, on a later occasion, of plates myself I got them to coat some plates for me, and for quality of result their emulsion cannot be beaten, though I found it all too slow for me after the productions of Messrs. Rouch and Wratten and Wainwright. Since I came home I have used some of their plates for making transparencies, and they leave nothing to be desired for clearness of shadow. I wish I could make some similar for myself.

The weather, after I arrived at Auckland, was for a time simply atrocious, so far as New Zealand weather can be atrocious. I make this reservation because even the rainy weather is tolerably pleasant, not being often accompanied by the blustering winds that make themselves so obnoxious at home. My companion sailed for Sydney on "All Fool's Day," and I got some instantaneous views of shipping from the wharf. I was very doubtful as to the success of these "shots," as the weather was dull, yet the sea so turgid that I had to use my drop-shutter with the elastic quite tight; and in order to get the "North shore," a mile or two distant, in focus I had to stop my lens down to $\frac{f}{7}$. However, they have turned out pretty well.

After a week of the bad weather I have mentioned I left Auckland in company with a new friend for a visit to the Coromandel district, where gold mining is "all the go," and the Maori country, where hot spring and lakes are the chief objects. In spite of the weather being still boisterous, we left Auckland by a small steamer for Grahamstown, Thames, on 10th April. On our arrival there we found news of a regular inundation and a higher tide than any inhabitant could remember. Rain fell in torrents for two days. But on the 13th we paid a visit to some of the mining sights. The auriferous quartz is conveyed by various means to the "batteries," where the quartz and gold are crushed among water till they form almost a paste. This paste is washed over blankets, impregnated with mercury, which forms an amalgam with the gold, while the quartz passes on. The gold is further separated—such of it as is not amalgamated—by repeated washings in large drums, which revolve incessantly and are fed with constant supplies of fresh water. Of course the gold falls to the bottom, while the quartz is washed away. The mercury is got rid of by distillation, and the gold finally fused into nuggets. This, at least, was the crude idea I gained by the use of my eyes. My ears proved of no avail, for a man was shouting a description—lucid and accurate, no doubt—into my ears all the time; but the din created by eighty "stampers," or crushers of the quartz, rendered all my attempts to hear a word utterly unavailing. The profit of gold mining depends on the quantity of gold obtained from a certain quantity of quartz, the position in which the quartz is found, and the cost of mining and conveying the quartz to the batteries. I was told that the average of pure gold per ton of quartz at Thames diggings was two ounces; but "I calculate" that would be a tolerably flattering statement.

At six a.m. on the 13th we started by a mail coach for Tauranga—a distance of eighty-four miles, and a road that would considerably open the eyes of Lord Sefton or any other member of the Four-in-Hand Club. For fifteen miles we were up to the axles in mud; for many miles more the road was washed away, leaving us only four or five inches between safety and eternity; and all the time the "road" was many degrees worse than anything I ever saw before. I state without hesitation that our coachman drove four horses at a sharp trot over miles of road that no carter or waggoner with his team in England would dream of attempting at a walk. But in spite of the jolting—and at many points imminent danger, as I thought—I must say I have seldom enjoyed a drive more. After the late rains the trees and the undergrowth of the bush glittered gloriously in the now shining sun, the creeks dashed tawny and foaming hundreds of feet below us, and every turn of the track revealed new beauties. Then the air seemed so balmy and exhilarating as we dashed up and down steep gorges, through creeks and across moors, that after our fourteen hours' drive we felt quite fresh in body and mind. I could write a complete chapter on this drive alone, but, remembering my own remarks at the beginning of this chapter, I refrain.

But up till then I had never seen any real bush; and to see vegetable Nature in her original garb is indeed a matter to cause awe and admiration. Enormous trees—some laden with foliage, others bare and blasted—clematis and "supple-jack" trailing from their highest boughs, and "rata" entwining, sapping, and finally supplanting the giant trunk that nourished it. For several miles we could hear a boiling torrent nearly beneath us, but not a glimpse of it did we get for the dense thicket of ferns and scrub that covered the ground. Bill Douglas, our driver, does this eighty-four-mile journey daily sometimes. He eats very little, drinks at every station—there are about fourteen—is a hale, muscular man, and has a nerve of adamant or any other supremely-hard material that pleases my readers! During this day's drive I would have given a great deal to get a view or two of some of the bush and creek "bits;" but Douglas was inexorable, and not without reason, for the road was by no means one to be trifled with in the dark.

Tauranga is a very pretty little town on the Bay of Plenty, and has considerable associations, having been the scene of some of the hardest fighting between the English and the Maories during the late war. At the cemetery may be seen many graves of officers and men who fell either in battle or by disease. From near the cemetery I got a very tidy view of the town and part of the bay; the negative, however, wants intensification, as I had left my shutter at the hotel, and had to make a hand exposure on boats and sea in motion. People may talk as they like about the simplicity and certainty of intensification with gelatine plates; it is to me always a matter of doubt and diffidence to attempt the operation, let the negatives be washed as much as they like. Success occasionally attends the operation, so do stains sometimes.

On the 17th we had another long and arduous drive of forty-five miles to Ohinemutu, where the hot springs country may be said to commence. We had eighteen miles of bush road to travel, and when I say that the road in the bush, not getting dried like open road, was a very great deal worse than that we traversed on the 13th I can go no farther. The mud came into the coach this time, and the road, though not so dangerous, was very much more difficult than before. My friend and I walked most of the eighteen miles up to our knees in thick mud, and many a time I thought the horses were going to stick altogether. The amount of whipcord rubbed into them might have attracted the attention of the "Society for the Prevention," &c., had there been such an institution in those parts. On our arrival at Ohinemutu at about eight o'clock on a frosty evening, I was amazed at the number of boiling springs all round. I expected three or four, but I found there were dozens of them, sending great jets of steam into the clear, frosty air. The steam, being rapidly condensed at night, presents a much more startling appearance than during the hot day. But more of Ohinemutu in my next.

Andrew Pringle.

ON AN UNCULTIVATED FIELD.

Everyone who mixes much amongst photographers must be familiar with the oft-recurring complaint that "photography is not what it once was," and the wish so frequently-expressed that "the good old times would come back again." If, however, we were to consult the

manufacturers and dealers from whom the photographer draws his supplies we should hear a different story, as I believe that photography as a business is more extensive now than at any previous period of its history. It is, no doubt, true that there is many a studio throughout the country in which very little work is done, and possibly the actual number of professional photographers may be less than it was a few years ago; but these circumstances are more than accounted for by the fact that the largest, best, and most profitable work is gradually drifting into fewer hands by a kind of "survival of the fittest" process, to which photography, in common with almost everything else, is amenable.

But while under the impression that professional photography is in a flourishing condition, I am quite alive to the necessity for being constantly on the look-out for new fields of operation, and think a valuable one has been suggested by a correspondent in a letter to me a few days ago. He is one of the largest paper manufacturers in Scotland, and has recently taken to gelatine plates and made a series of negatives of all the various processes involved in the making of paper. He writes:—"I have often wondered that some speculative photographer did not photograph in detail all the leading manufactures of the country, and sell the photographs, both as prints and lantern slides. A good man would make few failures. I fancy it would pay, and pay well, as museums and art institutes would gladly become possessors of complete sets." The suggestion is well worth the consideration of those whose time is not already fully occupied, or, indeed, of all who have the required technical acquaintance with photography, and who desire to increase their income by that knowledge.

The size of the negatives taken by my correspondent is 10 × 8, and probably that is as small as would be desirable for museum purposes; but duplicates should always be secured at the same time on a scale more suitable for lantern purposes, special care being taken, both in exposure and development, to secure the quality of negative best suited for the production of transparencies—that is, ample detail, transparent shadows, and no opaque high lights. Such negatives, if the photographer had not the time or the ability to print the transparencies, would, I venture to say, be readily purchased at a good price by any of the publishers of lantern slides.

By way of encouragement to those who may give the subject a little serious consideration, I may say that an experience of many years as a "popular lecturer" enables me to say very decidedly that lectures on arts and manufactures, with no better illustrations than specimens of the articles in the various stages of manufacture, are, with the audiences that generally attend such lectures, much more popular and more highly appreciated, and even confer more lasting benefit, than lectures on science with all the brilliant "experiments" which may be made for their illustration. JOHN NICOL, Ph.D.

THIRTY YEARS OF PHOTOGRAPHIC PROGRESS; HOW IT HAS BEEN SECURED, AND HOW IT MAY BE MAINTAINED.

[A communication to the Photographic Society of Great Britain.]

AFTER thirty years of continuous labour, and at the commencement of a new session, the members of this Society may very well suspend their usual technics, and devote one evening to a consideration of the direct and indirect results of their past work, as well as of some of the antecedent circumstances.

These thirty years have been singularly eventful ones in connection with our art, and it seems hardly possible that in the future so much progress can be made in all directions, in a similar time, as has taken place during this period.

When we remember how little known photographs on paper were some thirty years since, as compared with their present abundance and popularity, some explanation is required as to how all this has come about. My paper proposes in some degree to account for this; it also proposes to step back even further, and to show that the absolute rise and progress of photography is connected in one direct line with and through this Society.

I shall have to ask your indulgence in going over once more such well-trodden ground, but I am not aware that it has been done before with the same object.

We may take it for granted that, for all practical purposes, photography dates its existence from the announcement of the rival systems of Talbot and Daguerre. It is curious, with the experience since acquired, to compare these two methods, they having so many points in common, and yet being in principle so dissimilar. By each plan the images in the camera were fixed; each was worked out independently of the other; both were announced about the same time, though each was the result of years of prior labour; each used the same sensitive salt—iodide of silver—to produce a latent image in the camera, and each used a developer to bring out the latent image. But here the similarity ceases. Daguerre's images were made on thick metallic plates; they were developed *dry* by the vapour of mercury, and the final result was a "positive" photograph, the lights and shades as in nature. Talbot's images, however, were on thin sheets of paper, were developed *wet* by gallic acid, and were "negatives," the lights and shades exactly the reverse of nature. The camera-pictures of Daguerre, being positives, were complete at once, but Talbot's required another process before they became useful. What at first seemed a great advantage in the French process was ultimately found to be its chief disadvantage; for while, by the English plan, with only one action of the camera an endless number of prints might be produced, by the French method every individual print required a special camera-action. At the time, however, this disadvantage was not apparent, and the process had for many years a brilliant existence. But when collodion came into general use its days were numbered, and it speedily died out. It was a process that began and ended with itself; it has no historic continuity. There were many reasons why, despite its excellences, it could not survive in the struggle for existence. Essentially it was imperfect: it was not a whole or complete system. It was only *a positive process produced by negative means.*

I have thus dwelt on the daguerreotype, because, in tracing the progressive development of photography, its place has to be accounted for. The fact must be recognized that it was only a splendid episode in photographic history: it was a barren process—a *cul de sac* that led nowhere. Those who excelled in its practice found their knowledge useless when they came to paper or collodion. Excepting the use of camera and lens, they were as ignorant as if they had had no previous photographic training whatever. Thus died out one of the two systems—and for a time the one thought to be much the better—that were hailed as opening the photographic era.

In the industrial arts, where several copies are required from one original, the process of production consists of two parts—the one supplies, often at great cost and labour, the mould, type, *cliché*, matrix, plate, or whatever it may be called; the other works off, inexpensively and rapidly, the copies required. As we now know exactly the place that photography occupies usefully in society, we can see why daguerreotype failed radically in principle, apart from any other cause, and why Talbot's system contained the elements of progressive development and adaptability; it contained the twofold division of *positive* and *negative*, each capable of being treated individually.

In Talbot's system, it was his "photogenic drawing" process that formed the *positive*, and the "calotype" the *negative*. On these sound lines paper-photography started, and all the progress that has since been made has only consisted in alterations, additions, or variations to one or the other of these broad divisions. Talbot also supplied detailed methods of carrying out this complete scheme. For convenience, I will call each of these "types." The formula for the negative type, reduced to its essentials, was preparing a film containing a sensitive haloid salt of silver, exposing in the camera to form a latent image, and developing. Let us stop here for a moment to glance at the many different ways that negatives, whether used wet or dry, have been made since Talbot's time, and note how curiously the "type" is preserved, even to the details. In all subsequent processes there is always the sensitive film of the haloid silver salt, the camera-made latent image, and the developing. The latter is sometimes gallic acid, sometimes pyrogallic (either acid or alkaline), or their analogues. The vehicle of the sensitive salt was first paper, then albumen, next collodion, and now it is gelatine; and the "latent image" is common to all. Viewed from this "type" point of view, the contrast between the calotype of 1840 and the gelatine plate of 1880 is almost ludicrous in its resemblance. The vehicle has only changed from paper to gelatine in the haloid salt the bromine is used instead of iodine; the gallic acid is superseded by pyrogallic, and the latent image is the same as before. Yet it has taken no end of material, of processes, and of brains, to say nothing of forty years' hard work, to effect, not a change of the "type," but only some of the components! And this resemblance is preserved even closer in the positive "type."

Talbot's formula was chloride of silver, formed by double decomposition, on a sheet of paper, exposed under a negative till light formed the image. Then the removal or rendering insensitive the remaining material. Excepting the gold toning, where is the difference between the "positive" of today and forty years ago? True, Talbot's prints faded; but how about yours? Are you forty years in advance? Are you any?

But even in the avowedly-permanent prints, the carbon and the platinotype, though the sensitive materials differ the "type" remains the same. There is still the sensitive film exposed under a negative till light effects the desired change; then the removal of the undecomposed material. There is no developing a "latent image" in either process.

Having now obtained a clue to what was really involved in Fox Talbot's inventions, we can look with calmer interest at the results that have ensued. Although his processes permitted everything to be developed out of them that has since arisen, yet in the first instance the results were crude and uncertain. There was also at that time an utter absence of collateral knowledge to guide the student in this new field. While one set of followers laid themselves out for practising and improving Talbot's process, another set undertook to explore the regions of the unknown. These latter reasoned—if one salt of silver is so sensitive to light, may not another be more so? And who can tell but that the salts of other metals and other compounds may not be more sensitive still? Besides, until something more be known about the chief agent itself—that indefinite something called "light"—all is little else than groping in the dark. Therefore it was that many men of the highest scientific culture undertook this recondite study. Among these stands pre-eminently Sir John Herschel, whose researches are models of philosophic as well as practical inquiry. In the same breath must also be named, with highest honour, Robert Hunt, whose labour in this vast field began almost as early as Talbot and Herschel, and was continued to quite recently, even if it be now ceased—for happily he is still spared to us. By these and similar labours our art was placed on a firm scientific basis. Incidentally many interesting processes were worked with other salts than silver, though none were found to be of superior sensitiveness; and the useful salts of hyposulphite of soda and protosulphate of iron were brought to notice by Herschel and Hunt respectively. The result of the labours of these two classes of workers—the special and the general—was that, as fresh knowledge and publicity were given, the band of students increased. But the work was done in an isolated manner, few knowing what the others were doing. Thus were spent the first ten years of photographic life; much that was useful was accomplished, especially in the way of preliminary work. The event that was to give a new start to the art, as it gave to so much else, was the 1851 Exhibition. The numerous photographs shown from all parts, at home and abroad, indicated that the time had arrived to work unitedly instead of separately. The report of the Pro

visional Committee, read by Mr. Roger Fenton at the first meeting of this Society, describes graphically the discomforts of amateurs in those days. (The professional photographers were the daguerreotypists; the amateurs had the paper processes all to themselves.)

This report also describes the difficulties encountered in establishing this, the first photographic society, and how those difficulties were overcome. There was another circumstance that gave an increased fillip just then—the introduction of the collodion process. Among the band of amateurs then at work was Frederick Scott Archer, and, as he has told us, it was in his searchings to find some material that would remove the texture and unevenness of paper that he thought of collodion, because it seemed to him "a modification of paper." He says his first attempts were directed to the improvement of the surface of the paper by spreading over one side a thick collodion coating. Eventually he abandoned paper altogether, using glass as the support. But he never deserted his first love—paper; he recommended thick films of collodion, so that they might be stripped from the glass and be treated as paper, and at a later period patented a gutta-percha film for stripping. Thus out of the endeavour to improve the calotype was evolved the process that superseded it.

To return to my narrative. During 1852, by the exertions, among others, of Lord Rosse, President of the Royal Society, and Sir Charles Eastlake, President of the Royal Academy, as the highest officials of science and art in this country, the calotype patent was abandoned, and other difficulties removed, so that our Society could be formed. This being done, the first meeting was held January, 1853. Looking back at this period of time, it is interesting to note the prestige with which this Society was started. Failing to secure the originator of the art, Fox Talbot, to be the first President, Sir Charles Eastlake, President of the Royal Academy, consented to be our President also. The Vice-Presidents appointed were Earl Somers, an accomplished calotypist, Sir William Newton, the miniature artist as well as enthusiastic photographer, and Professor (afterwards Sir Charles) Wheatstone, the inventor of the stereoscope. Among the members of the Council, all a distinguished array, I find the well-known names of Robert Hunt, Dr. Diamond, Roger Fenton, Peter Fry, Count de Montizon, Hugh Owen, Dr. Percy, Peter Le Neve Foster, Charles Vignolles, George Shadbolt, Dr. Becker, librarian to the Prince Consort, and many more equally well known as fathers of the art.

But I wish here to impress the fact that this was a new society only in a nominal sense; that there was then a Calotype Club and many coteries in existence in London for the cultivation of calotype. This Society was then a virtual assembling of these detached members, and a binding of them together to work, for the future, under the cheering stimulus of sympathy and association. The men were the same, the work was the same; but the working conditions were more perfect. Thus, by the absorption of these veterans, this Society bridges over and connects the previous preparatory labours with all that has since been done, and makes the personal chain of communication complete from the very beginning of practical photography to the present time.

From this period we turn over a fresh page in photographic history. A new propaganda was then started, to expound, teach, develope, and extend the good tidings of photography. When these early workers found themselves thus happily associated a new enthusiasm seized them; the infection was contagious, and thus the fresh impetus arose that has never since subsided.

The machinery proposed for the collective working was threefold:—First, monthly meetings to read and discuss papers, exhibit apparatus, and generally to promote social union; secondly, the establishment of a journal to report these proceedings; and, thirdly, the holding of an annual exhibition exclusively of photographts. That this machinery was well devised is proved by its continued use to the present time. The formation of our Society soon led to similar ones at Liverpool, Manchester, Edinburgh, Dublin, and other large towns, which in all instances was followed by a rapid increase in the number of practical photographers. The establishment of the journal was practically the commencement of that photographic press and literature which has since been of such aid to progress by diffusing and multiplying information which otherwise would be confined to small areas. Our monthly *Journal* soon became a fortnightly one, and presently, as an off-shoot, the startling innovation arose of a veritable photographic weekly newspaper—the *Photographic News*. The Liverpool society also determined to have its exclusive journal; and that in due time has so expanded as to become another weekly newspaper—THE BRITISH JOURNAL OF PHOTOGRAPHY. Before the existence of these organs of our craft the information was published in the most miscellaneous manner. Those who desire photographic news prior to the establishment of these special papers must look for it through the files of *The Times*, *Athenæum*, *Art Journal*, *Illustrated London News*, *Notes and Queries*, *Philosophical Magazine*, and many other less likely sources. By means of the press the usefulness of the photographic societies has been increased tenfold. Instead of the papers being read only to the members assembled, they are now practically read to everybody; and the discussion of the topics, instead of being confined to those present, may now be taken up from all parts of the world. Speaking about photographic progress during these past years, who is able to estimate its indebtedness to the diffusive action of the press, the first impulse of which was derived from our own *Photographic Journal*, which, let me remind you, from the time it started to the present has continued its course, and now remains the oldest and longest-established photographic journal in the world, and also the only non-commercial one?

Important, however, as these two factors are—meetings of the Society and the photographic press—in promoting progress, we must never underrate the value of photographic exhibitions both as sources of enjoyment and means of popularising our art. They also serve as constant records of the value of the various processes as they arise. In this sense it is difficult to adequately estimate its usefulness as an educator, especially in reference to technical skill and manipulation. It is not given to every one to understand, from reading or hearing described, the value of a process; but every one can form a safe judgment about the goodness of a process, if they see first-rate prints produced by it. Again: some men are clever at giving out ideas that, individually, they cannot adequately reduce to practice, while others are able by skilful manipulation to produce splendid results from means which they could never originate. As processes have ultimately no other value than as means of producing photographs, the man who excels as a manipulator performs a very important function in illustrating the value of the different methods of working. It is the proud distinction of this Society that it saw from the earliest the value of annual exhibitions, and that it has persisted in maintaining them, though often grievously to the loss of its funds when it could ill spare them.

When this Society was started, it was not so much for the pleasure and the profit of its members as it was for the cultivation and improvement of the art itself, regardless of who should obtain the benefit, or how widely it might be extended. The opening words in the first number of the *Journal of the Photographic Society* states that "the object of the Photographic Society is the promotion of the art and science of photography by the interchange of thought and experience among photographers." The progress of the art for the thirty years, so far as it may be legitimately traced to this Society, may perhaps be found more in its indirect influence than its direct. Thus it has been seen that when the photographers of London formed a society, those of Liverpool and other towns followed in their steps; whereas if the original society had remained unformed, there is little doubt those in the provinces would not have existed—at least at so early a time; and as each society helped to diffuse information and popularise the art, if we wish to properly estimate the primitive influence of the work of our Society we must add to it much of the service done by others, in addition to that accomplished by ourselves. If this be true as to societies, it is also as true in reference to the press; but it is especially so in reference to exhibitions. Other photographic societies have exhibitions occasionally; we have them annually. In that sense our exhibition is the only "Royal Academy" of photography; and the influence does not cease when its doors are closed, for it is now notorious that many of the same pictures, especially the best and the medalled ones, do good service again and again by being re-exhibited in the provinces. It is hardly probable that these minor exhibitions would have been so graced if the pictures had not been prepared for the great London annual one. It is delightful to know, therefore, that the indirect influence of this Society's regular exhibitions ensures a larger supply of first-rate pictures to be shown in the provinces than would otherwise occur. There is only one drawback; it is a small one, but it is distressing to be told that at the very first photographic exhibition ever held at, say Medaltown, many more good pictures of the highest class were hung than could be seen at any one exhibition in Pall Mall. This is probably true; but Medaltown makes the mistake in supposing that these gems were made to be exclusively displayed there. Probably they are the pictures that have carried off the honours during the preceeding two or three years in London as well as other towns. All honour, however, to the practice of passing from one society to another the noblest result of our art. Happily, truth and beauty can be equally admired in the north as well as the south, and the accident of being seen first in the east or the west can never lessen their charms.

So much, then, for the agencies proposed thirty years since for the development of an art which, except as daguerreotype portraits, was for all practical purposes unknown to the bulk of the world. Yet how soon a rapid change was effected! A sudden mania seized society, and that which but a short time before was a curiosity suddenly became a household necessity. A new art-industry was created. Everything upon the earth, above and beneath it, must be photographed; every man, woman, and child must have its likeness taken—not once, but many times. A general interchanging of portraits became a rule of social life. The demand at one time for stereoscopic slides, at another for *cartes de visite*, as well as the craze to possess portraits of every one notorious, only further attests how firmly photography has engrafted itself on modern life. I do not propose even to note the myriad cases in art, science, commerce, or industry into which it has permanently interwoven itself. It is sufficient if I have shown that by the successful carrying out of the agencies proposed by our Society, and their indirect influence, that photography, which to the world was thirty years ago almost unknown, has now taken its place as a potent factor in civilisation alongside of the steam engine, the railroad, and the telegraph. From the birth of this Society to the present time the progress of photography has been one continued triumphal march.

There is another aspect of this thirty years' history that I have not touched on—the *technical* one. I propose to make but few remarks on this part of the question. It is sufficient to say that great progress has been made all along the line, but that more advance has distinctly taken place in some directions than others. If industry alone were all that is required for advancement, then the progress should have been much greater. Surely there never was a more determined and numerous band of workers than have diligently toiled for thirty years at the details of our technics. Much good work has no doubt been done, but much of the labour seems ill expended. In referring to the past records, the ardent mind is apt to be discouraged as he notes the rise and fall of celebrated processes, as well as what appears the waste of time and energy in discovering, perfecting, and then abandoning one process after another. Thus, during this period we see the calotype, daguerreotype, waxed-paper, albumenised glass, Taupenôt, tannin, to say nothing of minor processes, after having had expended on them the best energies of keen workers, pass remorselessly away into oblivion, as if they had all been huge mistakes. And now, even the great king, collodion—the conqueror of all that had gone before—even he is tottering on his throne, and threatened with the same doom. While in this frame of mind, and looking at things with the calm cold eyes of today, one feels almost ashamed at the earnestness that we formerly imported into discussions (say) on Fothergill formulæ, gum-gallic and raspberry-syrup processes, bottled-up light, organic-iron developers, and similar ephemeral topics. I know there is a

more cheering and philosophic aspect to the question; but it is a theme that requires treatment by itself, and which, if well done, would bear excellent fruit. Of one thing we are certain—that we have passed through two photographic epochs, and have entered on the third. They may be described as the paper, collodion, and the gelatine periods. The "paper" period ruled supreme ten years, from Talbot's calotype to Archer's collodion; that is to say, from the beginning of modern practical photography to the time when our Society began. This was a preliminary and a preparatory period. The next is the collodion era, and it has run the thirty years of our Society's present life. This has been a propagandist and expanding period. We are now entering on the gelatine epoch. How long it will last, and how to generalise its character, I, not being gifted with prophecy, decline to hazard. But that its period will as much excel collodion as collodion has surpasssed paper we are morally certain. So far from photography or its application being exhausted, we are only but dimly getting a glimpse of the great powers of nature that lie awaiting our disposal when we understand how to use them.

Having seen how the progress of the past has been secured, it is not difficult to suggest how the future is to be maintained. We have only to go on doing what we have done before—"only more so." It is said that Bishop Wilberforce, when asked which was the direct road to heaven, replied—"Take the first turning to the right, and keep straight on." Our road to future progress is even easier than the Bishop's to heaven; we have no turning to take—we have only to keep *straight on.*

Referring again to the three means proposed at the foundation of our Society for the progressive development of our art, all the experience since acquired points to the wisdom of their adoption. No one of them could have been spared in the past, nor can they be spared in the future. The necessity will always exist for the primitive impulse given by the magical influence of personal contact—the personal stimulating enthusiasm of working together to cheer and sustain in the birth of new ideas, and in the maturing, improving, modifying, changing the old ones, so as to weed out the useless and unnecessary additions that otherwise accumulate. Individually we are inclined to drift into narrow ways and limited ranges; but by free intercommunion we improve each other, and generate newer and larger thoughts than otherwise would arise. We can all do a something, each in his own way, to help on the common object. By these means our art has advanced, and by them it will be maintained. Hence the primary need of our societies. Then we must have the press to record and fix the points at which we have arrived, and to check each other by the enlarged experience taking place elsewhere, as registered in the press. And, finally, we must periodically bring all that we think, talk, and write about to the test of practical experience. Here comes in the value of our exhibition; and here also comes in the value of the silent members, who, gifted with high manipulative skill, can *do* more than they can say. Thus they also, in their especial manner, help on progress.

But there is one other class, to whom I have not yet alluded, who also can, and who ought, to do their share in the general advancement; I mean the commercial section. These are the people who can neither originate new methods nor improve old ones, but by the exercise of their business abilities can utilise to a profitable end the work of others. Hitherto we have had but little aid from them. For the advancement of the art they toil not neither do they spin, yet they manage to obtain a large share of the loaves and the fishes. They neither take part in our proceedings, purchase our journals, nor visit our exhibitions. They may say that their talents do not lie in these directions; and perhaps they are right. But I wish to show them that if they wish they can help, both morally and substantially. They can help us morally by ceasing their habit of standing aloof, and by coming among us. We shall be pleased to know that we have their sympathy in the good work; but they can sustain us in a more marked manner than they have yet done. They must know—or if they do not we will acquaint them—that all this collective work by which the art is advanced, and by which they profit, is not obtained without some cost. Neither this Society nor any other are state-aided institutions; they are carried on only by the expenditure which they can divide with us. Speaking of this Society, for example, its beneficial influence has always been seriously crippled for the want of adequate funds. Whatever good it has done could have been enormously increased but for this drag-chain. Why have we not got a hall of our own, like this Water-colour Society has, in which we could hold not only our monthly meetings but all other ones? Why are not our exhibitions held in the spring, when all the world is in London, instead of the autumn, when it is deserted by wealth and fashion? I could go on repeating my inquiries as to why many useful and laudable efforts are not effected. Our worthy President and Members of Council can instantly supply the answer—because we have not the funds, because we have not a sufficient number of subscribing members. I appeal, therefore, to this large and influential class who are deriving the most substantial benefits from continued improvements which, confessedly, they are unable to originate, to help and support those agencies by the aid of which they thrive. The refusal cannot be because of the small annual charge. I can only suppose it arises from their attention never having been called to the matter. Let it be known henceforth that they *can* help, and even if they do not do it for their pleasure they ought as their duty; nay, I put it stronger, it is their interest to do so. Take, for example, the great modern stride—gelatine negatives; who shall tell the enormous gain in a financial sense these parties have recently obtained without a penny of expense by them? How has this valuable process arisen? By the exertions of no one man, but by the united efforts of many. Like Topsy, it has "growed," as most of the other improvements have, by the unconscious and steady influence of many minds working in one direction, mutually helping, checking, and correcting each other, until at last it has become what it is.

Now that the important bearings of these agencies have so distinctly been pointed out, I hope that those who have large interests at stake will see that it is to their advantage to help these institutions; for it is only by these that their skilful *employés* receive that advancing education which, as employers, they immediately benefit by. If the tide of photography ceases to advance public interest will diminish, and commercial photography must suffer.

But if it is to go on, so that those who have heavy interests at stake may continue to derive the advantages, it can only be by themselves helping in a more specific manner than they have done the only agencies by which the art can be advanced. It is neither fair, just, nor honourable for those who derive so much good to ignore the means by which they benefit. As an increased means, then, of future advancement I earnestly appeal to those who have not yet aided to come among us, be they manufacturers, dealers, or heads of photographic establishments, and help, as they assuredly can, by becoming subscribing members to this or one of the other photographic societies in promoting the general and common good.

JABEZ HUGHES.

Our Editorial Table.

THERMOGRAPHY.—By J. F. CAMPBELL, Author of *Frost and Fire.* Kensington: J. WAKEMAN AND SON.

IN the modest introduction to this book the writer tells us that he has striven for some years to gather knowledge by new ways. That his strife has been signally rewarded by adding to the store of human knowledge no one will venture to doubt after perusing this volume.

The author's thermographic experiments have extended over a period of fully thirty years, so that ample time has been afforded for verifying the conclusions at which he arrived by repeating his experiments in different parts of the world. His observations on the phenomena of solar radiations have been carried on in India, Java, Cannes, other parts of the continent, and in England. In the British Isles he made least progress, owing to the almost perpetual cloud-roof with which they are covered—a roof pierced by the sun's rays only fitfully and at long intervals.

He was led to the pursuit of thermography by practising the art of photography when in its infancy. There can be no doubt that photography and thermography are in some measure allied to each other. The one represents, so to speak, the positive, and the other the negative, pole of actinism. A photograph is most readily impressed on a sensitive plate by the least refrangible rays of the spectrum, while a thermograph can only be obtained by the most refrangible of the heat rays. The rays, which are indeed photographically inert rays, are those upon which the thermographer depends mainly for his results, unless when the colours are united in the solar or other heat rays to form white light.

Although the writer has obtained thermographs, chromatic and in black and white, some substance remains yet to be discovered which shall register pictorially weak heat radiations. "An image of the sun, or of a red-hot pin cast by a lens upon black wax spread on glass gives an impression;" but wax gives no impression of weak heat radiations.

The influence of solar and artificial heat on metals, minerals, and a great variety of substances is carefully recorded in these pages. Each substance, is, indeed, made to tell its own story by unfolding its thermograph as a register of the number of degrees of temperature to which it has been subjected. Polished steel or iron when heated, for example, produce a chromographic scale, each tint produced registering a certain fixed temperature. First the steel becomes straw colour, next orange, and, as the heat increases, greenish, then blue, and finally violet. It will be seen from this that the colours at the hot end of the spectrum are produced at the lowest temperature, whereas those at the cool or actinic end are developed as the heat increases. The same piece of steel at a higher temperature darkens, then becomes red hot, and when the heat force is greatest it causes scintillation, and white light is given off with the sparks.

In the sun and in many artificial substances the maximum of heat is recorded when the heat force produces white light. There are other substances, again, which when burned at a high temperature produce only a single colour; as, for example, sodium chloride, which yields a light, when burned in a Bunsen flame, so homogeneous in its yellow as to reduce all coloured objects within its reach to yellow and black.

The author's goniometer is at use now in our best observatories. It consists of a sphere of glass and a cup. The solar rays passing through this lens transmit an image of the sun to a hollow sheet of asbestos millboard, on which the rays register their own form day by day.

There is a prophetic foreshadowing here of an exact thermographic science which shall teach its practical lessons to mankind all over the world; but many labourers must yet be enlisted before the work performed by solar radiation shall be so fully understood as to compass the great ends which the author has in view. After perusing this work a

thoughtful reader will find that the fruit of which he has eaten, though tough, is of the tree of knowledge, and that his eyes have been opened to see the working of the great sun-engine, whose force is in the whirlwind, the avalanche, and the flood, as well as in liberating the gnat from its tiny shell.

RECENT PATENTS.

FRENCH PATENTS GRANTED.

No. 154,053.—"Pantoglyphy, or Process of Reproducing Drawings or Engravings on Wood or Metal." Etève, of Paris.—*Dated March* 2, 1883.

No. 154,065.—"A Phototypographic Process." Allgeyer and Bolhœvener, of Paris.—*Dated March* 3, 1883.

No. 154,156.—"A so-called Sylvan-Galvano Process for Obtaining Plates with Metal Reliefs." Juncker, of Paris.—*Dated March* 7, 1883.

GRANT OF PROVISIONAL PROTECTION FOR SIX MONTHS.

No. 5,204.—"Improved Method of Producing Surfaces for Mechanical or Ink Printing by means of Photography." Harrison Garside, Manchester.—*Dated November* 2, 1883.

PATENTS SEALED.

November 30, 1883.

No. 2,799.—"Improvements in Apparatus to be Used in the Preparation of Metal Surfaces for Etching, Engraving, and similar purposes." Joseph Julius Sachs, London.—*Dated June* 5, 1883.

December 4, 1883.

"An Improved Method or Process of Producing Prints or Transfers of Photographic Pictures." Eugenio de Zuccato, London.—*Dated August* 28, 1883. (Three patents of same title and date.)

AMERICAN PATENTS GRANTED.

No. 287,857.—"A Photographic Dry-Plate Holder." G. Frank E. Pearsall, Brooklyn.—*Application filed May* 24, 1883.

No. 287,858.—"A Pneumatic Shutter for Photographic Camera." Henry B. Perry, Chicago.—*Application filed February* 17, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 11 ..	Great Britain	5a, Pall Mall East.
„ 11 ..	Newcastle-on-Tyne	College of Science.
„ 12 ..	Cheltenham Amateur	
„ 13 ..	London and Provincial	Masons' Hall, Basinghall-street.
„ 13 ..	Manchester	Mechanics' Institution.
„ 14 ..	Ireland	Royal College of Science, Dublin.

LONDON AND PROVINCIAL PHOTOGRAPHIC SOCIETY.

At the meeting of this Society, held on Thursday, the 30th ult., the chair was occupied by Mr. W. M. Ashman.

Mr. W. E. Debenham referred to what he had said at the last meeting as to the employment for illuminating dark rooms of a light less injurious to the sight than the ruby light generally used. Since that meeting an article had appeared from Dr. Herschell on the evil influence upon the eyes of the red rays, and Mr. Ackland had stated that he had remarked that since the introduction of gelatino-bromide plates and the general use of red light in the dark room, he had found photographers compelled more frequently than others to change the glasses in their spectacles owing to rapid weakening of the sight. If it could be shown that light of a pleasanter colour than red, produced in proportion to its luminosity no greater effect upon the sensitive plate, the reason for the employment of red light would be gone. He (Mr. Debenham) thought he could show that in proportion to the amount of light for working by, light transmitted through green and yellow media had less effect upon the sensitive plate than that of the red light hitherto in general use. To illustrate this, a lantern was produced the four sides of which were fitted up respectively with—1. Green glass and two orange-yellow papers. 2. Two ruby glasses. 3. Ruby flashed on orange pot glass. 4. Ruby glass and orange-yellow paper. Plates were handed round which had been simultaneously exposed under similar negatives for twelve minutes at an equal distance—eight inches—from the four sides, and a trace only of image had been produced upon the one exposed to the green and yellow side, whilst that exposed to the light through the two ruby glasses was strongly impressed. The lantern was handed round and the green-yellow light was considered to be more luminous to the sight than that from the two ruby glasses—which had so much more effect upon the sensitive plate.

Mr. A. Haddon said that it would be interesting to have the character of the coloured lights tried spectroscopically. This would throw a light upon the influence of light of various colours upon the sensitive film.

The Chairman read a letter from Mr. A. L. Henderson, in which he withdrew the offer made some time since of a premium for a safe light for the dark room under certain conditions. Mr. Henderson believed that he was now himself in the track for accomplishing the desired end.

Mr. A. Cowan showed a camera lent by Mr. Shuter for the purpose. This camera had been made according to Mr. Shuter's directions some two years previously by one of the leading camera-makers, but the improvements in it had not been commercially adopted. The most striking feature in the instrument was the arrangement of the vertical and horizontal sliding fronts. The leading idea had been to get rid of any such projection as that caused by a milled head, and the catch was a spring, the button of which, when not pressed down, was level with the rabbeted slip in which the front worked. The edge of the front itself was a piece of brass rackwork, into any of the teeth of which a detent on the spring fitted when the spring was released. Two other points worthy of notice were the arrangement of the side swing, and the slotted bars for ensuring parallelism of the front when extended. The side swing was actuated by a pinion, on one end of which were two milled heads, one of which moved the back and the other clamped it in the desired position when found.

The Chairman thought the camera so complete and perfect that it needed no criticism. It was a pity that it was not in the market.

Mr. W. T. Wilkinson showed a print mounted upon a large card without cockling. He said that the method of doing it was as follows:—One pound of glue was soaked in water until thoroughly swelled and melted; then twenty ounces of spirit of wine was churned in. If poured in without churning the mixture would be spoiled. A piece of glass was brushed over with the mixture, and the print laid first upon the glass and then in its place upon the mount.

Mr. W. Coles remarked that it was necessary, when obtaining methylated spirit, to see that what was called "finish" was not given instead. This could be detected by its becoming milky when mixed with water. He (Mr. Coles) then showed a negative intensified with silver in the manner lately recommended—with alum in the solution. At first it had appeared perfect, but had since darkened all over.

Mr. Debenham said that it showed the desirability, when silver intensification was employed, of using subsequent immersion in the fixing bath.

The Chairman preferred mercuric chloride, followed by ammonia.

Mr. Mackey used sulphate of iron in his fixing bath. This decolorised the shadows, and, if it were desired to intensify, mercuric-chloride could be used effectively, without bleaching and subsequent use of ammonia, merely by keeping it on the film until sufficiently darkened.

The Chairman said there was no question that the use of a ferrous salt in the fixing gave a good colour to the film.

Mr. E. I. Golding showed two transparencies of a rich and very warm colour, printed upon collodio-chloride and developed by Dr. Eder's plan, with very little restraining haloid, but great excess of acid. The emulsion had been made by mixing at a low temperature and setting immediately, so that it was very slow. The pictures shown had been exposed for twelve minutes to daylight. Ammonium chloride had been employed. With sodium so good a colour could not be obtained.

The Chairman remarked that the transparencies were very fine.

Mr. F. York said that he had observed that gelatine films took up small particles of dust or dirt in the various operations of developing and fixing. He found it advantageous to pass a wet chamois leather over them before standing them up to dry.

The Chairman showed some very rich prints on opal, produced by direct printing upon citro-chloride of silver in gelatine.

Mr. H. Moule had experimented with pepper shaken up occasionally during twenty-four hours in four times its weight of benzole, for producing a sensitive surface on glass or ceramic material. The result was quite successful, but the exposure required was long.

It was mentioned that Mr. Henderson's lecture on *The Production of Ceramic Enamels* would be given on the 13th inst., and that there would be as far as possible practical demonstration of the various parts of the process.

Mr. C. Darker and Mr. F. Lunig were elected members of the Association.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The annual meeting of this Association was held on Thursday, the 29th ult., Mr. B. Boothroyd, President, in the chair.

The minutes of the October meeting having been read and confirmed, Messrs. F. Evans, R. R. Gibbs, and J. Toby were elected members of the Society.

The Hon. Secretary read the annual report, as follows:—

Annual Report.

In presenting their report of the Liverpool Amateur Photographic Association for the year 1883, the President and Council are glad once again to be in a position to congratulate the members on the success which has crowned their efforts to promote the usefulness and welfare of the Society.

Since the annual meeting of last year thirty-two new members have joined the Association. There have been eight resignations; and death has deprived us of two ordinary and of one honorary member. In Mr. W. H. Wilson the Society has lost one of its oldest members and warmest friends; and, although Mr. G. F. Chantrill had but recently joined our ranks when his death took place, his face was familiar to most of us, and his long and earnest devotion to other departments of scientific work gave good promise of a useful membership of our Association. Mr. W. Keith, in days gone by, manifested a warm interest in our work, and was ever ready to give his advice and co-operation to the fullest extent.

The numbers of members on the books at the close of each of the last five years are as follow:—1879, 67; 1880, 71; 1881, 78; 1882, 93; 1883, 115. The meetings of the past year have been very well attended, and the following is the list of papers and their readers:—

By J. H. T. Ellerbeck—*From Trèves to Hanover.*

By R. C. Johnson, F.R.A.S.—*Celestial Photography.*

By E. Banks—*Hydrokinone as a Developer.*

By R. Crowe—*Practical Aids to Instantaneous Photography.*

By Rev. H. J. Palmer, M.A.—*Notes by a Peripatetic Photographer.*
" " —*An Autumn Ramble in Shropshire.*
By W. F. Donkin, M.A.—*Photography in the High Alps.*
By Mr. J. A. Forrest—*Conway.*
By Mr. A. W. Beer—*Knutsford.*

Demonstrations have been given by Mr. Adams of a process for reducing the density and increasing the brilliancy of negatives, and by the Rev. H. J. Palmer on enlarging with the new enamelled gelatino-bromide paper.

Exhibits of objects of photographic interest have been produced at the meetings by Messrs. Atkins, Banner, Banks, Beer, Boothroyd, Crowe, Donkin, Ellerbeck, Forrest, Haworth, Kenyon, Kirkby, Maycock, Phillips, Rutter, Rogers, Twigge, Tyrer, Wood, and Wynne.

Donations to the library have been made by the Revs. G. J. Banner and Palmer, and by Messrs. Wharmby and Ellerbeck.

The Hon. Secretary has received contributions of prints for the Society's exhibitions from Messrs. Crowe, Craddock, Ellerbeck, Forrest, Kirkby, Palmer, Pierce, and Tyrer.

A most successful excursion was made to Conway, and the members mustered in large numbers on this occasion to enjoy the splendid hospitality of Mr. L. Hughes. Later on in the year another social meeting was held at the house of Mr. Boothroyd, at Southport, and that gentleman's hospitable welcome made ample amends for the unpropitious state of the weather. Mr. Beer conducted a party of members on a pleasant ramble to Knutsford and neighbourhood in the month of April.

The Association took its usual prominent part in providing an exhibition of pictures and a lecture on a popular subject for the delectation of the visitors to the *soirée* of the Associated Scientific Societies of Liverpool; and at Southport, during the visit of the British Association, a very fine display of works by members of our body was made in the great hall.

The Council have decided upon presenting to each of the members entitled to it an enlargement of a negative of *The Gorge of La Baie Montreux, Switzerland*, by the Rev. H. J. Palmer. Should it be possible to execute the presentation print for this year upon enamelled gelatino-bromide paper, the Council intend to offer members the choice of an enlargement of the four negatives by Messrs. Beer, Kirkby, and Palmer, which were selected by the Council as suitable for enlargement for the presentation print. These were *La Baie, and the Portal of Chartres*, by the Rev. H. J. Palmer; *York Minister*, by Mr. Beer; and *Tired*, by Mr. Kirkby.

The annual competitions have been productive of much useful emulation among the members, and have tended greatly to raise the standard of excellence of the photographic work of the Society.

The Library, which has now been at the disposal of the members for a year, has proved of valuable service to many, thanks in a great measure to the labours and kindness of the Librarian, Mr. J. H. Day.

The thanks of this Association are due to the Library, Museum, and Arts Committee of the Corporation of Liverpool for the use of the room in the Free Library; to the Photographic Society of Great Britain for copies of the *Journal;* and to the Liverpool Engineering, Microscopical, Field Naturalists', Philosophical, Philomathic, and Geological Societies for copies of the annual report of their proceedings and transactions.

The HON. TREASURER, Mr. E. Twigge, read his report, showing a balance on the right side of £23, and on the motion of the Chairman both reports were adopted.

The CHAIRMAN announced that the Council recommended the following elections to the official list of 1884:—*President:* G. A. Kenyon, M.D.—*Vice-Presidents:* J. H. Day and A. W. Beer.—*Council:* H. N. Atkins, W. Atkins, Rev. G. J. Banner, Rev. T. B. Banner, K. Bean, B. Boothroyd, R. Crowe, W. H. Kirkby, P. H. Phillips, B. J. Sayce, E. Twigge, A. Tyrer.—*Treasurer:* J. H. T. Ellerbeck.—*Secretary:* Rev. H. J. Palmer. These gentlemen accordingly were elected on the motion of the Chairman.

The CHAIRMAN proposed that Rule V. should be altered to read as follows:—"Hon. members to be annually nominated by the Council, but their election must be confirmed by the members present at the annual meeting in November. Honorary members may attend the meetings, but cannot serve on the Council or vote on any question whatever."

Mr. J. H. DAY seconded the motion and it was carried unanimously.

The following gentlemen were then proposed by the CHAIRMAN as honorary members:—Messrs. Banks, Mawdsley, Thompson, and the Rev. J. D. Riley. After some discussion on the general subject of honorary members they were duly elected.

The CHAIRMAN stated, in answer to a question on the subject, that two gentlemen already on the Society's list as hon. members, Messrs. Guyton and Knott, would not be affected by the change in the rule involving an annual election, but would remain permanently on the Society's list.

Mr. J. H. T. ELLERBECK proposed that an annual dinner of members and honorary members of the Society should be held in lieu of the ordinary meeting, in the month of December.

Mr. A. W. BEER seconded the resolution, suggesting that Mr. Ellerbeck should make the necessary arrangements.

The proposal, on being put to the meeting by the Chairman, was carried, and the 20th of December was the day appointed for the festivity.

Mr. W. H. KIRKBY gave notice of his intention to propose the following alterations of the rules:—To add to Rule II. the words—"To be elected by ballot, one black ball in five to exclude;" and to alter Rule V. to—"Honorary members shall be nominated by the Council; but their election must be confirmed by the members of the Association present at one of the ordinary meetings. The election both by the Council and at the meeting to be by ballot, and to be carried by the majority of votes. Honorary members shall retire at the next and every annual meeting; but are eligible for re-election on the recommendation of the Council. Honorary members shall be entitled to attend the meetings, but are not to receive the presentation print, and shall not serve on the Council or vote on any question whatever."

The Rev. T. B. Banner and Messrs. Pelham and Wharmby, the judges of this year's competition, at this point entered the room, and the Rev. T. B. Banner announced their awards as follows:—

Subject.	Prize.	Honourable Mention.
Solitude	P. G. Hall	K. Bean.
Street View	A. W. Beer	R. Crowe.
Cottage	J. H. T. Ellerbeck	Rev. H. J. Palmer.
Labour of Love	Rev. H. J. Palmer	J. H. T. Ellerbeck.
Marine	W. H. Kirkby	A. W. Beer.
Country Life	A. W. Beer	K. Bean.
Wild Flowers	Rev. H. J. Palmer	J. H. T. Ellerbeck.
Reflections	J. H. T. Ellerbeck	P. G. Hall.
Best Series of Pictures	A. W. Beer	Rev. H. J. Palmer / J. H. T. Ellerbeck } equal.
Own Plate	Rev. H. J. Palmer	W. H. Kirkby.
Best Picture of the Year	P. G. Hall	W. H. Kirkby.

Mr. BANNER added that the judges were unanimous in considering this year's competition pictures above the average in excellence.

The Rev. H. J. PALMER announced that the Associated *Soirée* would take place on the 19th of December, and hoped that the Society would have a splendid exhibition this year.

The CHAIRMAN requested gentlemen who were willing to co-operate with the Hon. Secretary as a Hanging Committee to send in their names, and the following gentlemen were appointed:—Messrs. J. A. Forrest, Crowe, Beer, Guyton, Paris, and Whiteman.

Mr. P. H. PHILLIPS proposed that the February meeting should be a "popular" one, to which ladies and non-members would be invited, and that there be a lantern exhibition.

Mr. W. H. WATLING seconded the proposal, and it was carried unanimously.

Mr. KIRKBY exhibited two photographs sent by Mr. Westrup taken in Fiji. One of Levuka, the chief town, and the other of a native village with tropical foliage, were much admired.

The Rev. H. J. PALMER brought an album of prints of his work this year in France, Italy, and Switzerland.

Mr. KIRKBY showed a solution of green fog—that is, an emulsion which had given plates with green fog to a high degree. It had been allowed to decompose and deposit the silver bromide. The supernatant liquid exhibited the characteristics of this evil, being dichroic—green by reflected light and pink by transmitted light. Its dichroic character was destroyed by the addition of potassium bichromate.

The meeting resolved itself into a *conversazione*, and the remainder of the evening was devoted to the examination of the exhibition of the competition prints.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE last excursion meeting of the session was held at Symond's Yat, on the Wye, a few miles above Monmouth. A fair number mustered, and the morning seemed to promise a fine day. The number joining in the excursion was, however, perhaps somewhat lessened by the early hour at which it was necessary for the start to be made, some probably not caring to leave their morning slumbers at such an hour as would enable them to reach the station in time for the train leaving at 7.15, and very likely taking the same view as the boy who, being reproached by his male parent for his sluggishness with the proverb—"the early bird catches the worm"—replied, "more fool the worm to be up so early." Nevertheless, a merry party started upon the somewhat roundabout journey to the "Yat," *viâ* the Severn Bridge and Coleford.

After a short run to Berkeley Road, a change of trains took place, and in a few minutes some of those present crossed the Severn Bridge for the first time. In form, width, and construction it very much resembles the ill-fated Tay Bridge, but, being much shorter and in a far less-exposed situation, it is to be hoped that no such sad end is in store for the convenient and prettily-situated Severn Bridge. The view on both sides of it is exceedingly pretty, and the gradually-broadening river, seaward, with various craft dotted here and there on the one hand, and the foliage-covered landscape and winding canal and river on the other, make a ride across the Severn Bridge in fine weather decidedly enjoyable.

Coleford being reached, a "break," which had been ordered and was in readiness, conveyed the party to "Symond's Yat," the drive being most pleasant. In this district (close to the Forest of Dean) the absence of hedges and the substitution of stone walls make the villages appear dirty; in fact, all the roadside cottages are dirty-looking, and very different from the pretty cottages and charming gardens on the other side of Bristol, in Somersetshire. "Symond's *Yat*," or "*Gate*" (where it is reported some gate or enclosure at one time existed), is upon a bold, precipitous bluff of a hill, running out to a complete point with a valley on each hand, through which the river Wye runs, so tortuous is its coast.

The print in question, in form and surrounding characteristics, is not unlike the grand print of the Rigi, in Switzerland (though, of course, diminutive in comparison), with Lake Lucerne on one hand and Lake Zug on the other. A large expanse of country is seen from Symond's Yat; and on the morning in question the scene on looking down upon the village and river with its ferry, boats, barges, and cottages, was very beautiful, the effect caused by the mist below, and the rays and flood of sunshine pouring through it being peculiar but exceedingly fine.

Notwithstanding the beauty of the effect, however, it was unsuited to the camera, so a general move was made for the level of the river below, and after a steep descent the path brought the "knights of the camera" to a building called a "refreshment house," the sight of which raised the spirits by the anticipation of the good things in store for those who had breakfasted so early and journeyed so far. Here a very pleasant hour was passed seated under the spreading branches of umbrageous trees, the river

Wye wending its devious course close beneath, and all the sights and sounds of country life around. After a partial rest, with the usual anecdotes and the fragrant nicotian addition to the purity of the morning air, a start was made by crossing the ferry to the right-hand bank of the river, where, upon striking a path leading to Monmouth, the party entered upon what proved to be one of the most enchanting river-side rambles that it is possible to conceive. The grassy glades, the autumn-tinted woods, and the beautiful Wye all tended to make a picture quite beyond the power of camera or artist to do justice to. In fact, it must be admitted that, as far as photographic work was concerned, the very brilliance of the sunshine and the prevalence of that mysterious hazy veil of slight mist which rendered the whole scene so charming were the very causes which prevented satisfactory photographic results from being attained.

It was, however, refreshing to see one visitor (Dr. Atchley) turning the occasion to advantage by waging war upon the various magnificent specimens of the butterfly tribe which abounded—the slow and artful advance, the balancing of the hat in mid-air, the momentary hesitation, the swoop, the unbalancing of the Doctor, the near approach to a catastrophe, the cheer which broke from all around when the painted beauty was seen to be briskly soaring aloft, uninjured and untouched, after all the preparation for capture!

And so we walked on and on, our Secretary, whose character for indefatigability had previously never been questioned, showing for once obvious symptoms of having had enough of his 12 × 10 camera and his plentiful supply of plates of the same calibre which, a little unexpectedly to himself, he had to carry for several miles. Well, it *was* hot, certainly! but, as all things bring their compensations with them, it was a treat to see the chuckles of satisfaction which emanated from one of the Vice-Presidents at seeing the Secretary fairly "collared" for once, and to note the malicious glee of the said Vice-President and the Doctor in keeping up the pace for the last mile. They will get served out for that last mile some day, as sure as fate!

A capital tea at the "Beaufort Arms," Monmouth, and an evening railway trip home by way of the New Passage for change, brought an exceedingly-pleasant day to a termination amidst general expressions of congratulation at the satisfactory wind-up of the outdoor meetings.

Correspondence.

FERROUS OXALATE DEVELOPMENT.

To the EDITORS.

GENTLEMEN,—I was much pleased to see the letter from Mr. O. C. Smith in your last issue, in which he takes up the cudgels in behalf of the ferrous oxalate development from a professional point of view. As an amateur I can heartily corroborate all he says on the subject. I cannot understand why the iron developer has been so systematically snubbed and pooh-poohed by English professional photographers as a rule, except it be that they have never thoroughly tested its capacities for themselves, but have taken their opinions of it second-hand from persons prejudiced in favour of pyro. I, like your correspondent, Mr. O. C. Smith, have quite discarded the use of pyro. with its stains and green fog, *et hoc genus omne.* Hydrokinone, too, I tried for a time, but found all its belauded advantages very greatly exaggerated, so I went back to the ferrous oxalate a wiser if not a sadder man. I have developed hundreds of plates with it this year, and am perfectly satisfied with it as a clean, ready, bright, and effective developer. All that has been written about its not allowing sufficient latitude of exposure I look upon as nonsense, as far as regards its use in the studio; and a landscape which has been so under-exposed as to require "forcing up" by ammonia is generally ruined by green fog and worthless.

All I can say is that in practical work I have not experienced these difficulties, which, I am convinced, exist chiefly in the imagination.

I use the iron developer in the same way as Mr. Smith. I first bring out the detail with old solution, and give requisite density with new. I then pour the developer back into a large bottle and expose it outside on the window sill to the full rays of the sun, which, when the solution is acidified, will convert the ferric oxide into ferrous oxalate—the active principle of the developer.

In an article on the subject in the Journal of August 18, 1882, you recommended oxalic acid for acidifying instead of tartaric acid, as advocated by M. Audra. I have tried this, but am not able to give a definite opinion as to its superiority to tartaric acid.

So treated, ferrous oxalate developer is cheaper than pyro., and to my mind unquestionably gives softer and much quicker-printing negatives—a very great advantage at this dull season of the year.

I find that the addition of five to ten drops of a solution of iodine in spirit to fifty c.c. of developer, according to M. Wild's formula, increases the vigour and density of the negative.

I believe the day is not very far distant when the ferrous oxalate system of development will be as universal in England as it is on the continent.—I am, yours, &c., A. M. MACDONA.

St. Leonards-on-Sea, December 4, 1883.

To the EDITORS.

GENTLEMEN,—I am glad that the letters from Messrs. Macbeth, Goodall, and Smith have called attention to the above developer, which, for amateurs particularly, is infinitely preferable to pyro. My experience of the ferrous oxalate is that it gives results in half-tones and transparency nearer approaching to wet-collodion delicacy than any other dry-plate developer. Then, too, it is clean, cheap, and serves almost indefinitely.

My use of the bath differs from that of Mr. Smith, inasmuch as I prefer porcelain dishes to black ones, as the white ground of the former shows the progress of the development much more clearly than the latter. For portraits I use the bath of fully saturated strength, but only about 3 of iron to 12 of oxalate, until I see how the vigour of the negative promises. If weak I add iron to bring up to par. For landscape I use my old bath, which has served for portrait development diluted with 3 or 4 parts of water. This gives a slow development (15 to 20 seconds) but it enables me to compensate by treatment (more or less iron or oxalate as occasion requires) for any insufficiency of exposure or over-exposure.

The very slow development, too, which I have continued on from my wet collodion experience, gives a clearness of distance and atmosphere full of half-tints which pyro. has failed to give me, though I have experimented on all the plates in the market.—I am, yours, &c.,

84 & 85, *King William-street, London.* KENRIC B. MURRAY.

December 5, 1883.

UNIFORM SYSTEM OF DIAPHRAGMS.

To the EDITORS.

GENTLEMEN,—Referring to the letter of your correspondent "G. D. K," upon the above subject in your last issue, I should like to point out how I think the discrepancy between the tables of Mr. W. K. Burton in the current ALMANAC, page 250, and that of Mr. Warburton in his paper published in the Journal may be explained.

As I understand it, the scheme of the U. S. stops is based upon the principle that No. 1 in the series shall equal $\frac{f}{4}$; No. 2 shall equal half the area, and consequently requires double the exposure of No. 1, No. 3 being half the area of No. 2, and so on down the series.

Now, if we look over Mr. Warburton's table, we find that he has given as the U. S. number the *aperture value inversely in terms of No. 1.* If, instead of heading the column "U. S. No." we put down "Equivalent exposure to No. 1 ($=\frac{f}{4}$)," we shall make the table right. This may be easily seen by referring to Mr. Burton's table under the heading "Portraits in Studio Light," where "No. 1 or $\frac{f}{4}$" requires 1 sec., and "No. 9 or $\frac{f}{64}$" requires 4 min. 15 secs. (? printer's error, 4 min. 16 secs.), these numbers being as $4^2 : 64^2 :: 1 : 256$, which states the sum, and gives an answer as per Mr. Warburton's paper on page 708, and all the other numbers in that column work out in the same manner and have the same values on both tables under the altered heading, as I have above suggested.—I am, yours, &c., G. W. ATKINS.

Sheffield, December 1, 1883.

PHOTOGRAPHIC LENSES: THEIR FOCI, APERTURES, AND ANGLES.

To the EDITORS.

GENTLEMEN,—May I ask you to kindly rectify a slight error in printing my remarks on this subject in the last number of the Journal.

After speaking of a *comparison* between the table drawn up by Mr. Burton and that drawn up by Mr. Warburton I am, in lines 12 and 13, credited with the words—"I, of course, only refer to the columns of Mr. Burton's table." This, to say the least of it, sounds exceedingly vague. What I did say was this:—"I, of course, only refer to the first column of Mr. Burton's table." Why I referred to the first column only is self-evident, the remaining nine columns having nothing to do with the case in point.—I am, yours, &c., G. D. K.

December 1, 1883.

THE BRISTOL INTERNATIONAL EXHIBITION.

To the EDITORS.

GENTLEMEN,—I read in the printed conditions of the International Photographic Exhibition about to be held at Bristol that the medals are "to be decided on the opinions of five gentlemen—being two eminent painters and three well-known photographers—three of the judges being outside the Association."

In your last issue I notice that the judges appointed are four photographers and one painter. This does not appear to be in accordance with the contract they have made with their exhibitors, and I would suggest that the authorities should at once rectify the mistake, as in the awarding of medals they are sure to fail in satisfying some exhibitors, who would have good ground for complaint.

I have no personal objection to any of the names published, but I should prefer to see the "two eminent painters" as judges. I should have sent photographs of a different character had I expected the artist-painter element to be so much in the minority among the judges as the latest published intelligence conveys.

I am one of those who endeavour to merit the title of "artist," but am not willing to allow its use indiscriminately to everyone who takes photographs. In saying this I have no intention of making insinua-

tions of want of artistic training against any of the gentlemen whose names are published; in fact, some of them I know to be competent in every way to act in this capacity, and the others I have no knowledge of, so I write without *animus*.—I am, yours, &c., EXHIBITOR.

December 3, 1883.

THE NEWCASTLE-UPON-TYNE EXHIBITION.

To the EDITORS.

GENTLEMEN,—In your issue of the 30th ult. an account is given of the exhibition held at Newcastle, and in the course of your remarks it is stated that "though there is not an entire absence of criticism the justice of the awards seems to be generally recognised." This fairly represents the real state of feeling. It cannot, however, but be admitted that dissatisfaction with certain of the awards is openly and loudly expressed. Had the dissentients from the opinion of the judges been limited to the unsuccessful competitors, this complaint might have been airily treated; but the interest manifested in exhibitions of this nature is happily not confined to competitors; and among this wider public an idea is prevalent that the diplomas, to begin with, have not in all cases found their way to the most deserving candidates.

It is a difficult matter, of course, to assign with perfect exactitude the relative positions in the merit list which pictures ought to hold; and trifling differences of opinion on this score may advantageously be overlooked. But when there is a strong consensus of opinion against any particular award, there is reason for a shrewd suspicion of a miscarriage of justice from some untoward cause. Passing by minor matters, I may mention that *Tabley Chapel, Cheshire*, which received the first prize as the best single landscape, seems, outside of judicial and editorial circles, to be viewed with only scant favour. Some of its critics object to it on the ground that it is not artistically taken; that it is "too square on;" that there is a plentiful lack of detail; that the shadows are too dense; that, in short, it is void of the picturesqueness of a picture.

My communication is, I fear, already too long, but I was moved to write it by finding my own impressions about this subject so strongly corroborated by the outspoken testimony of others. FLANEUR.

December 4, 1883.

EXCHANGE COLUMN.

Wanted, an instantaneous shutter in exchange for chromatropes and comic changing slides.—Address, H. C., 16, Berkley-square, London, N.

Wanted, dissolving-view or good single lantern, fully fitted, in exchange for gem camera, nine lenses, half-plate portrait lens, camera, or cash.—Address, ROBERT WM. SIMMONS, photographer, Galway.

Wanted, a first-class bellows-body camera and rectilinear or symmetrica lens, not less than half-plate, for oil or water colour paintings to value of £10 or £12.—Address, ARTIST, 5, Archway-road, Barnes, London, S.W.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Edwin Debenham, 79, Princes-street, Edinburgh.—*Photograph of Mr. Carl Rosa.*

John McKenzie Young, Mostyn-street, Llandudno.—*Photograph of Sir Stafford Northcote.*

James Huntley, 7, Church-street, North Shields.—*Two Photographs of the "Wellesley" Training Ship.*

*** We are compelled to leave over several "Exchanges" until next week.

N. WILLS.—You will be able to procure the metal rims and glass at Messrs. Marion and Co.'s, Soho-square.

W. GREAVES (Lutterworth).—We have handed your letter to the Publisher, who will reply to you privately.

J. F. POLLETT.—Your letter is scarcely such as we can publish, though, perhaps, your strictures may be perfectly correct.

C. T. J.—Out of print some years ago. If another edition were published it certainly would not prove a commercial success.

ARCHER BUTT.—If you look through the numbers of the Journal for the past few weeks you will find the information you require.

T.—The glass may be obtained from any glass merchant. If it be not in stock he will procure it for you. The paper need not be oiled.

WALTER MACDONALD.—There was a manual published on the subject some years ago by Mr. W. C. Hughes, of 82, Mortimer-road, Kingsland. Write to him.

W. B. C.—We are pleased to learn that you have been so successful in perfecting your invention. When the specification is published we shall be glad to learn particulars.

PERPLEXED.—Simply write the names on the negative with an opaque ink. Black varnish, thinned with benzole, may be used if the ordinary ink you employ has not "body" enough.

J. MCNAMARA.—On both the subjects on which you ask for information you will find articles in our forthcoming ALMANAC. You had better wait till that is published, as we cannot afford space to go fully into the matter in this column.

W. WALLIS.—There must be some mistake, as we have not received any negatives or queries from you. They have miscarried through the post. If you will kindly send us another example and repeat your queries they shall receive every attention.

A. E. JILSOME.—If the bell rings when it is connected direct with the battery, and does not when it is arranged in the entire circuit, it is clear that the connections are not correctly made. Probably the fault will be found where the leading wires are connected with the commutator.

W. A. SIMONS.—By all means secure the lens marked "C" on your list. For general purposes it will prove much more serviceable than either of the others. Both of these are, however, good, but only for special purposes, which we imagine you will, as an amateur, seldom require.

X. X.—The process is not patented, but the working details are preserved as a trade secret. The lantern, as shown in your sketch, will answer very well for enlarging if you fit it with suitable condensers, which are not shown in the diagram. We presume you have omitted them by accident.

X. A. Y.—Without seeing an example of your difficulty, we strongly suspect that the inky appearance is due in great measure to under-exposure and forcing the development. A full exposure is imperative if you wish to secure warm tones. By fully exposing a quick development is secured, which always conduces to a brown colour.

R. W. S.—The ox-gall is used to facilitate the removal of the film from the glass. Waxing will answer the purpose quite as well. The oxide of barium is merely to confer the opalescence on the film. The amount of opalescence is dependent upon the quantity of oxide of barium added. Other pigments may, of course, be used instead of the barium, if desired.

ALFRED RICHES.—It is a decided case of green fog, and a bad one, too. The only chance you have of utilising the plates is by exposing them fully and employing a weak developer containing the minimum of ammonia. Employ the plates only in a good light, so that you do not require to force them in the development, as you frequently have to do when the light is indifferent.

S. WELLS.—1. The *Manual of Photography*, by Mr. Jabez Hughes, published by Mr. J. Werge, Berners-street, you will find very useful.—2. The apparatus you name is, we believe, very well worth the money, but you cannot expect the very highest state of perfection at the price. Get the price lists of some of the leading photographic opticians and camera makers and compare them. This will give you an idea of the value of first-class apparatus.

E. BEVERLY (Bradford).—This correspondent forwards us a piece of "Jeyes' disinfectant soap," which, he informs us, has afforded him much relief from the ill effects produced by the bichromate of potash used in carbon printing. We have handed over the soap to a gentleman who is now suffering from the disease, and he has promised to report on its efficacy in his case. In the meantime we should advise all who may be suffering from the cutaneous disease produced by the bichromate to give the soap a trial, and let our readers have the benefit of their experience.

RECEIVED.—G. Watmough Webster, F.C.S.; Lyddell Sawyer. In our next.

PHOTOGRAPHIC CLUB, ASHLEY'S HOTEL, HENRIETTA-STREET.—At the next meeting of this Club, on Wednesday next, the 12th inst., the subject for discussion will be—*On Double Printing and Masking.* On Wednesday, the 19th inst., the annual dinner of this Club will take place at Anderton's Hotel, Fleet-street. E.C. Tickets may be obtained from the Hon. Secretary. Early application should be made.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Weeks ending December 5, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Nov.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
22	29·87	W	47	44	—	51	43	Cloudy.
23	29·76	NW	39	37	—	47	36	Overcast.
24	29·48	SW	47	47	—	55	37	Cloudy.
25	29·10	SW	47	46	—	52	45	Cloudy.
26	29·93	W	40	39	—	52	37	Hazy.
28	29·31	SW	52	50	—	57	38	Overcast.
29	30·40	SW	45	43	—	51	42	Foggy.
30	30·30	W	47	45	—	53	43	Overcast.
Dec.								
1	30·22	N	46	42	—	45	42	Cloudy.
3	29·90	W	45	43	—	55	43	Overcast.
4	29·65	NW	40	36	—	44	36	Cloudy.
5	30·14	N	37	35	—	40	35	Overcast.

CONTENTS.

THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1232. Vol. XXX.—DECEMBER 14, 1883.

PHOTOMICROGRAPHY.

Helio Cameras and Microscope Objectives used with or without a Heliostat.—The forms of apparatus that have been used with or without a heliostat (yet employing direct sunlight), for the production of both small and moderate-sized negatives, are very various. Speaking generally, the best require a specially-constructed camera, or the use of a dark room or chamber. A plan for use with a heliostat without the dark room was communicated to the Liverpool Amateur Photographic Association in February, 1871, by Mr. Thomas Higgin, whose photomicrographs were much admired. The paper appeared in the Journal of March 10, 1871, and a diagram of the apparatus was given in The British Journal Photographic Almanac for the same year. The method is commendable for its portability and simplicity, though for extreme accuracy it may not vie with the plan used at the Army Medical Museum, Washington. Mr. Higgin fixed the heliostat upon a shelf carried out from the top of the camera, and when standing towards its front, the mirror, the condenser, the stage, and the coarse adjustment were each within easy reach. A small hole in the front of the camera enabled him to see the image upon a sheet of opal glass, which temporarily takes the place of the sensitised plate in the dark slide, the final adjustment being made by inserting the focussing-screen and using a two-inch objective as a focussing-glass, set for the ground surface of the screen. The carrier for the objective is attached to a plate of zinc, which is moved by the fine adjustment worked from the screen end of the camera; this plate travels upon another plate moved by a rack, worked by milled heads at the sides of the camera. The apparatus is placed in a window with a south aspect. It is not necessary to have the window open. A four-inch objective is used as the substage condenser for powers below the two-inch and two-thirds, and for higher powers the usual achromatic condenser. A beam of sunlight is received on the mirror of the heliostat and by it reflected on to the mirror of the microscope, and then transmitted through the condenser to the object on the stage, the small aperture in the front of the camera being closed by a shutter at the time of exposure. Mr. Higgin speaks highly of the use of collodio-bromide dry plates, and points out the value of photomicrographs of articles of commerce—as starch, flour, &c., and their adulterants—for estimating the purity of various samples offered for sale. He states that the camera and microscope, thus arranged, are easily managed and capable of producing the best results.

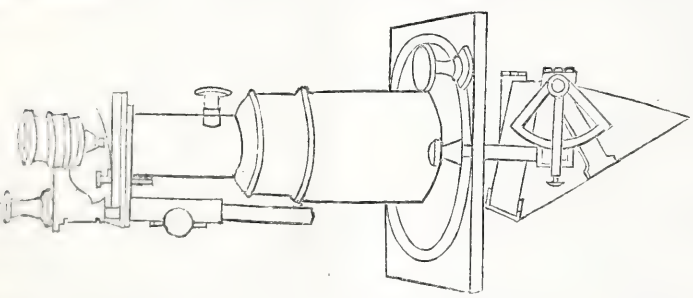
The cost of the heliostat employed by Dr. J. J. Woodward, U.S.A., is stated to have been ten dollars, while the one made by Messrs. Abraham and Co., Liverpool, for Mr. Higgin was £6; "but a cheaper form still would be made if a demand arose for it." We always supposed that Dr. Woodward used a Silbermann's heliostat, which, from the perfection of the construction, was more expensive than many others, as made by Dubosq, Paris. Dr. Woodward gives the price 500 francs. *M. Mic. Journ.*, 1876, p. 147. Dr. Sternberg, U.S.A., in his recent work, *Photomicrographs, and How to Make Them*, gives the price of Keith's heliostat, as made by Mr. E. Kubel, 328, First Street, Washington, N.E., under the direction of Dr. Woodward, at fifty-four dollars, the additional portions of the apparatus amounting to sixty dollars. We have lately seen one made by Spencer, of Dublin, the price of which was £5 10s. Later allusion may be made to one or two others.

The next method is that which Mr. E. Viles originally communicated to the Photographic Society of Great Britain in 1878, and whose beautiful enlargement (30×24 inches) of the proboscis of the blow fly was highly praised. To find a negative that would bear this magnification was a source of difficulty, for, in attempting to photograph this size upon the screen direct, he found eight feet to be the greatest possible distance between the object and screen, and then the image was unsatisfactory. To lessen the distance and retain the amplitude he tried an amplifying lens (analogous to an eyepiece), but the enlargement was a mere blur. Preference was given to a distance between the screen and object-glass of not more than three or four feet. This is in accordance with our own experience. After many failures he succeeded in making a small, perfect negative with a two-thirds' objective, which gave an enlargement of twenty diameters. A four-inch object-glass, with a power of about twelve diameters, was screwed into the microscope, and the negative placed on the stage to be enlarged ten diameters. It was necessary it should bear this power. The enlargement was made by a solar camera with a condensing lens of twenty inches diameter. The sun's rays were made to fall continuously upon the condenser by means of a heliostat, which is briefly described as consisting essentially of a mirror mounted on a polar axis similar to an equatorial telescope, clockwork being used to turn the mirror from east to west with a velocity equal to the rate of the earth's rotation. With this automatic solar camera a print was taken, in half-an-hour's exposure, on carbon tissue fixed to the focussing-board, and developed as usual. Mr. Viles did not think so good results would be obtained by using an intermediate transparency. Except with the smallest degree of amplification he had not been successful with anything but sunlight. "Paradoxical as it may sound," he says, "better enlargements can be made of objects one inch in diameter to half-an-inch without a microscope than with one, using a good lantern with the lime or electric light, and for the amplifying lens a small portrait combination, stereo. size, or a smaller one with a flat field without the use of central stops. The focussing is to be made on cardboard, and the objects should be moderately transparent and not of a non-actinic colour. With proper specimens the exposure is short, using sunlight, a darkened room with a window exposed to the south, and an adjustable mirror, or heliostat, the condenser consisting of the front lens of a large portrait combination. A beam of light is thrown on to a sheet of white paper placed in a proper position, and a microscope object-glass is made to slide to and fro in the cone of light. The reason Mr. Viles gives is that there is one point, and only one, which affords a perfectly-illuminated disc of white light. When that is found that is the position the lens should be placed in relation to the condenser, and the object slide is to be put in the cone of rays just at the focal length of the enlarging lens. If too much light should surround the object, use a higher-power objective, and if the whole of the object be not illuminated use a lower power.

In the ordinary microscope the slide is placed on the immovable stage, and the objective is moved nearer or farther till distinct

vision, but in the method adopted this object-glass is fixed at the best position, which as described is found by moving it along the optic axis of the condenser. In focussing, an annular diaphragm is placed over the condenser and removed before the exposure of the plate. The exposure is made without a ground glass as a radiant. A brass bar, with a rack on the top, carries the various parts of the apparatus, and to the objective holder is attached a 5 × 4 camera. The entire apparatus rests in a mahogany box, composed of the bottom and one side only, and this is screwed on to the bar of an equatorial stand in the place of the ordinary telescope, the purport being that one movement of the Hooke joint keeps the condenser pointed to the sun. The motion being arrested, the exposure is made instantaneously. No mirror is used. A good bromide-collodion emulsion with a structureless film was preferred, the negative developed by iron, cleared by cyanide, and neither intensified nor varnished, but at once converted into a transparency by the use of strong nitric acid, according to the method described by Mr. Viles in the *Year Book* for 1877. Suitable stops were used in the objective to secure depth of penetration, and extra lenses to obtain the actinic focus, after Mr. Wenham's plan. Soon after this communication to the Society the form of heliostat was described and reported in the Society's *Journal*. See also an excellent paper, by Mr. Viles, in The British Journal Photographic Almanac for 1878, *On the Solar Microscope*, &c., and in the same Almanac the heliostat is described and figured by the Editor. A similar one —that of M. Foucault—is likewise figured in Monckhoven's *Treatise on the Optics of Photography*, and likewise Silbermann's, as made by M. Dubosq, Paris. *Vide Traité d'optique Photographique.*

Some methods of operating and forms of apparatus will be now described that require a dark room unless used with a specially-made camera, and we first select that employed by M. Bertcsh, of



which the foregoing diagram has been copied from his catalogue. Having been unable to meet with a perfect description of this apparatus, such explanations will be given as are found in the descriptive catalogue of M. Lebreton, optician, Paris. It is there entitled *Microscope Heliographe*, with achromatic, parallel, and homogeneous illumination. The cost of the entire apparatus, with chromatic polariser, is given at 1,500 francs, while the larger size, adapted for the illumination of opaque objects, is figured at 2,200 francs. It may be regarded as the type of the continental solar microscopes when supplied with a mirror instead of a prism.

To the circle in the square brass frame on the light side is attached a bar carrying a large prism; a milled head on the tube side of the plate or frame rotates the prism on its own axis, which can be set at any angle marked upon the side scale. The prism can be rotated also round the optical axis of the instrument by turning the large milled head, which engages a tooth-wheel circle, to which the bar of the prism is attached. The large body tube screws on to the circular plate, and carries at the prism end a large condenser. Into the body tube slides another tube, so that it can be drawn out to lengthen the positions. This second tube carries a smaller tube and another inside, actuated by a rack work, and which is fitted at the objective end with a lens, or lenses, so that by the position of these in relation to the large condensing lens, parallel or converging light can be thrown upon the object on the stage, which is fixed on the end of the outer small tube. The stage plate has a stout, square, projecting piece, through which passes the bar that carries the arm into which the microscope objective screws. For coarse adjustment the bar is worked by a rack and pinion, while for the fine adjustment there is a separate milled head, which acts on a micrometer screw in the body that supports the objective, as in many of the continental forms of microscopes. A light-tight shutter is fixed against the window of a room with a south aspect, and a hole cut in the shutter rather larger than the condensing lens, over which is fixed the square frame of the apparatus.

AMMONIA IN PRINTING.

Though the method of "fuming"—as the plan of subjecting sensitised albumenised paper to the vapour of ammonia is termed—is in common use in America it has gained no ground in this country. It has been tried by many experimentalists, professional and amateur; yet, so far as we are aware, it has secured absolutely no hold in England. It is difficult to explain why this is so, but the fact remains. Perhaps it is the old story—a new groove to be got into; the old groove answers all purposes; no one changes. Yet a season is approaching when every printer is at his wits' end to get a satisfactory show of prints for his day's work, and when it might be imagined he would hail with fervour the thought that a process which would give him prints in almost half the usual time was at hand ready for immediate adoption.

Such a character is given, by those who are familiar with its use, to the employment of ammonia-fumed paper. Will not some of our readers—many of whom are of recognised eminence in all matters relative to silver printing—take the subject up once more, and give an unbiassed opinion as to the quality of colour to be obtained with fumed paper, its ease of working, and the keeping qualities to be expected from it? Let them not be afraid of giving their failures as well as their successes—failures generally teach more than actual achievements; then there will be a fair chance of forming a true judgment on the whole question.

One very possible cause of the existing differences of opinion may be found in the different characters of the two climates. In this country the average temperature is not very high, and there is usually a fair proportion of moisture in the atmosphere. In the United States, on the contrary, the climate is drier and the temperature higher—a difference which may account for a considerable proportion of the unfavourable results obtained in this country. It is evident that a sensitised sheet of paper exposed to comparatively moist air will retain more moisture than one hung up for a similar length of time in drier and warmer air; and, in consequence, that it will be more acted upon by ammonia in a given length of time, and also liable in a limited period to a complete excess of action, the result in the latter case being that a disagreeable metallic sheen will characterise the finished prints. Another effect of too limited desiccation is a mottled appearance fatal to perfection of results.

Incomplete treatment by ammonia causes the paper to print of too foxy a tone; excessive exposure a cold slaty hue, and a metallic sheen similar to that produced by a hygrometric state of the paper. Here are seen at once several causes, any one of which will suffice to render the result of fuming either irregular or imperfect; and, as first-class printers can turn out ninety or ninety-five per cent. of good prints from their paper, they are not likely to be content with a smaller "output."

At the last Convention meeting held in Milwaukee one speaker very cleverly and truly said that the toning bath is the silver bath; and it is beyond question that no toning solution whatever will give good prints upon imperfectly-sensitised paper, whether caused by excess of acid, over- or under-floating, or, we may say, in connection with our subject, over- or under-fuming, for bath and ammonia vapour must be worked in keeping with one another.

In place of fuming the paper some authorities recommend placing in the printing-frame pads saturated with ammonia, or bag pads containing powdered carbonate of ammonia. The result to be gained should be the same in each case, but it would appear to be a certainty that the paper would require different treatment upon the silver bath, according to whether one or the other method of applying the ammonia was to be selected.

There is a most considerable difference in the effect of these two plans in other cases. It is now many years since the method of using washed sensitised paper—that is, paper which, after sensitis-

ing, had had the surplus silver removed by floating the sheets as they came from the silver bath upon a bath of pure water and then being hung up to dry. If any one will try this experiment he will find that the paper becomes apparently worthless; it will take a long time to get an image, and, when printed, it will be so feeble as to be useless and altogether weak and deficient in depth in the shadows. Let the experimentalist next expose the washed paper for ten minutes to the vapour of ammonia in a closed chamber, and then try a print from the same negative. The result will be marvellous. Instead of the feeble, dull print he will get a perfectly vigorous impression, rich in the shadows and with all gradations from high lights to half-tones—one that will tone easily and smoothly, with an entire absence of any approach to mealiness, and with perfect purity in the whites.

He will further see, if the negative he is using be a weak one, that he can get more brilliancy by this method of printing than by any other. Should, however, the negative be a dense one, requiring in dull weather more printing than a whole day will allow, the result will be less satisfactory, and after a while the print will appear to gain little depth, even after a very prolonged exposure to light. The cause of this effect will not be difficult to find. The extremely volatile nature of ammonia causes the speedy dissipation of the slight amount retained mechanically within the texture of the paper, while the chemical combination that takes place between the ammonia and the chloride of silver of the paper does not seem to be strong enough, or, at anyrate, sufficient, to enable the printing to go on without further aid.

This, however, can be remedied by the use of a thick pad which, with the aid of the practically-impermeable "back" of the printing-frame, will store and retain sufficient ammonia to carry the printing on perfectly satisfactorily for two days—a time beyond which few negatives are likely to require to be exposed. We have experimented very largely in this direction, and the remarks we make are no theoretical disquisitions, but founded on the results of many dozens—we may say hundreds—of prints obtained in this special manner. The results of these trials unquestionably pointed out the fuming of the pads, and not the paper, as being the best method to adopt, for certainty, uniformity, an dexcellence of results. It is surprising that the method is not more generally adopted, for it contains many special elements of increased excellence in the results from such negatives as are below usual printing strength.

We have not treated of the use of ammonia in the printing bath itself; but as our article is quite long enough we now leave the subject, promising to treat of ammonia in the bath at an early opportunity.

A COMMERCIAL QUESTION.

In a few weeks from the present date Parliament will assemble for the transaction of business, and, so far as we know, nothing has been done in the way of concerted action by photographers with regard to the copyright question.

Doubtless the Copyright Bill, which has been before the House for several years past, but each year crowded out by press of other business, will again be brought forward by Mr. Hastings. Possibly, also, the short bill introduced just at the close of the last session by Mr. McLaren will again be re-introduced. If so, we trust it will be considerably amended, or, at least, be rendered much more explicit than it was; otherwise we fear, as we expressed at the time of its introduction, that instead of helping to avoid it will lead to considerable litigation.

With regard to the bill of Mr. Hastings and the gentlemen with whom he is associated, we have on previous occasions expressed the opinion that, with some slight amendment, and one or two alterations of the terms employed—for instance, that of "author," which gave rise to so much difficulty in the case of Nottage *v.* Jackson, a few months back—it will prove a very valuable measure to photographers, by enabling them to secure a legal copyright in their work, and also in the work of their paid assistants. One point in connection with this or any other bill that may be introduced will require consideration, and this is that a clause be introduced to make the Act, when passed, retrospective. For after the decision, to which we have referred—and up to the present time it has not been appealed against—there can be no legal copyright in the major portion of the photographs hitherto published. By the insertion of such a clause it would then be established, provided the forms which had been gone through in good faith, as it was supposed, would make them so.

As the matter now stands, those firms who employ assistants to take their negatives can have no legal copyright in them unless each be registered in the name of the *employé*, and the copyright be afterwards assigned by him to his employer. The inconvenience of this system was pointed out by us some months ago, and is so palpable that it requires no further comment.

In the face of this, the existing state of things, we can but express surprise that nothing whatever has been done by the general body of photographers, or, at least, by a combination of those who make the publication of their work the principal feature of their business, to endeavour to obtain an alteration of the law. We should have fully expected that, ere this, a meeting or meetings would have been called by them to consider the question, and to bring the result of their deliberations before the promoters of the two bills in Parliament to which we have alluded. These gentlemen, we feel convinced, would only be too happy to receive suggestions from photographers, if only to make the measure to be introduced by them as complete and practical as possible. A petition from photographers to Parliament calling attention to the urgency of the matter might possibly assist in securing an early consideration of the question, which, if the bill be carefully framed in the first instance, will not, we imagine, entail any very protracted discussion, nor, therefore, take up much of the valuable time of the House. Such a petition, we have little doubt, would be cheerfully signed by every photographer, professional or amateur (numbering several thousands), throughout the United Kingdom, whether they publish their works or not—the pirates alone excepted.

Since the existing Copyright Act has proved to be practically useless, in the majority of cases, in affording legal copyright in photographs, numerous letters from correspondents have appeared in our columns, expressing different views on the question as it now stands; but none of these have contained any practical suggestions as to how the subject should be dealt with in the future in order to secure an alteration in the existing state of the law. It is for this reason that we again direct attention to the subject, as, if anything is to be done before the meeting of Parliament, no time should be lost in bringing the matter prominently forward, and that energetically, too.

But, the question naturally arises—Who are the proper parties to take the initiatory steps in the matter? It being a purely business question, it is one, therefore, that cannot come within the province of any of the photographic societies, as it might do if it were a technical one. Clearly the question is a commercial one, and it is for this reason that it should be taken in hand by those whom it most concerns, and whose interests are most at stake. If these were to inaugurate the movement we feel assured they would receive the hearty co-operation of others, although they may be but little affected by the present state of the law.

We mentioned as a suggestion, just now, that a petition to Parliament, signed by several thousands of photographers, might receive attention, and possibly be of some assistance in urging forward the consideration of a Copyright Bill, and that signatures to such a petition could readily be obtained from almost every photographer throughout the kingdom. But how? To send paid canvassers through the provinces, or even to call upon every photographer in the metropolis would, of course, entail considerable expense, which the promoters of the movement could hardly be expected to incur. But this difficulty can be easily met. Most of the large stock dealers and publishers, both in London and the provinces, have travellers continually calling on photographers throughout the country, and they would, doubtless, be willing to assist in the matter by securing the signatures of the major portion of their customers, as doing this would entail upon them but little or no extra trouble. In some cases the petition might even answer

their purpose well by enabling them to employ it as an introduction to fresh business.

As we have previously said, the copyright question is a purely business matter, and as such we have treated it in this article.

November—astronomically celebrated on account of its meteors—has this year, with the early part of December, earned a place in the annals of meteorology on account of the marvellously-beautiful skies that have on most evenings followed the setting of the sun. Some people have called them "sunsets;" but, as they have always followed with an increasing brilliancy the waning tints of the true sunset, some other name must be given. Others, again, have termed the gorgeous appearances "auroral phenomena;" but with equal incorrectness, as they do not partake of any of the characters of the aurora. It is to be hoped that photographs of the spectrum may have been obtained to aid in determining their true nature, which, so far, apart from a very extravagant suggestion in an article in *The Times*, appears to have baffled the philosophers. If they indicate a continuance of such weather as we were favoured with during the greater part of last month, photographers will have "much to be thankful for."

With a good-sized optical instrument like a portrait objective there is not much difficulty in measuring the curves that bound its surface, but when smaller lenses are in question it becomes a far more difficult feat to accurately gauge the curvature, and when it comes to estimating the degree of roundness in a tiny spot of glass that almost requires a microscope to see it at all, the difficulties are at a maximum. Professor R. B. Clifton, however, has devised a most ingenious method (which he lately brought before the Physical Society) of applying mathematical formulæ to the purpose. He lights the lens with monochromatic light, places it on a plane or curved surface, when, upon viewing it through the microscope, circles similar to the familiar iridescent rings seen when pieces of glass of unparallel surfaces touch one another will be observed, and, by a calculation which he explains, the measurement of the distances between certain rings gives the curvature. Mr. Richardson pointed out that the same method could be used to ascertain if the lens were uniformly curved and spherical.

Our popular contemporary, *La Nature*, usually has something interesting to say about photography and photographic processes, and last week gave a short but appreciative account of our lately-closed Exhibition in Pall Mall. In the same number also appears a long account together with an illustration of a "new" method of preserving solution of "sulphate of iron," which the writer of the article in question states can only be used with advantage for developing when prepared a very few hours beforehand. The "new" method consists in placing the solution in a wide-necked bottle fitted with a blow tube and a syphon, and covering the liquid with a layer of paraffine oil. The method is several years' old now, and was published in our pages at the time of its first suggestion—by Mr. Léon Warnerke, we believe. We presume, too, that the writer means oxalate of iron, not sulphate; for it is new to us to learn that a solution of the latter substance is so changeable that, even when kept in stoppered bottles, it rapidly becomes useless.

A new method of bronzing iron has been published by L. Meyer, and it should be useful and economical for the exposed parts of apparatus used by photographers. It would be invaluable for the head-rest, only that that much-maligned instrument is rapidly growing out of fashion; also, for the various parts of the rolling-frame not actually polished, though we are not sure that even the steel plate might not be treated by it. It would be harder and should be cheaper than nickelising. The process consists in treating the clean, polished objects with the vapours from a mixture of nitric and hydrochloric acids heated to 300° or 350° C., till a bronze appearance is taken on. After cooling they are rubbed down with vaseline, and again heated till that substance begins to decompose; also a second time so treated after cooling. The colour of the bronze can be altered at will by varying the proportions of the acids or adding others—acetic acid, &c. It is stated that some iron rods so treated were exposed for ten minutes to the acid and other vapours of a laboratory without their appearance being in the slightest degree impaired.

The usual formula for the acid chloride of gold always includes a certain number of molecules of water, and a continental authority, J. Thomsen, stated as the results of his researches that it crystallised with four molecules of water; whereas, according to the *dictum* of Schottländer, only three molecules were contained. Thomsen has repeated his experiments, and finds that the salt does crystallise with the four molecules as he states, but, he says, in dry air they gradually lose one molecule.

We alluded, some month or two ago, to the MS. offered to the British Museum authorities for a million pounds, that purported to be a new text of almost the whole book of Deuteronomy, and which proved to be an entire fabrication, suspicion having previously been thrown upon it from the difficulty in submitting it to photography that had been experienced. Interest is again aroused in some circles in connection with photography and the Sacred Book, for we learn that photographic transcripts only from the original of the *Glagolithic Codex* of the four gospels, discovered in 1844 at the Monastery of Mount Athos, have been taken to aid in illustrating a complete copy in Cyrillic characters at present being published in Russia.

A FEW PRACTICAL HINTS ON EMULSION MAKING.

I am sorry to notice that of late there has been comparatively little in the columns of The British Journal of Photography on the subject of emulsion making. The time of year approaching is the one which is in every way the most favourable for the manufacture of dry plates, and the one during which it would be well for all amateurs who make their own plates to avail themselves of to produce a supply for the summer months, when the difficulties even of the commercial makers are generally great—those of the amateurs insuperable.

I fear the fact is that it is beginning to be with the gelatine-plate amateurs now as it was some years ago with the users of collodion. The commercial supply is getting so good, cheap, and reliable that the few who, some years ago, made plates for themselves have given up the habit and purchase them instead. Certainly I would be the last to blame them for doing this if they have no scientific interest in the subject, because I know well from my own experience the plates made at home are little, if at all, cheaper in the end than those purchased from a reliable dealer; and, also, if it be the fact that by a great effort one occasionally gets results of wonderful sensitiveness or suchlike, yet, on the whole, there is less certainty of ensured success from home-made plates than from those purchased.

In spite of all this, it appears to me the greatest pity that the small band of amateur emulsion workers who have, so to speak, kept the ball rolling up to the present day should cease their efforts. It is on account of their efforts, carried on from year to year, that small improvements have been made one after another, and that since the time when Bennett published his process so great advances have been made—if not in the final results gained, at least in the ease with which these results are obtained.

It is with a hope of re-awakening the interest which appears to be flagging, and in the hope of making, possibly, one or two photographers who have never taken up the manufacture of emulsion now to do so, that I would give a few hints in connection with matters having an entirely practical bearing on the question. It is often in the matter of small points of detail that a beginner finds practical difficulties, and a word or two from one who has dabbled in gelatine emulsions for some years may be of use.

I will take, first of all, the matter of mixing the two or more solutions which are used in making an emulsion. A great deal has been written and said about the care which it is necessary to exercise in this matter, and the desirability of a considerable time being spent in it. Now, though the worthy chief-editor, who has had a large experience in the manufacture of emulsions, is strongly in favour of very slow mixing, I must take the liberty of expressing the opinion that it is unnecessary, and that little, if any, benefit

arises from it; that, in fact, if the solutions be not too concentrated, and if the proportions of gelatine, &c., used be correct, as good a result will be got from quite rapid mixture as from the most slow and careful. A method which I have several times advocated gives me as good a result as any other, and certainly is easier and more expeditious. I should like to recollect who was the first to suggest it so that the credit might be given to him, but I cannot. The whole of the water used is added to the gelatine and bromide solution, which is heated in a bottle or flask, when the silver is added in the solid form and in one portion. A few seconds of active shaking is sufficient to dissolve all the silver and a beautiful emulsion results.

If there be a very large quantity of the solutions it is not possible to follow this course. In such a case I add half the water to the silver and this half to the gelatine and bromide. The latter is heated in a jar; the former in a bottle or flask. The silver solution is poured into the bromide in two or three portions, whilst the bromide solution is rapidly stirred. I find the emulsion as fine as if half-an-hour be taken to the mixing.

It is a question when iodide is used whether it should be mixed with the bromide, or should be added separately. I may say that, whatever be the reason, there is less chance that the iodide of silver will be in great proportion found at the bottom of the vessel if the soluble iodide be added to the already mixed silver and bromide, than if it be mixed with the bromide and the two be added together. I had accepted the statement made by (if I recollect rightly) Captain Abney, that this was because the particles of iodide would necessarily be of the same size as the particles of bromide in the emulsion if the former replaced the latter, as will be the case when the soluble iodide is added last; but your Editors pointed out that what I have stated does not follow from the replacing of bromide with iodide.

The vessel in which boiling is performed (if the boiling process be adopted) is of some importance. If very small quantities of emulsion be made, there can, I think, be nothing better than an ordinary glass flask; but, for any quantities above very small experimental ones, I find a most useful vessel to be that sold by Messrs. Stiff and Co., of Lambeth, under the designation of "shut-over jar." It is a glazed stoneware vessel, with a lid or cap, which fits over the top with a lip, so that it is quite light-tight. I should, perhaps, be somewhat unwilling to let a shut-over jar full of emulsion remain in full sunshine for a length of time, but certainly there need be no fear of submitting it to such light as there ever is in the dark room—say, for example, what occasionally comes from an unprotected gas-burner or from a door left open for a second or two. The shut-over jars can be had in sizes to hold a half-pint and upwards.

A shut-over jar placed in a covered saucepan, which is filled with water to within an inch of the top of the jar, is surrounded on all sides with either boiling water or steam, and the emulsion in it reaches to within about 3° Fahr. of the boiling-point. A little hint may be useful in connection with the manipulation of this cover of the jar. It is desirable, if boiling be long continued, to stir the emulsion at brief intervals. The cover is naturally hot, and if precautions be not taken the fingers are burned. There is, however, a small sunk knob on the cover by which it is lifted. If a little cold water be poured into the recess around the knob the cover may readily be lifted without burning the fingers.

It is a common practice to pour an emulsion, which is so far finished as to be ready for washing, into a flat dish, so that it may set quickly. The danger of contamination from dust, &c., is thereby increased, whilst the emulsion sets little, if at all, quicker than if it be left in the jar, and the latter be placed in a large vessel full of cold water.

If emulsion is to be washed in the usual way—the bromide not being precipitated—it is essential that it should set stiff before it is cut up; otherwise it will absorb so much water that it will always remain too soft. In very hot weather the use of ice is necessary. Of course this may be placed in the vessel containing the cooling water; but I prefer to take a moderately-sized piece of clean ice and press it right down among the emulsion. It will melt, absorbing the heat from the emulsion, and will make it in a short time very stiff.

I used to be very much troubled with the messiness of the canvas or scrim method of dividing the emulsion for washing, and somewhat grudged the price of one of the very efficient but rather expensive dividers which one can purchase from dealers. I got from Mr. A. B. Brown, of Edinburgh, a design for a squeezer which was made by a carpenter in less than an hour, and has now served me most admirably for several years. It is simply a long box of rectangular section—"a square cylinder," as I have heard it called—into which there is fitted so as to work freely a square plunger of wood. The box is about fifteen inches long, the plunger about six inches longer and, perhaps, an inch and a-half square. On one end of it there is fixed with copper tacks some copper wire gauze. The emulsion which has set in the jar is taken out in lumps by hand, is placed in the box, and is squeezed through the wire gauze into a sieve placed in a suitable vessel full of water. I may say that I have found a vessel commonly used to store bread in, and, I believe, called a "bread pan," very convenient. This vessel has a cover with a top making it so nearly light-tight that after washing is over the vessel may be emptied and the sieve may be left in it to drain without danger of light getting access.

The washed and drained emulsion may be placed in a shut-over jar. The spirit and salicylic acid, or other antiseptic, is added, but need not be mixed with the emulsion by melting. If it be poured over the emulsion, which is in the form of threads, and be mixed up with it by stirring, it will be possible, after an hour or so, to pour off the emulsion nearly two ounces of clear fluid for every ounce of spirit which was poured over it. This will, however, be found to be almost entirely water. The spirit has been absorbed by the emulsion, which in return can give off a considerably larger quantity of water. This is a convenient method of making emulsions somewhat more stiff. W. K. Burton.

COLOURING LANTERN TRANSPARENCIES.

No. I.

Having completed colouring a set of photographic transparent views of scenery in and around Hadley Wood and Barnet for exhibition at a forthcoming sunday school Christmas entertainment, it was strongly urged upon me by a friend—an occasional contributor to The British Journal of Photography, who had favoured me with his company and had closely watched me throughout—that I should contribute a few simple practical notes on this class of work for the benefit of himself and other readers of this Journal. With this request I now comply.

When I prepare photographic transparencies for colouring I do not treat them in precisely the same way as if I intended them to be used without colour. If you examine a fine slide, by any well-known maker, embracing rural scenery with much foliage, it will be found that whereas in nature the foliage was green of a hue more or less bright, in the photograph it is seen to be many shades darker than it should be, owing to the number and density of the atoms of silver composing the foliage, this being the case to such an extent as to prevent the green pigment from showing at all. In some transparencies of this description I have piled upon the foliage layer after layer of my brightest green without any colorific result having been attained, the heavy, sombre, unnatural effect remaining as before.

This is altogether a different matter from painting a photograph upon paper or porcelain; for in these the blackest foliage or heaviest shadows can be lighted up at pleasure by the employment of opaque or body colours, or by mixing a little flake white with the transparent pigments which alone are applicable to transparency painting. But if in a transparency recourse were had to this procedure it would make things worse than before, for the luminous equivalent of flake white when applied to paper is, in a transparency, the thinning of the deposited silver so as to allow more light to be transmitted—the touch of pure white given to form the highest light in the one finding in the other its equivalent in the complete removal of the image by the needle-point or penknife, so as to leave nothing but bare glass.

To one who has had some experience both in making and colouring transparencies it is not difficult to obtain the best class of photograph for receiving colours with effect, although it may prove difficult to describe the characteristic features of such a photograph. Perhaps the best idea will be conveyed by saying that it ought to be "outline-y," and even its outlines should not be too dense. A very brief exposure and rather long development afford the keynote to the nature of the manipulations requisite to secure the best effect. Plates prepared by the old-fashioned tannin process, and developed by acid pyro. and silver, give an effect peculiarly well-adapted for receiving colour in the highest style of the art; but the exposure must be short and the development forced. When the picture is laid face down on a sheet of white paper, the appearance presented should be that of a properly-printed proof upon paper, while the intensity, when raised up and looked through, must show a sufficiency of vigour.

Having obtained a suitable transparency, it must next be varnished. Some years ago I adopted the use of a varnish composed of sandarac dissolved in methylated spirit. It gave a clear, bright film, and both oil and water colours took to it nicely; but I sometimes had occasion—as every painter of lantern slides will have to do more or less frequently—to pick out bits, and put in, or rather take out, touches of high light by means of the needle-point. I found, however, to my extreme dissatisfaction, that the collodion film would chip and break off round the spot upon which I operated, and that if I drew fine lines by my scratch point they became jagged and broken. Being recommended to try white hard spirit varnish diluted with alcohol, I did so with a result even worse than before. Having read in one of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANACS of the virtues of castor oil when added to a plain sandarac varnish I tried it with excellent effect.

I have also employed, with the greatest degree of success, a solution of albumen composed of the white of an egg beaten up with twice its volume of water together with ten drops of ammonia. After the frothy mass has settled the clear liquid is poured off. To use it, the transparency is flooded with the liquid, which is then drained off at one corner and the picture immediately immersed in a tray of hot water, the temperature of which is but little under the boiling point. This coagulates the albumen, leaving it not only of a glassy degree of brightness, but modified in such a manner as to render it unaffected by either water or oil paints, while it is susceptible of the most delicate touches of another class of pigment, which I shall describe before concluding.

The question now arises:—What class of colours is best for transparency printing—oil, water, or varnish? This cannot easily be answered; each has its own advocates. They are all good in their way, and there are some transparency artists who employ them all even in one picture. As oil pigments appear to enjoy the greatest amount of popularity, I will speak of them first of all. Although nearly every dealer in lantern appliances keeps boxes of colours for sale, it will be advantageous, especially for the beginner, to purchase from artists' colourmen, under their definite names, the various colours required. They are conveniently put up in tubes and are sold at a very low price—fourpence and upwards. It must also be noted that only very few pigments can be employed, owing to the paucity of such as are quite transparent, hence the expenditure for an outfit is very small.

For blue, *Prussian blue* forms the most useful among all the blue pigments, and one can get along very well indeed without any other, although there are some subjects in which *Payne's grey* comes in handy. There are other transparent blues, such as *Chinese blue* and *cyanine blue;* but the Prussian is susceptible of such easy modification by the admixture of others that no other is really required. The best yellows are *gamboge, Italian pink,* and *yellow lake.* There is but little difference between the two last, although the former of them is probably the more advantageous. The *gamboge* is useful for foliage, and with a small proportion of Prussian blue forms a good green. Both *raw* and *burnt sienna* must be procured. The former is useful in the representation of light, dry, sandy earth, dry roads and light-coloured houses; the latter is a very transparent brown of an orange tint. Both *Vandyke brown* and *burnt umber* are useful, but much less so in a photographic transparency than in other classes of work, because any subjects which were of these tones in nature will be represented so very darkly in the photograph as to require scarcely any colouring at all. *Crimson lake* and *pink madder* complete the list. The latter by itself dries very slowly, but by the admixture of megilp or mastic varnish its drying is quickened. This applies also to the Italian pink. A tube of *lampblack,* by which to render any portion more or less opaque; a tube of megilp, for use as a vehicle; and a bottle of mastic varnish and pale drying-oil, together with a few sable brushes, a palette, palette-knife, and large camel's-hair brush complete the outfit.

The most important piece of work in the painting of a lantern landscape being the sky, I close this article by describing how it is done, premising that I do all my painting upon a retouching desk, which I find to answer this purpose rather better than the easels specially prepared for transparency painting. Let us imagine that the subject is a landscape having about two-thirds sky, into which a tree and a spire project upwards. Mix on the palette a little burnt sienna and pink madder, and, having charged a brush with this, draw it in streaks across the sky a little above the horizon, and then laying down the brush dab it all over with the point of the first or second finger until it presents a uniform appearance. Never mind the fact that the paint has been carried over the tree and the spire; it must be removed from them by a pointed piece of soft wood as the last operation of all. Next apply to the upper portion of the sky some Prussian blue, and in doing so remember that there is no use whatever in hoping or attempting to make it quite uniform by means of the brush alone. The finger is the all-potent instrument by which uniformity is secured, and *dabbing* with it must be had recourse to. Bear in mind that the sky is of a deeper hue at the zenith than near the horizon; therefore let the dabbing be performed in such a manner as to retain more of the paint at the top than lower down, the quantity being so attenuated by the time it descends to the warm layer already applied as to merge into it quite imperceptibly. The laying on of a uniform sky seems, like playing the violin, very easy to the onlooker; but it is only by dint of several trials, carefully made, that success is attained. As the beginner will probably spoil several skies before he succeeds to his own satisfaction, a soft piece of calico dipped in spirits of turpentine will be a useful aid to him during his novitiate.

To complete the blending of the colours, and to obliterate the slight textural markings arising from the rugosity of the finger point, is the function of the large camel's-hair brush of which I have already spoken. It must be whisked very lightly over the surface; and, if cleverly done, all surface asperities will disappear and the colouring look as if the glass were stained. Until the sky presents such an appearance the formation of clouds must not be thought of; but the treatment of these is reserved for my second article.

T. J. HOUSTON.

IRON PRINTING PROCESSES.

THE publication of Herr Liesegang's work on methods of producing copies of tracings, &c., naturally directs attention to processes which, notwithstanding their intrinsic merits, have not received that amount of attention which they deserve. The processes we refer to are those which depend upon the effect of light upon salts of iron. The general principles involved are not new discoveries—indeed, the process which he called "cyanotype" was described by Sir John Herschell in the early days of photography. However, the variations and improvements which have been from time to time introduced; the practical utility of the processes for the reproduction of architects' and engineers' drawings; and the probability that the direction of the attention of experimentalists to these methods may result in further improvements and increased applicability, induces us to think that they should occasionally be brought under the notice of our readers.

We now propose to give three of the leading and characteristic methods of producing different results. The first to be described is that in which the dark image is produced by the action of light upon those portions of the sensitive surface exposed to its action. The resulting prints, therefore, show light and shade the reverse of that which is seen on the drawing or tracing copied, the black lines of which show out in the print as white upon a blue ground. In many cases—especially if the drawing is not to be coloured—this is of no consequence, and the simplicity of the process commends it to those for whom the disposition of light and dark colour is not important.

A sheet of paper is floated for two minutes upon the following solution, which is mixed in the dark room:—

Water	40 ounces.
Ferridcyanide of potassium	3 „
Ammonio-citrate of iron	2½ „

Or the ferridcyanide may be dissolved in twenty-five ounces of water and the ammonio-citrate in fifteen, and these stock solutions mixed in the proportion of five and three, as required. The paper, if well dried and preserved from light, moisture, and air, keeps for some considerable time.

As it is intended to use the photographic copy direct, and not to reproduce from it the tracing to be copied, it must be laid with its face against the glass of the printing-frame; if the face were in contact with that of the sensitised paper, the direction of the lines, &c., would, of course, be reversed as in a negative. The printing is carried on until all the lines are visible, showing as a dingy yellow upon a dark ground. The paper is then taken from the frame and laid in water, which is repeatedly changed, until the lines show as perfectly white upon a blue ground. This blue ground becomes somewhat darker if a few drops of chlorine water are added to the washing water. Dilute hydrochloric acid has a similar effect.

A variation of the process consists in changing the blue into black, in the following manner:—The print is immersed in a four-per-cent. solution of caustic potash until the blue colour disappears and is changed into a yellow. The print is then well washed and laid in a solution of tannin one part, water twenty-five parts. It

takes in this bath a beautiful black tint, which is just as permanent as our ordinary writing ink.

The next process to be described—that in which the effect of the light is to convert the iron compound into one which may be discharged from, instead of fixed in, the paper—gives, consequently, an image resembling the original tracing; that is to say, one showing dark lines upon a white ground.

There are several variations of this process, all involving more difficulty and requiring more care than the method above described. We shall give one of them—that of Pizzighelli. For this method three solutions are prepared :—

A

Water	11 ounces.
Gum arabic	2 "

B

Water	11 ounces.
Ammonio-citrate of iron	5 "

C

Water	11 ounces.
Perchloride of iron	5 "

The solution A becomes in a few days useless; B and C, in closed bottles, remain good for some weeks. For use these are mixed thus:—

A	20 parts,
B	8 "
C	5 "

and in the order named, otherwise the gum coagulates. The mixture is at first thick, but after some hours flows freely, and remains good for some days.

The paper must be well sized, so that the solution may remain upon the surface and not sink into the paper. Paper sized with gelatine is to be preferred to that prepared with starch. The paper is laid upon a flat board, and fastened along two sides with pins. The sensitive compound is spread with a broad painter's brush as evenly as possible, and then smoothed with a badger brush. After drying, the paper is pressed flat and kept from air and light. The paper is now exposed to light under the tracing; but as the visible change is very slight, a few slips are exposed under a piece of similar tracing-paper with lines upon it in the same or another frame. From time to time one of these slips is taken and placed in the developing bath. When the ground developes white and shows no blue points the print has been sufficiently exposed to the light. If, however, the lines appear weak and undecided the exposure has been too long. In direct sunshine an exposure of one minute may be sufficient; in cloudy weather from five minutes up to an hour may be required.

The development of the pictures is as follows:—Three dishes are placed side by side upon a table. The first is of well-varnished wood, and contains a solution of two parts of ferrocyanide of potassium in nine parts of water. The second dish, which contains water, is of zinc, and must always be kept very clean and occasionally washed with potash. About twenty inches above this must be a water tap, with an india-rubber tube sufficiently long to reach the dish. The third dish is of wood covered with gutta-percha, and contains a mixture of eight parts of hydrochloric acid or three of sulphuric acid in one hundred of water. The print, upon being taken from the printing-frame, has the edges turned back for a width of from three-eighths to three-quarters of an inch. This is to ensure that none of the solution touches the back of the print, as that would cause a stain. The exposed side of the paper is carefully laid upon the developing solution, and the hand passed lightly over the back to drive out air-bubbles. After a few seconds the paper is quickly raised from the bath and held vertically till the developing is completed; that is to say, until all the lines show as blue. This takes from forty to fifty seconds. The picture is then laid upon the water bath, and after a short time is immersed in the acid bath. The print is moved about with a wooden spatula in the acid, and the lines are soon seen to become stronger; the ground loses its yellow colour and becomes white. The print must not be left for more than five or six minutes in this bath, or the paper will be weakened; meanwhile the water dish must be frequently rinsed with abundance of water, especially in the corners. The print is now laid in it and washed with a forcible stream. After thorough washing the print is hung up to dry.

If, in spite of all precautions, there should appear spots of blue in the white ground, they may be removed, after drying, by touching with a dilute solution of potash and drying off with blotting-paper. The same solution answers also for removing blue stains from the fingers.

The third process that we propose to describe is one which, like the second, gives dark lines upon a white ground; but these lines, instead of being blue, are of a dark, violet-black colour. The sensitising solution is composed as follows:—

Water	30 ounces.
Gelatine	1 ounce.
Perchloride of iron in syrupy condition	2 ounces (by measure).
Tartaric acid	1 ounce.
Sulphate of iron	1 "

The exposure required is several minutes of sunshine, and is judged to be sufficient when the paper—except in the lines that are to be dark—has lost its greenish-yellow colour and become white. It is then developed in a bath of one part of gallic acid dissolved in ten parts of alcohol, and diluted with fifty parts of water. In this solution the lines immediately become blacker, and the print is then finished by being well washed in water.

For all these processes—perhaps the last more especially—it is necessary that the lines in the drawing to be copied should be very solidly drawn, and in indian-ink or some medium possessing great opacity. The white parts also should be as transparent as possible; and, in fact, the drawings for the purpose are generally made on a transparent kind of tracing-paper.

ADDITIONS TO THE DEVELOPER.

It appears singular, at first sight, how difficult it is to remove the photographer from the old tracks. All of us, no doubt, at one time or another, have tried many useless experiments and wasted valuable time in the endeavour to adopt in our practice some worthless formula privately given to us or publicly recommended; and in time, I expect, the result is, in most cases, a gradual hardening of the photographic heart to the verge almost of utter disbelief in any new thing. It is only the professional photographer who knows the difficulty and danger consequent upon altering the routine of his establishment, the time spent in teaching others the new way, and the material wasted before perfection in its use is arrived at; so that, after all, it is not to be wondered at that he shrinks from the risks of loss and the consequence of upsetting his routine till he is fully assured of a real gain to accrue from the change. The more, too, is the feeling likely to be developed when one remembers the number of dropped processes that have been ushered in with the loudest of praises.

Feeling all this, I was still surprised, however, the other day, upon calling on a photographic acquaintance of great skill, to find that some well-known and fully-discussed methods of working were not in use at his establishment. I can scarcely say they were unknown to him, but I did come to the conclusion that he did not read his journals much. The tendency of my conversation with him led me to think that I might with no disadvantage return to an exceedingly well-worn topic—the addition of certain chemicals to the developing solution.

My readers need not turn away aghast at the thought of a list of the thousand-and-one chemicals suggested for the purpose being presented to them. It is mainly of sulphite of soda that I intend to write. At one time it was strongly urged against it that it showed the developer, and at others a number of little faults were found with it, so that we may well imagine that to those who have not been brought into contact with its actual use by other hands, its employment would appear to bristle with so many disadvantages that it would not be worth while adopting it in their practice.

To such, and all who have not yet adopted it, I should like to say that this plan of Mr. H. B. Berkeley's is to me of inestimable value. I would not be without the salt if it were many times the price it is, though as it is so very cheap no one can assign its cost as a reason for objecting to it. I do not find any practical difference in the behaviour of the developer with and without the addition of sulphite; while, as to the average character of the resulting negatives, the comparison is utterly and entirely in favour of the sulphite-developed ones. In fact, I cannot conceive of anyone, after having once given it a trial, ever ceasing to employ it—that is to say, of course, if he desire to produce the highest quality of work.

As to the proportions in which to use it opinions vary, but I have a very confident belief that two ounces of sulphite of soda to one of pyro. is the best proportion. I have put to the true test, that of actual working practice, all proportions—from equal weights of each to one of pyro. and four of sulphite—and have found efficiency and economy to be best studied by the two to one proportion. If only one to one be used the exception from yellowing is not complete; if four to one be adopted it possesses little, if any, superiority over two to one, and is naturally more costly. Now and then, when I have had a new batch of plates, or when my

usual mode of working has varied for some reason, I have given the plain pyro. without sulphite a trial, but have been very glad to put in a quantity before I have passed many plates through the fixing bath and been able to see their colour, the old sickly yellow of the early pyro. days being a thing of the past entirely. I should, however, interpose here and say that no proportion whatever of the sulphite will give a "wet-plate appearance" to a negative that has had a prolonged development, as in all negatives, unless fixed in new hypo. or treated some time with alum, there will be a faint yellow appearance, which, however, does not in any way approach the old sickly yellow.

The sulphite is procurable in the shops both as ordinary crystallised or recrystallised. Either will answer the purpose, but I use myself, and would recommend others to use, the recrystallised on account of its greater purity and consequent uniformity, and of its not being liable to contamination with carbonate of soda, which must interfere with the power of the developing solution. I am in the habit of dissolving a pound at a time, and keeping in a stoppered bottle for use each time an ounce of pyro. is dissolved. I make it in the strength of one in four—that is, a pound of sulphite in sixty-four ounces of ordinary water. It is most easily dissolved with hot water. Though this strength is just within the limits of solubility of the salt as given in the text-books, I have found at times that some of the salt has crystallised upon the bottom of the bottle, thus showing either that the salt recrystallised though it was not really pure or else that the authorities were wrong. I am inclined to believe the latter to be the more probable supposition.

The other addition to the developer that I would again allude to being my own suggestion, it behoves me to speak of it with becoming modesty. Nevertheless, after a long experience with "citrate" to arrest the effect of over-exposure, I must say I cannot speak too highly of it. It is far less known than the use of sulphite; in fact, I know of very few photographers who use it, yet I do not hesitate to say that citrate of ammonia added to the developing solution infinitely surpasses any other remedy I have tried, and they have been many.

When a negative has started developing, and the rapid evolution of the image tells of great over-exposure, the negative may be saved by instant and free use of the citrate; while if citrate of ammonia be added to the solution before beginning to develope, the difficulty will be to make any image appear at all, though the exposure may have been dozens of times too long. Further: the citrate does not appear to destroy the image, so that, if development be commenced with it and then it is found to restrain it too much, it is only necessary to mix up some fresh solution without any (or with less) of the citrate to obtain any development of which the negative was originally capable.

The citrate I prefer to use is that of ammonia. It possesses the greatest restraining power, and when used in small quantities can be made to adjust development and exposure to perfection. Two to four grains (I always keep it in solution) to each drop or minim of ammonia will arrest development almost entirely with an average plate, and will readily enable a good negative to be obtained if twenty times too much exposure have been given.

In conclusion: I may say that if what I have now written should help to draw attention again to two additions of proved value for the developing solution, and only a few even will try them, I shall be sufficiently rewarded. G. WATMOUGH WEBSTER, F.C.S.

ON PHOTOGRAPHY AND SOLAR ECLIPSES.

[Abstract of a communication to the South London Photographic Society.]

THE subject of the remarks I have to make is *Photography and Solar Eclipses*. What I wish to do is to explain briefly some of the most important problems to which photography is looked to solve, and by what means this is being done, as well as to point out some of the principal discoveries which have been already made by its means.

Without going into all the astronomical relations affecting the eclipse of the sun by the moon, I will just note one or two points. Drawing your attention to this diagram, I first ask you to note that we have here three bodies varying in size. The largest, the sun, is giving out light from every part of his surface; part of this light is being intercepted on the moon. Now, if the sun could be regarded as a point, we should have a sharp shadow cast on the earth, such as is thrown by rays coming from point A [on diagram]. Taking a point on the opposite edge of the sun's disc we shall have another shadow, but some part of both shadows will receive light coming from other points of the sun. We have, therefore, a black shadow or umbra in the centre, and a fainter shadow called the penumbra surrounding it. Now, an individual standing on a part of the earth in the fainter shadow, as he receives light from one part of the sun and no light from the other part, sees the sun partially eclipsed; whilst an observer in the dark central shadow, receiving no light from the sun at all, sees that body totally eclipsed by the moon. A good illustration may be got by standing in a line with two other individuals: the person farthest from you is eclipsed by the one nearest you, unless the latter individual is made of glass. Now by stepping a little to one side the central person will only partially eclipse the one farthest from you. To return to the case of the moon, we have also to remember that that body is moving, and its shadow, therefore, also moves. The path along which the dark shadow (the umbra) moves is called the line of totality, and of course it is along the centre of that (the central line, as it is termed) that totality lasts longest. This will explain to you why a total eclipse is visible from some parts of the earth only. The angle which the moon's disc makes with the eye (I need not explain that term to photographers) is sometimes a little larger than the angle formed by the sun's disc, and sometimes a little smaller. In the latter case the sun is not completely covered up, but a portion of it is visible as a ring, forming what is called an "annular eclipse." It is only when the sun's disc is completely covered by the moon that an eclipse is of any particular value to astronomers.

On such occasions, structures which are not ordinarily visible to the eye, on account of the glare of the atmosphere due to the sun, are revealed to us, and we are able for a short time to study them. It has only been my fortune to be present at two such phenomena, but as you would prefer that I should tell you of what I have seen rather than of what I have heard, I will read to you a brief description of each phenomenon.

Our encampment was a little to the north of the village, by the side of the river. Our instruments were erected in the open air—for we had no fear of rain—and our chief enemy, "dust," found its way through every crevice; the open roof of an ordinary observatory would have been no protection against it, and only the sides of it would have availed us. Our Egyptian friends had anticipated this, however, by surrounding the instruments with a tall hedge of rushes placed thickly together. Near this little enclosure was the steamboat on which we took our meals, and one of the cabins of which had been converted into a dark room. Near this, again, was the dahabeah placed at our disposal by the governor of Souhag. The instruments of the French observers were erected a little to the north of our own, and the encampment of the guard of soldiers a little to the south of us. Up to the morning of the eclipse a line of tents, a Nile boat, and a steamer were the only objects to denote that anything unusual was to take place. But on the famous morning the place assumed a livelier aspect.

Many dahabeahs of the neighbouring gentry came and anchored by the shore; the villagers of Souhag, who had been told what was to take place, came down towards the encampment. Our guard kept them at a respectful distance from ourselves; but they grouped themselves on the sloping bank in the face of the sun, looking towards the eastern side of the Nile, their bright garments forming a pleasant contrast with the glaring yellow sand. At last the moment of first contact approached, and we had already begun serious work. Even at that moment we were not able to suppress a sense of the ludicrous brought before us in the person of a certain member of the party, who, not having gone out to make astronomical observations, volunteered to keep guard at the entrance of the enclosure; for we knew from experience that the Egyptian soldiery were not to be trusted in such a moment. This gentleman was seated on one of the cases, a large revolver of 45 calibre at his side, and on his face, which was usually so mild and pleasantly-humourous, was the most grim, bloodthirsty smile that anyone could call up. He wanted to kill a man, I believe, and he very nearly had a chance. As darkness approached, and the frightened poultry rushed into the enclosure as if seeking shelter and sympathy, a native attendant followed them to drive them out. He was instantly covered by the revolver, and would certainly have suffered but for the timely "It's all right!" of one of the observers, upon hearing which our vigilant friend dropped his weapon.

The encroachment of the moon's disc across the sun was productive of the utmost alarm amongst the crowd of Arabs and Felaheen, and many were the invocations to Allah which reached our ears in the shape of a monotonous hum. Smaller and smaller became the sun, and darker and darker became the atmosphere, till suddenly the moon's shadows swept over us, and coincident with the commencement of totality a cry went up from the crowd of spectators at seeing the sun's light thus suddenly extinguished. Considering the effect of the phenomena on those hardened by science and the knowledge of its meaning, it was little to be wondered at that the ignorant Egyptians, prone to superstition, showed signs of fright and alarm. Round the black disc of the moon was a fringe of blood red dots, and extending some distance were rays of light crossing each other in all directions, and forming the most brilliant crown of glory that can be conceived. To further enhance the effect, a scimitar-shaped comet was seen near the sun. The atmosphere seemed suddenly cooled, and the objects surrounding us were robbed of their natural hues and bathed in a weird glow of violet light. As suddenly as the rays of the sun disappeared so suddenly did they reappear, and the lifting of the moon's shadow lifted with it the anxious thoughts that from very different causes had hitherto held sway over observer and spectator alike.

The eclipse of 1883 was also a very beautiful one, but, seen with such very different surroundings, it carried with it a very different effect. The features of a choral island seem to carry with them beauty and repose, and these were communicated, as it were, to the corona itself. There was no weird colouring around us, few prominences on the sun itself, and no comet to add to the effect—only the silvery glory of the corona itself. I need not give you any further details of its appearance and effect, having brought it so recently before photographers in the *Photographic News*. There were only a few natives on Caroline Island to witness the eclipse, and the only opinion we could get from them on the subject was that it was "no good." I may mention that we told these natives to keep away from the encampment during the momentous event, and, to ensure their doing do so, we placed sentries to keep them from going many yards away from their huts. It was rough on the natives, maybe; and looking back to that time, there is rather a touch of the ludicrous in the stationing of several men armed with repeating rifles to keep guard over four men, one woman, and two children with no warlike implements at all.

One of the earliest attempts was made in 1851, when D. Busch obtained on a daguerreotype plate the prominences and a small portion of the corona. Mr. Ranyard, in his elaborate work on eclipses, says of the photograph:—"It is by far the most valuable record we have of the eclipse of 1851." An important piece of work was done in 1860 by Mr. Warren De la Rue with a photoheliograph. He was able to prove that the prominences were truly solar, as portions of them were cut off when the moon passed over them. In 1870, Mr. Brothers obtained at Syracuse the finest photograph of the corona that had till then been obtained.

During the Indian eclipse of 1871, some exceedingly beautiful photographs were taken at Baikul and Dodabetta, by Mr. Davis, Mr. Hennesy, and Captain Waterhouse, and though taken at different phases at totality, and in different places, their details were identical, tending to show that the corona is not a purely optical phenomenon.

In the Egyptian eclipse of 1882, the photographic work of which was arranged by Captain Abney, only three instruments were used, these three being mounted on a telescope stand, and driven by clockwork. There were a long camera and lens of five feet focus, which would give us an image of the sun about five-eighths of an inch in diameter, the lens used being the front combination of a Dallmeyer's rapid rectilinear of four inches diameter; a camera of shorter focus mounted with a prism in front of it; and a small spectroscope of the usual form used for photographic work. I have here a photograph of these instruments on the stand, and this brings to my mind a little anecdote concerning it. One member of the party invented rather a long name for this set of instruments. Shortly after my return home, I had to send a telegram concerning them, and, by way of economy, I used this very long word. The young lady who took this telegram over the counter scanned it over, but when she came to the word "Tele-spectro-photo-heliograph," lifted up her head and her voice, recommending me to take my custom somewhere else in future, and I was only able to appease her wrath by telling her that it should not occur again.

We were able to get some very pretty and very useful photographs of the corona, photographing it to its extreme limits, as was shown by the way the sky was impressed on the plates. On all three photographs we found an image of the comet and were thus able to get at its position. Moreover, careful examination showed that the comet had moved an appreciable distance during the time of totality, which was only seventy seconds. This was really an important feat for photography to accomplish.

The work of the prismatic camera I must go into at a little greater length. You know the principle of an ordinary spectroscope. If we allow ordinary sunlight to fall on a prism we have it spread out into a band of colours, crossed by fine dark lines. If, instead of ordinary sunlight, we use the light from a spirit lamp moistened with common salt, instead of getting a continuous spectrum we get a bright yellow line. If we allow a beam of white light to pass through sodium vapour, we find the sodium vapour will absorb the very kind of light which it can itself give out. We can extend this to other substances; in fact, it is by comparing the fine black lines crossing the solar spectrum with the bright lines given out by various metals that we are able to get at the constituents of the sun. Turning to the diagrams I have here, the top part represents a bright line spectrum as obtained when a slit is used. If a ring instead of a slit be used, we get a series of rings; but with a total eclipse we have the ring already formed, as I can show you here by placing this disc of black cardboard over this representation of the sun and its surroundings. By looking at an eclipsed sun this is the sort of spectrum we get.

This method of observation had been pursued in several eclipses previous to that of 1882; but it was during the eclipse in the latter year that the phenomena thus seen were photographed amongst some of the results of the photographs taken in the prismatic camera. It may be mentioned that many of the prominences were of different temperatures, which was shown by the different lines they gave out. The prominences were also photographed in the infra-red and ultra-violet regions, so that we obtained a permanent record of more than could be seen with the naked eye. The ordinary spectroscopic camera with the usual slit was reserved for analysing the corona, and some very interesting results were obtained. A number of lines were procured which show that in a small amount of reflected light the corona has very distinct lines of its own. Another photograph was taken this year with two prisms instead of one; therefore, we have two records, which will have a good deal to say on the question resuscitated by Dr. Hastings, as to whether the corona is genuine, or whether it is mainly an optical phenomenon.

To come to the work accomplished this year, and about which you have perhaps read a good deal in the photographic papers, it was, I may say, mainly based on the work of May, 1882. The point to which I shall chiefly draw your attention is that conveyed in the telegram home that we had succeeded in photographing the flash. I will once more make use of this disc of cardboard to show you what I mean. I nearly cover up the sun, leaving a thin edge of the sun's disc, which we will still suppose to be sending out ordinary sunlight. I keep on moving the cardboard till, just as we are on the very verge of totality, we get, instead of a spectrum crossed by dark lines, a series of bright lines. This is called the "reversion spectrum" or flash, because it flashes out suddenly, then disappears as the moon's disc covers up that part of the sun which gives out the lines.

To turn your attention to another diagram: I have here marked the boundary of the light-giving portion of the sun by this line. An outer line marks the boundary of the photosphere, which is composed of gases that cut off portions of the sun's light, and give rise to the Fraunhoferic or dark lines. The light given out by the atmosphere itself is feeble, but it is readily visible when the rest of the sun is eclipsed, its light consisting of bright lines such as I have represented in the coloured diagram. To photograph this phenomenon we used a plate that was being slowly moved along by clockwork, and, though we have not yet got all the bright lines of the flash, we succeeded in getting the most important of them. The rest we hope to get on another occasion, as well as the order in which they appear.

I should like, in conclusion, to say a word or two in relation to the theory put forward by Dr. Hastings. Leaving out the evidence afforded by the photographs of the spectrum, let us take Dr. Hastings' theory on his own ground. It is based on a variation in the length of a particular line during totality. This variation, says Dr. Hastings, must be due to diffraction. But if one line varied by diffraction, so did all the lines of the coronal spectrum; or, in other words, the visual corona itself must have undergone remarkable changes during totality. We have no evidence that any such changes occurred. It may also be said that Dr. Hastings' observation contradicts similar observations in the particular line (1474) made in 1868 by his own countrymen.

The photographs taken during the recent eclipse have not yet been critically examined, but they bid fair to give us some very important data. I may fairly conclude, then, by saying that in the application of photography to this branch of study, distinct advances are being made, and we look to the "black art" to furnish us with still more important evidence of its usefulness.

C. Ray Woods.

ANNUAL DINNER OF THE SOUTH LONDON PHOTOGRAPHIC SOCIETY.

On Friday last, the 7th instant, the twenty-fourth annual dinner of the above Society was held in the "Commodore's"-room, Holborn Restaurant. The chair was occupied by the President, the Rev. F. F. Statham, M.A., F.G.S., the vice-chair being filled by Mr. Jabez Hughes. About thirty members and friends were present. After the toast of the Royal Family had been duly honoured, the Chairman proposed the toast of the evening—"Success to the South London Photographic Society"—and, in doing so, congratulated the members on the present flourishing condition of the Society, notwithstanding that several other societies had during the past few years sprung into existence. He also directed particular attention to the fact that many of the leading features of this Society were being copied by other and older societies—such as its technical and lantern meetings, monthly competitions, and its question-box—which showed that the Society was one of progress. He also mentioned that the South London Photographic Society was the first society to inaugurate weekly technical meetings, which had given birth to an equally-flourishing association, the Photographic Club, and to the London and Provincial Photographic Association, which also met weekly. Much of this healthy state of the Society he (the Chairman) attributed to the energy displayed by the indefatigable Hon. Secretary and Treasurer, Mr. F. A. Bridge, with whose name the toast was associated. The toast was enthusiastically received. Mr. Bridge, in responding, assured the members that more of the success of the Society must always rest with the members themselves than on his efforts; and called upon them to assist him still more in furthering the ends of the Society. The toast of "Other Societies" was next given, and responded to by Messrs. E. Cocking, E. Dunmore, and A. Cowan. "Professional Photography," coupled with the name of Mr. Jabez Hughes, was the next toast. In responding, Mr. Hughes briefly reviewed the progress of photography, and the changes it had undergone, as well as the different processes that had been introduced and died out during the period he had been connected with the art. In proposing the toast of the "Society of Arts,"

coupled with the name of Mr. H. Trueman Wood, the Chairman alluded to the great use that Society had been to science and art generally, especially to the interest it had always taken in photography, and that from its members had originated the first photographic society ever formed, namely, the Photographic Society—now the Photographic Society of Great Britain; also that in the rooms of the Society of Arts, over thirty years ago, was held the first photographic exhibition. Mr. Wood, in responding, briefly alluded to the numerous societies which, at different periods, had originated with the Society of Arts, several of which now met at Burlington House. The toast of "Commercial and Permanent Photography," coupled with the names of Messrs. Foxlee, York, and Clark, was drunk, and responded to by those gentlemen. The toast of the "Photographic Press" was duly honoured and responded to by Messrs. Bolas and Greenwood. Mr. Wood next rose, and in feeling terms proposed the health of the Chairman. In doing so he alluded to his own connection with chairmen generally, and mentioned that, in all his extended experience, he had never met with one to surpass the Rev. Mr. Statham; and it was to that gentleman's ability he attributed the great success the South London Photographic Society had achieved. He trusted next year, when the Society entered upon its existence of a quarter of a century, the event would be commemorated with something more substantial than a mere dinner. This toast, as it always is on these occasions, was received with great enthusiasm, and drunk with musical honours. The Chairman, in reply, said it always gave him the greatest possible pleasure to preside over the meetings of the Society, where he always met a number of gentlemen whose friendship he highly esteemed. He regretted, however, that the state of his health occasionally prevented his attendance. The proceedings during the evening were enlivened with songs and recitations, by Messrs. Bridge, Hughes (original song, which we append), Harding, Cowan, Cobb (original "Items"), Spickenell, &c. Mr. Bridge, with his usual ability, presided at the pianoforte. The proceedings were prolonged until a late hour.

THE SPIDER AND THE FLY.

(NEW VERSION.)

"Your portrait in a twink I'll take
In the studio near the sky.
Will you walk up to the studio?"
Said Tout to Passer-by;
It's the prettiest studio,
That ever you did spy.
We've Dallmeyer lens and cam'ra,
We've access'ries all around,
Our plates are quick as lightning,
We've a handsome new background.
Will you, will you, will you, will you,
Walk up Passer-by,
Will you walk up to the studio,
Altho' it's rather high."

"But what's the price for one like this?"
Said doubtful Passer-by;
"I'd like to give to my dear Ciss,
My photo. on the sly."
"Complete like this, in pass partoo,
We'll only charge a bob,
Walk up quick and get it through,
We'll soon knock off the job.
Shall we, shall we, take your portrait,
Dear Passer-by?
It's but a bob to do the job,
In the studio near the sky."

Then up the crooked stairs he went,
Past landings three or four,
And quite intent on portrait bent,
Past just as many more.
At last he stopped to take his breath,
Quite beaten out of puff,
He heard a voice inviting cry—
He thought the voice was gruff—
"Come up, come up, one more stair up,
Come up Passer-by?"

"Your money first!" the gruff man cried,
"It's the way we do it here;
It's but a crown, so dub it down,
I'm sure that that's not dear."
"But, for a shilling I agreed,
With the man down at the door;"
The gruff man frowned, "The man be— [drowned,
I'll have five bob, or more.
Won't you, won't you, pay the money,
Pay your shillings five?
For if you don't, I swear you won't
Go out from here alive."

The gruff man he was big and strong,
The Passer-by was not;
So he paid the crown, and sat him down,
And soon the portrait got.
But, while in dark-room Gruff was gone,
The other did the trick—
He unscrewed the lens from under cloth,
In pocket slipped it quick.
Gruff bowed him out, and down he went—
Downy Passer-by;
For lens and portrait both he'd got,
From studio near the sky.

He quickly found, when he got out,
An uncle that he knew;
"How much?" "Five bob;" then up the [spout
Dallmeyer's lens it flew.
He wrote a letter with these words—
Pawn ticket put inside,
Besides a sketch of thumb to nose,
The fingers opened wide:
"Open wider, your eyes, Spider,
In your web so high;
Or you'll some day catch a Tartar,
When you think you've caught a Fly."

JABEZ HUGHES.

A FEW REMARKS UPON THE PLATINOTYPE PROCESS.

[A communication to the North Staffordshire Photographic Association.]

As the beautiful platinotype process does not appear to have gained much favour amongst the gentlemen who practise photography in this district, perhaps a few remarks upon a method of printing which is capable of such a number of useful and varied applications may prove interesting to those present. As I intend presently to give you a practical demonstration of the method of developing a variety of platinotype prints, I hope some of you will take up the practice of this facile and much admired process.

Most of you well know that salts of iron in the ferric state are by the action of light reduced to the ferrous state. This fact has been taken advantage of by the clever inventor of the platinotype process. The sensitised paper, containing only salts of iron and platinum, is exposed under a negative, as usual in silver printing. It is then floated on a hot solution of potassic oxalate, whereby the salt of platinum is reduced by the ferrous oxalate so formed into the fine state of subdivision known as "platinum black," thus forming an imperishable picture. I say "imperishable," because the resulting pictures can only be destroyed by fire, or by treating them with nitro-hydrochloric acid; so I think you will all acknowledge their permanence as pictures. After development the print is immersed in a weak bath of hydrochloric acid and water until all yellowness has disappeared, and afterwards it is washed in water alone for half-an-hour or so, when it is ready for drying and mounting. In the process of mounting there is no fear of any "cockling" of the print.

Contrast the above simple process with the elaborate treatment required in the case of a silver print. It may, perhaps, be said by some that the colour of platinotype is not to their taste. Well, there is no accounting for the taste of some people, or the country would not be inundated with such a number of coloured daubs; but a photographic revolution may, perhaps, reach even to the Potteries. In the meantime, it is to be hoped that many of our members, fortunately for posterity, may possess some idea of pictorial effect in a photograph; and such I am sure will not suffer the platinotype process to pass by unnoticed. With improvements recently made in this process, the paper prepared by the Platinotype Company gives extremely brilliant prints with pure whites. These pictures, as I have already said, being absolutely permanent, the platinum image is especially suitable as a basis for artistic handwork of all kinds—metallic platinum neither being affected by, nor affecting, any pigment employed.

Besides being applicable to paper the platinotype process can be successfully applied to linen and other fabrics. The image on these substances is capable of enduring any amount of rough treatment, including scrubbing in soap and water.

When I tell my amateur friends that a print in platinum can be taken from a negative in one-third the time of a silver print, and that the subsequent operations are done in "no time;" that an engraving black, as well as a sepia tone, may be obtained; and that if they *wish* a gloss on the print they can procure it by enamelling, it will be their own fault if they produce any more evanescent silver prints. I would also advise those gentlemen who print in carbon, for the sake of permanence only, to discard it in favour of platinum.

Having now said as much as necessary on behalf of a process which I personally much admire, I will try my best to demonstrate the development of a few pictures.

In the first place, it must be remembered that, to ensure success, it is absolutely necessary that the prepared paper be kept perfectly dry. Here is a tube with a kind of box at the end containing calcium chloride. The substance must be occasionally dried on a hot shovel, to free it from the moisture it absorbs. Its purpose is to keep the paper dry by taking up the moisture from the air inside the tube. You will see that this prepared paper is of a yellow colour; you will also notice that in this print, which is ready for development, almost all the detail is visible, and the picture presents a dingy-red appearance in the deep shadows. This denotes that the paper has been about long enough exposed; but of course a little experience is necessary to judge the proper depth requisite from different negatives.

A *good* negative is the first desideratum. A negative, be it collodion or gelatine, which will yield a rich silver print will do credit to platinotype. Of gelatine negatives preference must be given to one developed with ferrous oxalate or sulpho-pyrogallol; ordinary alkaline pyro. will do, provided the film be not stained or fogged. It is useless to employ a yellow, foggy thing, such as some workers yet turn out as specimens of dry plate work, and, using them to produce platinotype prints, blame the process and not the negative, because of their resulting "mud washes." Use a *good* negative and you will get good results in platinum. Some of you have a number of wet plate negatives: select a good one, and a print from it by this process will please you. The discoloured, weak, and miserably thin negatives produced by some persons have done harm to this process; because, although giving almost passable silver prints, they are useless for anything else, unless it be a dose of hot solution of caustic potash, so that the glass may be used again.

I have here an enamelled iron dish containing a solution of potassic oxalate, 130 grains to the ounce. I heat this until the thermometer denotes 170° Fahr. See that no particles or crystals are floating on the bath; then draw over the hot solution the undeveloped print. You see it comes out instantly. By varying the temperature of the bath, any corrections in over- or under-exposure may be made. Here is a print obviously over-exposed. Allow the temperature to drop a few degrees, and here we have a successful picture. I now add a portion of this solution to the bath. Here is a differently prepared paper, and hence—a sepia-tinted picture.

I will now conclude by submitting to you a few examples of the process, hoping that I myself, and my friend Mr. Burgess, may not be long alone among you as platinotypists. W. B. ALLISON.

ON THE PRODUCTION OF LANTERN TRANSPARENCIES.

[A communication to the Dundee and East of Scotland Photographic Association.]

WITHIN the last few years the magic lantern, formerly regarded as a toy fit only for the amusement of children, has become a very important

aid to education. At nearly every lecture on astronomy, physiology, and the other sister sciences the lantern is called into request, and its utility in showing diagrams and pictures to large audiences is being widely taken advantage of.

The fearful coloured daubs, formerly so much in request, have almost entirely vanished, and their place is filled by photographic transparencies. Until photography was employed for this purpose, the price of really artistic hand-painted slides was enormous; and this alone was quite enough to prevent the magic lantern coming into popular favour. Now, however, we can condense square miles of land, sky, and sea into the small compass of three square inches, and at the same time be perfectly certain that every detail—even the very smallest—will be rendered with a fidelity to nature which not even the greatest artist could equal, not to say excel. Before entering into the details of my subject, I must ask your pardon for going into a few details which some of you may think unnecessary; but there are others who have not taken up the subject at all, and it is for them that these commonplace details are intended.

You are aware that there are two methods of producing slides—(1) by superposition or printing; and (2) by reduction. If the negatives are quarter-plate, or even 5 × 4, they will most easily be done by the first method; but all sizes above these will have to be reduced. Of course it is possible to take a little bit out of a large negative, but slides produced in this are seldom in good perspective, as there is no foreground. To make slides by printing, therefore, the negative is put into a printing-frame, the sensitive plate placed face downwards on it, the frame closed, and the exposure made. For development the usual pyrogallic acid developer with sodic sulphite may be used; but, as there is always a difficulty in getting the high lights pure, it is better to employ the ferrous oxalate developer. I find that the following proportions answer exceedingly well for transparencies:—

Protosulphate of iron..1 ounce.		Oxalate of potassium..	4 ounces.
Water ....5 ounces.		Bromide ,, ..	20 grains.
		Water	20 ounces.
1 part	to		4 parts.

After development the plate should be very thoroughly washed and fixed in a fresh solution of hypo. After again washing a five minutes' immersion in the following solution has a great influence in rendering the film clear and brilliant:—

Alum	1 ounce.
Citric acid	½ ,,
Water	8 ounces.

The plate is then washed in running water for five or six hours. If one of the usual makes of gelatine plates have been employed the transparency will generally be found to be of a cold, blue tone. The gold solution used for toning prints has not the slightest effect on gelatine plates, and I have found that treatment with mercury is the most suitable method of giving them an agreeable, warm colour. An immersion in the following solution—

Bichloride of mercury......................	20 grains,
Chloride of ammonium	20 ,,
Water....................................	8 ounces,

followed by thorough washing and then treating with dilute ammonia, will improve the tone very considerably.

Of the usual make of gelatine plates the "Britannia" are perhaps as good as any. They are moderately quick and give very clear glass, but still they leave something to be desired. The dry collodion plates made by Messrs. W. W. Rouch and Co. gave satisfaction, their only drawback being that the shadows are far too heavy and they were also expensive, quarter-plates costing 4s. per dozen. They were developed with pyro. and ammonium carbonate; but they had also too cold a tone. It was only this year that a really suitable plate was brought into the market. I refer to Chapman's Manchester gelatine and albumen plates. These plates are very thinly coated with emulsion, so that there is no fear of hardness, and the albumen in them gives an agreeable, warm tone, very like the much-admired French slides which are produced by an albumen process. I find that an exposure of thirty seconds at three feet distance from an ordinary gas flame is generally sufficient; but this will, of course, vary with the quality of the negative. The ferrous oxalate developer is used, and the treatment is just the same as that given above. When these plates are treated with mercury and ammonia the tone is all that could be desired; and, though some contend that a plate intensified with mercury will fade, yet I have not found this to be the case.

With negatives the chance of fading would be serious indeed; but slides can be easily reproduced, and I should rather have "a thing of beauty" for a year or two than a thing of ugliness for ever. I think, however, that if the plates are thoroughly washed, both before and after intensification, there is little danger of this happening.

We shall now pass to the other method of producing slides, namely, by reduction. For this purpose a box is made having one end open; in the other a hole is cut to carry the negative. This having been inserted, the box is directed against the sky. It is very important that there be no object in the way, such as trees or houses, as they would show in the transparency. The camera having been adjusted to the proper distance, so as to get the image the right size, a small stop is inserted and the exposure given, the development being effected in the same manner as for printing. I may mention one point of the utmost importance, and that is how to get the sky clear. If there be the slightest deposit on the sky the effect is marred, except, of course, in the case of there being suitable clouds on the negative; but I prefer to do without clouds in most cases, as the illumination of the picture on the screen is greatly enhanced by a clear sky.

For the purpose of blocking out skies I employ a mixture of burnt sienna, glycerine, and water applied with a small brush to the back of the negative. Black varnish may also be used; but it is very difficult to remove, while the other mixture is easily taken off with water. A coating of varnish greatly helps to clear the picture, which should then be mounted with another thin piece of glass and edged with black paper.

D. Ireland, Jun.

Our Editorial Table.

Die modernen Lichtpaus Verfahren zur Herstellung exacter Copien nach Zeichnungen, Schriften, Stichen, etc. Zweite sehr vermehrte Auflage.

Düsseldorf:—Ed. Liesegang's Verlag, 1884.

In the preface to this, the second, edition of an interesting work from Dr. E. Liesegang's library on modern lichtpaus processes—which, as is stated on the title-page, has been much added to since the issue of the first edition—it is mentioned that since the death of the original compiler, Herr Fritz Haugk, a new edition has been called for, and that the development of those processes in which salts of iron form the sensitive compounds has been so important that an entirely new work upon the subject is found to be necessary.

In addition to a thorough and exact description of the process—which by direct printing gives, like the original, dark lines upon a white ground—there are introduced in the present work some description of the chromic acid processes and more detailed accounts of various methods of producing impressions on the wood block for the engraver.

By "lichtpaus" it is explained that these processes are referred to which give in the readiest manner, and by the employment of substances sensitive to light, exact representations of a drawing or the like in cases where no very great number of copies is required. Where a large number of impressions is wanted—say over fifty copies—some one of the photo-mechanical processes (albertype, photolithography, &c.) is cheaper. These processes, however, require a special installation, presses, &c., which for lichtpaus are not required. The early photographic methods, before the discovery of a substance sufficiently sensitive to light to be employed in the camera, where lace and similar articles were copied by being laid upon silvered leather and paper, were essentially "lichtpaus" processes.

Of special service in engineers', architects', and similar offices, where it is wanted quickly and at small expense to make copies the exactitude of which is assured, the present work should find a welcome reception amongst those for whom it is particularly intended.

The processes mainly treated of in the former work were those in which salts of silver play a part, and these are given in the present edition. These processes it is not necessary to refer to here further than to note the remark that whilst for the iron processes it is essential that the lines of the original should be absolutely opaque, silvered paper will give a useful result in cases where the lines are weak and no success could be obtained with iron salts. The most interesting chapters are those which treat of the iron processes, and particularly of that modification in which the image is at once produced like the original—in dark lines upon a white ground. Specimen prints both of this method, and of that in which the dark lines of the original are represented as white in the copy, are given as a frontispiece.

Those methods are first described which give white lines upon a dark ground. In these red prussiate of potash is employed, and citrate, chloride, &c., of iron according to the particular process. In connection with these processes, not only are formulæ given, but a machine for preparing paper is described by letterpress and woodcuts. Following this is an account of the processes in which yellow prussiate of potash takes an important part. These are specially interesting, as being those which give dark lines upon a white ground. Similarly, the method with iron and gallic acid, giving also dark lines and of a dark violet colour, will be found to be well worthy of attention.

Following these processes is a slight description of papyrography—a variety of zincography. The Willis's aniline process comes in for attention, and, finally, the production of photographic impressions upon wood for the use of the engraver has several pages devoted to it.

Altogether we can commend this work to those who are disposed to study processes which are of great interest, but which have not received so much general attention as their intrinsic merit deserves.

RECENT PATENTS.

FRENCH PATENTS.

No. 151,097.—"Photo. Dyes." Lémary, Paris.—*Dated March* 27, 1883.

NOTICE TO PROCEED.

No. 5,244.—"Improvement in Apparatus to Produce Intense White Light." Charles Denton Abel.—*Dated November* 5, 1883.

No. 3,806.—"Improvements in Apparatus for Printing from Engraved Plates." John Henry Johnson.—*Dated August* 3, 1883.

PATENTS LAPSED.

No. 4,949.—"Improvements in Producing Printed Representations of Photographs, and Means therefor." James Dredge. — *Dated November* 27, 1880.

No. 4,922.—"Improved Method of Producing Copies of Drawings or Engravings." Edmund Edwards.—*Dated November* 26, 1880.

PATENT APPLIED FOR.

No. 5,681.—"Improvements in, and Relating to, Colour Printing; also partly applicable for Producing Coloured Photographs and for similar purposes." W. R. Lake; communicated by A. Bisson.—*Dated December* 8, 1883.

ENAMELLING WATER COLOUR OR OIL PHOTOGRAPHS.

The following specification, that of Mr. George Robey, of 5, Chancery Lane, London—and which received only provisional protection—has been published during the week:—

My invention has for its object a new or improved process of enamelling water colour or oil photographs.

The process is as follows:—

A polished glass plate is first prepared with powdered talc and then coated with collodion and allowed to dry; this being effected the plate is then immersed in cold water.

The print is saturated in a solution of gelatine and chrome alum and brought into connection with the collodion on the glass plate and then allowed to dry, after which the paper on the back of the photograph is removed by means of powdered pumice. The whole is then coated with castor oil, which has the effect of making it perfectly transparent; and, finally, the whole is coated with benzole in order to remove the grease and colour applied to it.

The photograph is then stripped from the glass and mounted in the usual way, the result being a beautifully-enamelled surface. This improved mode of enamelling has a great advantage over the present method of cristoleum, inasmuch as it entirely does away with the glass front.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 20 ..	London and Provincial	Masons' Hall, Basinghall-street.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

At the ordinary meeting of this Society, held on Tuesday, the 11th instant, Mr. J. Glaisher, F.R.S., President, occupied the chair.

The adjourned discussion on Mr. Jabez Hughes's paper on *Thirty Years of Photographic Progress: How it has been Secured and how it may be Maintained* was resumed.

Colonel Stuart Wortley said that the title and the paper together reminded him of the story that in a certain work in natural history the crab was described as a red fish which walked backwards. This definition was admitted by scientific authority to be correct, with the exception that the crab was not a fish, was not red, and did not generally walk backwards. The paper before the meeting did not tell them how photographic progress had been secured, and did not explain how it could be maintained. It would be difficult to give an entire list of the processes and names that had been passed over in Mr. Hughes's paper, but he might refer among processes to the Woodburytype, autotype, and platinotype; and among the names of workers in the field of photographic progress certainly the name of Mr. Russell Manners Gordon ought not to have been passed over with only the reference as a matter of wonder to the interest formerly displayed in such things as the gum-gallic process.

Mr. T. Sebastian Davis said that a history of photographic progress for the last thirty years ought to include mention of the fact that, whereas in all the older processes of photography, except daguerreotype, the development was due to the reduction of nitrate of silver by one of the reducing agents—sulphate of iron or pyrogallic acid (sulphate of iron being already known in chemistry as a reducing agent). Major Russell had introduced a new element of success in the discovery that the haloid affected by light could be itself successfully reduced by alkaline pyro. He further thought that it was very courageous of Mr. Hughes to speak of collodion as a process passing away. The negatives of enlargements which were shown at the recent exhibition were nearly, if not all, produced by the collodion process, which process was also found more sensitive to a complete scale of gradations than the gelatine, and, therefore, more fit for such purposes as lantern transparencies. Another reason why it was better adapted for the latter purpose was the greater clearness and purity of the transparent parts, and the superiority of its gradations gave it an advantage in rendering delicate shades in distances better than could be obtained with gelatine in its best form. Best of all in these respects was the old albumen dry process. For all still-life subjects he believed better results could be obtained with collodion than with gelatine. Reference had been made to gum-gallic plates. The principal drawback to this process was that at first plates did not keep, but by the use of a final wash of gallic acid which he (Mr. Davis) had introduced, this objection had been removed. The keeping property of gelatine plates was one great reason why they had been so generally adopted.

Mr. W. E. Debenham said that Mr. Hughes had spoken with satisfaction of the Society's *Journal* as being the only non-commercial one. He would like to know in what sense it was considered to be non-commercial. There was a price printed upon it; therefore it was to be supposed that some copies were sold. There were a few advertisements, for which it was to be presumed payment was received. Was it non-commercial only in the sense that it did not pay? and, if so, would it not be worth while considering whether it might not to some extent regain the commercial position it enjoyed when it was looked to for the information it contained—when it was so extensively purchased as to be a source of profit instead of loss to the Society?

Mr. J. Spiller recognised in the paper a bold attempt to place on record the progress of the last thirty years. Mention had been made of the avowedly permanent processes as not involving the development of a latent image. To this he must take exception. The platinotype was a permanent process, in which the latent image was brought out by development. As to what Mr. Debenham had said he differed from him, and gloried that the Society's *Journal* was a non-commercial one.

Mr. W. Peek thought, with reference to what had been said about the *Journal*, that it would be more interesting and sought after if the members would write articles for it instead of sending them to the weekly journals. As it was, there was scarcely anything in it but the reports of the meetings of the Society and a few extracts from foreign papers.

Colonel Wortley wished to add to what he had said that he thought the name of the late Mr. T. Sutton, of Jersey, ought not to be passed over.

Mr. Hughes replied that he had not expected such a discussion to take place as he was pleased to find had arisen. He was glad that when a member dissented from a paper that was read he should have the courage, as Colonel Wortley had, to say so. It was too much the habit to listen to papers, to say nothing in public, but afterwards in private groups to describe them as "bosh." Much that might be challenged in papers passed into history as the voice of the Society, simply from the silence of the members who held opinions different from those contained in the papers. Colonel Wortley had hit upon the weak point of the paper; but it should be remembered that he (Mr. Hughes) did not profess to exhaust the subject of thirty years' progress in one communication. He professed to leave the subject of photographic technics as not coming within the view he had proposed to himself. He rejoiced to see in the present state of photography a fulfilment of what seemed like a prophecy of Sir John Herschel's—that, "*coûte que coûte*," the use of iodide of silver must give way to that of bromide, on account of the superior range possessed by the latter agent. The progress of photography was shown by the fact that it was now almost as indispensable to the community at large as the other products of scientific research. Mr. Davis had spoken of the superiority of the definition of gelatine over collodion, and of albumen over collodion. He would go further, and say that the older process styled "daguerreotype" was superior in definition to all others, and in that sense it would seem as if we had been making progress backwards. He fully recognised the great services to photography of Major Russell, whom he would class with Fox Talbot and Daguerre. As to the Society's *Journal*, it was not started for profit. There was a time when it did pay; now that it did not pay it was kept up for the satisfaction of the Society. If a commercial journal did not pay it was discontinued; but the Society's *Journal*, being kept up whether it paid or not, was a non-commercial one. There was formerly a distinction between amateur and professional photographers. The amateurs in years gone by worked calotype and the professionals daguerreotype. Now they stood on one common ground and all worked gelatine. From this union of experiences into one common stock more progress might be expected. There were, however, no barriers between amateurs and professional photographers, and many of the latter were also ardent amateurs in the love they had for the art and the manner in which they gave up their time to experiments and joining in the work of the Society. There was in this country no professional photographic society and no amateur photographic society; all members worked together.

The usual vote of thanks was given to Mr. Hughes for his paper, and the Chairman introduced

Mr. Pancoast, of the Philadelphia Photographic Society, who said that any of the members of the Photographic Society of Great Britain who might be in Philadelphia would be heartily welcomed by the Society of that city. He referred to a practice, which he deprecated, as existing in America of purchasing plates, exposing them, and sending them to a photographer to be developed and printed. Now and then a good picture resulted, for which the person who uncapped the lens took all the credit.

The following gentlemen were elected members of the Society:—Messrs. W. Adkins, W. M. Bywater, H. H. Cunningham, H. F. Godbold, F. Greene, J. B. Scott, A. Wilkinson, and J. J. Varley.

It was announced that, according to the rules of the Society, the following officers would retire at the annual meeting:—The President, one of the Vice-

Presidents (Captain Abney), the Treasurer (Mr. W. S. Bird), and six members of the Council (Messrs. F. Bedford, W. B. Bolton, J. H. Dallmeyer, L. Darwin, W. England, and P. Mawdsley); and that nominations for election for these offices must be received not later than the 21st of January.

The next technical meeting takes place on Tuesday next, the 18th instant, and the next ordinary meeting on the second Tuesday in January.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

The annual general meeting of the above Society was held at the House of the Society of Arts, John-street, Adelphi, W.C., on Thursday evening, the 6th instant,—the Rev. F. F. Statham, M.A., President, in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. W. M. Ashman, T. J. Collins, Henry H. Bashaw, and Wilson Noble were elected members of the Society.

The Secretary then read the annual report and the balance sheet, the latter showing a balance in hand of £10 15s. 3d., after paying all claims. Messrs. A. L. Henderson and W. Ackland were appointed auditors.

On the motion of Mr. Jabez Hughes, seconded by Mr. Wm. Brooks, the report was adopted and entered as read.

The Chairman proposed that a hearty vote of thanks be accorded to Mr. F. A. Bridge, the hon. treasurer, for having kept the accounts in such a favourable condition, which was carried unanimously.

Mr. F. A. Bridge called attention to a notice on the paper of a motion brought forward by Mr. W. M. Ayres at the last meeting, as follows:—1. That that there shall be six vice-presidents—two to retire annually, and not be eligible for re-election for one year. 2. That the committee shall consist of twelve members—four to retire annually, and not be eligible for re-election for one year.

The motion was now seconded by Mr. Harrison, and an animated discussion took place, during which

Mr. Jabez Hughes drew attention to the fact that, as under the present arrangements all the officers retired annually, the object of Mr. Ayres' motion, which was to bring "new blood" into the executive, was thus accomplished.—The motion was lost.

The voting papers being handed round, and Messrs. Mackay and King appointed scrutineers, the following officers were then elected:—*President:* Rev. F. F. Statham, M.A.—*Vice-Presidents:* Messrs. W. Brooks, E. Cocking, F. Howard, Jabez Hughes, H. Trueman Wood, and F. York.—*Committee:* Messrs. W. Ackland, T. Bolas, W. Cobb, A. Cowan, E. Dunmore, E. W. Foxlee, J. Nesbit, and H. Wilmer.—*Hon. Secretary and Treasurer:* Mr. F. A. Bridge.

On the motion of Mr. Harrison, seconded by Mr. Poirson, a vote of thanks was accorded to the officers for the past year.

Mr. T. Bolas proposed a vote of thanks to the Society of Arts, coupled with the name of Mr. H. Trueman Wood, for the use of their room and other services rendered to the Society.

Mr. Jabez Hughes, in seconding the proposition, remarked that photographic societies had arisen under the wing of the Society of Arts, and had had its support and best wishes.

The proposition was enthusiastically responded to.

Mr. H. Trueman Wood, in returning thanks on behalf of the Society of Arts and himself, said that if he had known this vote of thanks was going to be passed, he wonld have delayed his arrival until a little later. He knew it was a great source of gratification to his Council to be able to assist the South London Photographic Society. As for himself, he felt there was little credit due to him, as he was only a dabbler in photography; and upon each occasion he attended the meetings he derived some benefit from being present, as he had the opportunity of learning something.

The result of the artistic competitions for November were then announced, Mr. E. Dunmore being the successful competitor in each instance, namely, landscape: *A Village Church;* and figure: *Out in the Cold.*

The subjects for competition during January and February were drawn in the usual way, the result being, for January, landscape: *A Winter Scene;* figure: *Waiting.* For February, landscape: *The Thames;* figure: *Rustic.*

Mr. C. Ray Woods read a paper entitled *On Photography and Solar Eclipses.* [See page 758.] At its conclusion,

The Chairman said he thought the highest praise possible had already been accorded to Mr. Woods by the profound attention and silence with which all present had listened to his observations. He thought that all photographers might feel proud of a fact summed up in one of Mr. Woods' remarks, namely, that photography in connection with astronomy had surpassed all that had been previously achieved in astronomical observations, in giving permanent results which might afterwards be examined at leisure. He would like to ask Mr. Woods one question, and that was whether during their observations they had noticed the phenomenon known as "Bailey's beads."

Mr. Woods replied that he had not himself witnessed this phenomenon, but he believed its appearance was due to the inequalities of the surface of the moon.

Mr. W. Brooks said he did not pretend to know anything about astronomical photography, but he would relate an incident that occurred in his experience of an eclipse some sixteen or seventeen years ago. He was at that time photographing some Druidical remains on one of the Cornish hills, being quite unaware that an eclipse was taking place. The light began to fail, and gradually became very dark, till at last everything in the landscape appeared of a neutral violet tint. Just while this darkness was passing over he was exposing a plate, and as he was giving something like three minutes with an open lens, they might judge how dark it was. During the exposure the clouds suddenly cleared away, the sun shining right into the lens, and he then discovered that it was an eclipse. On washing the plate he noticed a very remarkable circumstance—the negative had a strong indication of colour throughout the whole landscape, the grass having a greenish colour, the stones grey, &c.

In answer to a question,

Mr. Brooks said the picture was taken on a wet plate.

A vote of thanks was passed to Mr. Ray Woods for his paper.

Mr. F. York, referring to a camera shown by Mr. Watson at the technical meeting, with a double swing-back, said that he did not consider a swing-back at all necessary in cameras, and was surprised to find that his opinion to this effect had been pooh-poohed at the technical meeting. He exhibited a camera without a swing-back, which he had used for more than twenty years for architectural and other subjects, and he considered its advantages were quite equal to those of the swing-back. He passed round some prints of well-known buildings in London taken with this camera, which were pronounced to be very fine.

Mr. Trueman Wood argued that the work could have been just as well, or better, done by using a swing-back, and he did not see what were the disadvantages Mr. York hinted at in connection with a swing-back.

Mr. York replied that the chief disadvantage of a swing-back camera was its liability to be knocked over.

Mr. Brooks remarked that several of Mr. York's pictures had evidently been taken from an elevation, and he did not think he could have got them from the ground without using a swing-back.

Mr. Bridge said he had had some subjects to photograph in Holland which he should very much have liked to see Mr. York try with his arrangement of camera.

Mr. F. W. Hart showed another method of working without the swing-back.

The lantern meeting of the Society was announced to take place on the 3rd January, and Mr. Brooks said, in connection with the same, that he would be in attendance in the room all the afternoon before the exhibition, so that should any intending exhibitor have slides of the suitability of which he had any doubt, if he brought them during the afternoon he (Mr. Brooks) would be glad to give his advice respecting them.

The meeting was then adjourned.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on Thursday, the 6th instant, the chair was occupied by Mr. J. J. Briginshaw.

Mr. Cooke produced a Spanish bank note, which, to the eye, showed nothing remarkable. A photograph of it, however, exhibited the words—"Anti-Photographic Bank Note Printing." This was caused by a design being printed in a yellowish colour, which was hidden to the eye by the blue colour of the printing of the note itself.

A question was read from the box—"Why does paper sensitised on the nitrate of silver bath refuse to tone if kept for a week or more?"

Mr. W. E. Debenham said that the refusal to tone came on together with the condition in which the paper was spoilt by discolouration.

Mr. J. B. B. Wellington remarked that he had tried the plan recommended by Mr. Debenham of glazing his dark-room window with green glass and yellow paper. The glass which he had obtained was somewhat deeper in colour than Mr. Debenham's, and he found that he could work safely with only one thickness of glass and two of paper for daylight, and one each of glass and paper for the lantern for coating. The light to the eye was ample, and a very great improvement on what he had been accustomed to when using red light.

Mr. A. Haddon asked how Mr. Debenham would account for leaves of trees making impressions in the camera if green light was so inactive in the dark room.

Mr. Debenham replied that the light he recommended for the dark room was passed through yellow paper as well as green glass. Leaves of trees reflected a good deal of white light as well as green.

Mr. Haddon said that if green leaves acted in the camera by the white light which they reflected, why did they not come out on iodide plates as on bromide?

Mr. Debenham thought that the reason they were generally represented better on gelatino-bromide than they were on collodion plates was that the bromide process being so much quicker there was less tendency to under-expose than formerly. There had, however, been many collodion negatives taken in which green leaves came out beautifully. Mr. J. R. Sawyer had, during the past summer, exhibited a sheet of a set of ribbons of various colours, and the colours had come out in the same relative strength when photographed by the gelatino-bromide process and by a collodion plate containing iodide with the usual small percentage of bromide.

Mr. A. L. Henderson said that he had recently tried the paper called "canary medium," having first oiled it. In this state the green appeared to be all taken out of it, and the light was very unsafe. He showed plates with distinct markings upon them which had been produced by short exposure to the light through this greased paper, with and without the addition of a ruby glass.

Messrs. J. Cowdery, H. Francis, and F. H. Darker, were elected members.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

The third ordinary meeting of the session was held in Lamb's Hotel, Dundee, on Thursday, the 6th inst. There were over sixty members present.

It was agreed to rent a room in Reform-street, to be used as a dark room, for the convenience of members who might not have sufficient accommodation at home. Mr. J. C. Cox, the President, has undertaken to get all the necessary sinks, water and gas connections put up at his own expense. It was decided to make a small charge to each member using the room.

Mr. D. Ireland, jun. (the Hon. Secretary) then read a paper *On the Production of Lantern Transparencies* [see page 766], which he illustrated by means of a number of slides prepared by the different processes.

The members having been invited to bring slides for exhibition and discussion, several gentlemen complied with the request, and a large number of pictures were shown by the aid of the Society's new lime-light lanterns.

It was intimated that Mr. Alexander Simpson, Newport, had been the successful competitor in the competition for "Sky," and Mr. D. Ireland, Jun., for the November one, "Reflection." The subject for December and January is "Snow Scene."

NORTH STAFFORDSHIRE PHOTOGRAPHIC ASSOCIATION.

A MEETING of this Society was held on Thursday, the 6th instant, in the Town Hall, Hanley,—Mr. R. E. Burgess in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. Haigh was elected a member of the association.

On the proposition of Mr. HAMPTON, Mr. Alfieri was requested to kindly contribute some lantern slides from his stereoscopic collodion negatives illustrative of "The Potter's Art."

Mr. COTTER exhibited some nice transparencies, made by contact, upon the Derby Company's lantern plates.

The CHAIRMAN then called upon Mr. W. B. Allison (Hon. Secretary), to read a paper, entitled *A Few Remarks Upon the Platinotype Process.* [See page 760.]

The paper was listened to attentively, and the prints exhibited were much admired. The simplicity of the process was remarked upon, and several members stated their determination to give the process a trial, and procure licenses from the company.

A vote of thanks was passed to Mr. Allison. After some interesting discussion upon the process, the meeting was adjourned.

It was agreed to have at the next meeting a demonstration of the method of enlarging upon argentic paper and opal, the Honorary Secretary undertaking the arrangements for the same.

BOLTON PHOTOGRAPHIC SOCIETY.

A MEETING of this Society was held on Thursday evening, the 6th inst.,—Mr. E. N. Ashworth in the chair.

The Rev. J. W. Cundy, and Messrs. T. H. Thwaites, Benjamin Abbatt, Fredk. Abbatt, R. Mercer, Jas. Jackson, W. H. Collins, — Laithwaite, and Geo. Paton were elected members of the Society.

In order to make the Society as useful to the younger members as possible, it has been decided to give practical demonstrations of the processes of photography. Mr. Thomas Parkinson gave the first of these lectures at this meeting, selecting for his subject—*Toning Silver Prints.*

Mr. WM. BANKS then gave a short lantern exhibition of transparencies by Mr. J. W. Cundy, Mr. C. K. Dalton, and others. Mr. Banks also exhibited and explained a new five-wick lantern, which may be employed either for opaque objects or for transparencies in the usual way; but, owing to the lateness of the hour, it was not used.

The meeting was held in one of the class-rooms of the Mawdsley-street Board School, which, although more convenient of access, was not considered so suitable as the Society's former room at the Baths.

A cordial vote of thanks to the chairman, Mr. T. Parkinson, and to Mr. W. Banks, brought the meeting to a close.

BERLIN ASSOCIATION FOR THE CULTIVATION OF PHOTOGRAPHY.

THIS Association met on the 16th ult., when the chair was taken by Professor H. W. Vogel.

The principal subject before the meeting was a circular from the German Photographic Society intimating its intention of holding the annual meeting in August of next year, at Berlin, and proposing to combine that meeting with an international photographic exhibition, in which project it hoped to have the co-operation of the different photographic societies in Berlin.

The meeting expressed itself on the whole not unfavourable to such an exhibition, but thought it rather strange that the German Photographic Society had not communicated with the photographic societies domiciled in Berlin before determining to hold an exhibition. In 1875 the Berlin Association thought of getting up an exhibition at Berlin, but the great international exhibition of Vienna had come in the way and it was indefinitely postponed. The Association might now be willing to take part in such an undertaking, but only on condition of having a considerably greater share in the management of it than seemed to be offered by the German Society. Then there was the difficulty of getting a suitable hall for the exhibition at a moderate price. The exhibition of 1864, which Herr Beyrich and Dr. Vogel had been mainly instrumental in getting up, had proved financially a loss to the Society on account of the high rent paid for the hall and the limited number of persons who visited it. Then the German Photographic Society seemed to forget that in a city such as Berlin the exhibition must be of a much higher class in order to be attractive that was required for an annual meeting held in some provincial town.

A resolution embodying the foregoing remarks having been forwarded to the German Photographic Society, a reply was subsequently received to the effect that it still adhered to its original plan of combining an exhibition with its visit to Berlin regardless of whethr it obtained the co-operation of the Berlin societies or not.

The CHAIRMAN read a letter from Herr Scamoni, of St. Petersburg, which had followed him to Salt Lake City and back again to Berlin, in which he said that he took the opportunity of a friend who was going from St. Petersburg to Berlin to send a few specimens of Russian photography to show that they were not so far behind in that country as most people supposed. The pictures sent were mostly taken by Herr Schapiro, and consisted of a series of portraits illustrative of the memoirs of a madman, several fancy portraits, &c.

A Pearsall camera was then shown and some photographs by Sarony—amongst others a portrait of Miss Mary Anderson. This concluded the business of the evening, after which the meeting was adjourned.

Correspondence.

DECEMBER MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—PRESENTATION OF INSTANTANEOUS PROOFS.—M. GUERRY'S NEW SHUTTER.—M. FRANÇAIS' NEW SHUTTER.—PRESENTATION OF PROOFS ON SILK.—BALLOON PHOTOGRAPHY.—M. LÉON VIDAL'S MODIFICATION OF WARNERKE'S ACTINOMETER.

THE December meeting of the Photographic Society of France was held on Friday last, the 7th instant,—M. Davanne in the chair. This evening might justly be called the evening of instantaneous proofs and rapid shutters.

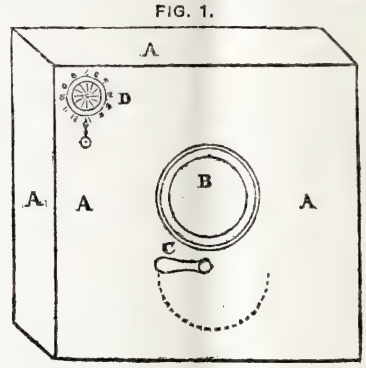
MM. Audra, Hickel, Français, &c., exhibited some very fine specimens of objects in motion.

M. Guerry presented a new shutter, or it might be called a combined shutter, as behind the instantaneous shutter is placed a screen which can be opened and closed slowly or rapidly at the will of the operator; in fact, both are worked by the same pneumatic ball. The instantaneous shutter is exactly like that of Mr. Noton, having square openings in the centre, &c. [See THE BRITISH JOURNAL OF PHOTOGRAPHY for 1879, page 555.] It differs only in the fact that, instead of a steel spring being used as a motive power, two india-rubber springs are employed to pull back the two sliding plates. These being in duplicate, and moving in contrary directions, balance each other, and, therefore, no shock can be felt except when exposure is completed.

I will not discuss the value of the central opening, proposed by M. H. L. Bundy, put into working shape by Mr. Noton, copied by two or three other persons, and which idea has now been revived on the continent. I can only say that M. Guerry has made a very compact and convenient little instrument, which does him credit; in fact, he is well known here as a manufacturer of rapid shutters which, for the studio, leave nothing to be desired.

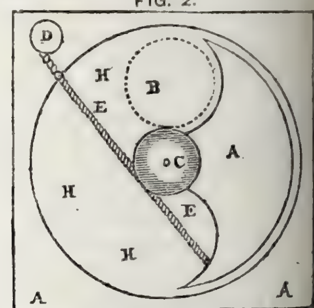
M. Français, the well-known optician, presented a new and novel rapid shutter intended to be placed in the centre of the lens or behind

FIG. 1.



FRONT VIEW.
A A A A, wooden box. B, lens. C, handle of revolving disc. D, knob or ratchet catch to differ exposure by tightening or loosening spring.

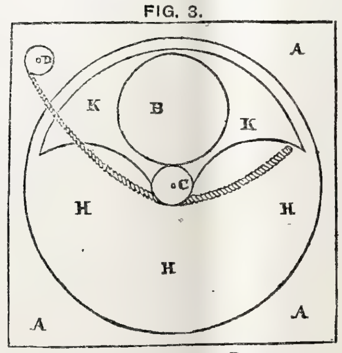
FIG. 2.



INSIDE VIEW, SHOWING APPARATUS WHEN AT REST.
A A A, inside view of wooden box. B, lens. C, groved wheel placed upon an axis. D, ratchet wheel. E E, strong steel spring. H H H, ebonite disc. K, hole in ebonite disc.

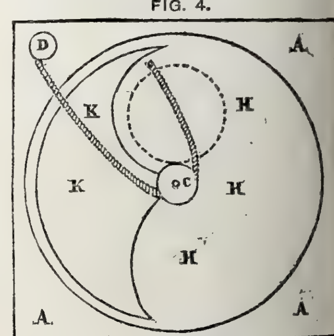
it, at will. It has not been patented, and as it is very simple in its construction, peradventure some one would like to try and make it. I

FIG. 3.



INSIDE VIEW, SHOWING POSITION OF DISC WHEN ABOUT TO FOCUS.

FIG. 4.



INSIDE VIEW, SHOWING POSITION OF DISC AND SPRING WHEN READY TO OPERATE.

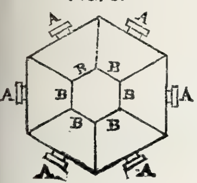
give diagrams in order that that end may be accomplished without great difficulty. *Fig.* 1 shows the front of the rapid shutter. *Figs.* 2, 3, and 4 the interior, with the different positions of the revolving disc and spring.

M. Larger presented some very fine specimens of photographic printing upon silk. As this process is known and worked in England I need not enlarge upon its value. It appears that the silk is sold ready sensitised in the market.

M. David drew the attention of the members, as well as the makers of photographic cameras, to the great advantage of employing celluloid in the manufacture of dark frames and slides.

M. Triboulet gave a description of the photographic apparatus with which he endeavours to take panoramic views from a captive balloon. The balloon is let up into the air and held in its position by a chain or wire rope. The apparatus is suspended from the car, and consists of a sexagon camera (*fig.* 5) containing six lenses having a fixed focus.

FIG. 5.



A, six lenses. B, six sensitised plates.

An electric communication is maintained from the earth by means of the wire rope. When all is ready—that is to say, the six dry plates in the slides and the instantaneous shutters in readiness—the balloon is allowed to rise in the air, and when at a given height the electric battery is set to work the six shutters open and close at once—the plates are exposed. The balloon is then pulled down, and the images developed, which, when pasted side by side, give a panoramic view of the surrounding district. If a ground plan be required another camera is placed so that the lens can take the view under the balloon. A specimen was exhibited of work done, but it did not appear to many of us that the balloon was very high in the air when the proofs were obtained, therefore a doubt arose in the minds of some as to their authenticity.

M. Léon Vidal made a communication in connection with a new idea as to the construction of an optical photometer. He had purchased the new actinometer of Mr. L. Warnerke, which is fully described in THE BRITISH JOURNAL OF PHOTOGRAPHY of 1880, page 53. In working with it he thought it could be simplified by doing away with the phosphorescent substance and using daylight instead. M. Vidal began by intensifying the series of circular discs of increasing opacity, by pasting upon them a film of dioptric paper—on No. 1 a single film, and increasing every number, until the last (No. 20) had a covering of twenty pieces of paper. Moreover, a piece of semi-transparent paper was pasted over the the hole or opening in the partition C. When it is necessary to make an observation, as in Mr. Warnerke's instrument, the lid D is closed and the eye is placed in the funnel E of the telescope. The figure is focussed sharply. The operator begins with No. 1. As the tube or box H can be revolved on acting on its rim, it is turned to No. 2, and so on. Consecutive numbers will then be seen through the telescope. But as the numbers get higher the light will diminish in intensity, till at last one is reached which can hardly be distinguished. This number must be taken to represent the intensity of light at that moment. Supposing that No. 15 can barely be seen, and the next day being a foggy one, No. 6 can only be observed. The following day being a very bright one, the reading can go to No. 19. The difference of light between Nos. 6, 15, and 19 can thus be got at by a compensating table like Mr. Warnerke's sensitometer discs. Whether this idea of applying Mr. Warnerke's instrument in the above manner will suffice time must prove.

25, *Rue des Apennins, Paris*, E. STEBBING., *Prof.*
December 11, 1883.

ISOCHROMATIC PLATES.

To the EDITORS.

GENTLEMEN,—In a paper recently read by me before the Photographic Society of Ireland, on *Isochromatic Plates*, and which appeared in this Journal, page 688, I stated these plates had been only very moderately successful in my hands. In fairness to the patentees, Messrs. Attout, Tailfer, and Clayton, who kindly sent me another lot of plates, I now wish to say that I have, with a short exposure in bright sunlight, as they suggest, obtained pictures of coloured ribbons and stuffs in tints exactly corresponding to the lights and shades of the originals, thus quite bearing out as genuine in all respects the prints sent out by the firm. In photographing coloured plates in a book I have not done quite so well.

I enclose two rough, untoned prints for your inspection—one taken on a Freeman plate and the other on an isochromatic plate. The ribbons were mounted on a white ground and the coloured stuffs (calico), which Mr. Clayton sent me, on a black ground, and are denoted by the letters Y (yellow), B (blue), O (orange). You will note that, in both cases, on the isochromatic plate the blue is darker than the yellow, and in the calico than the orange. The calico was a dark blue, while the ribbon was a rich bright blue.—I am, yours, &c., GREENWOOD PIM.

Monkstown, Dublin, December 10, 1883.

[The difference in the rendering of the various colours by the two plates is very marked in the examples sent, and would seem to point to the great value of the isochromatic plate for copying purposes when coloured objects have to be treated.—EDS.]

PHOTOGRAPHIC LENSES: THEIR APERTURES, &c.

To the EDITORS.

GENTLEMEN,—Allow me space in which to reply to the letters of "G. D. K.," and Mr. G. W. Atkins.

"G. D. K." has fallen into an error for which I think Mr. W. K. Burton is to some extent responsible. In Mr. Burton's table, on page 250 of your ALMANAC for this year, he gives the apertures in relation to the focus, which increase the exposures in geometrical progression, and at the same time he has attached numbers to them in arithmetical progression; but it is due to Mr. Burton to say that he does not state that these numbers, 1, 2, 3, 4, 5, &c., are the U. S. numbers of the apertures, as "G. D. K." says he does. At the same time I must express my opinion that they are out of place and misleading, as is evident from "G. D. K's." letter.

Numbers placed on stops, to be of any use, must express *value;* and, if we take the nine examples given by Mr. Burton and number them 1, 2, 4, 8, 16, 32, 64, 128, 256, they will express the *value* of the apertures, whereas to number them 1, 2, 3, 4, 5, &c., is as useless as though they were marked a, b, c, d. Had I numbered the 134 calculations in my table from 1 to 134 consecutively some one would, no doubt, have taken the numbers to be the ones belonging to the stops.

I will now say a few words in answer to Mr. Atkins. "G. D. K." asks for information. Mr. Atkins professes to correct my tables by saying that the numbers I give in the second column are not the U S. numbers, and that this column should have been headed "Equivalent Exposure to No. 1 ($= \frac{f}{4}$)." Let me refer him to page 224 of the ALMANAC for this year, where the recommendations contained in the report of the committee appointed by the Photographic Society of Great Britain are given. He will find amongst other things "that the standard-unit diaphragm should have a diameter equal to one-fourth the equivalent focus of the lens and be marked '1' . . . . second; that diaphragms with smaller openings should have apertures diminishing in area to the extent of one-half from the unit-standard downwards, and be marked successively 2, 4, 8, 16, 32, 64," &c. And a little further on we read thus:—"Should a lens not admit of a diaphragm as large in diameter as one-fourth its focal length, nor exactly any one of the above-mentioned sizes, we still recommend that all the apertures be made in uniformity with the above scale, with the exception of the largest, which should be marked with the number its area requires in relation to the unit diaphragm." Now, that this and the above numbers would be the U.S. numbers is again made plain by reference to the table and diagram at page 25 of the ALMANAC (not Mr. Burton's). Let us take circle No. 9: it measures one inch in diameter, and with a lens of eight inches focus this stop would, of course be $\frac{f}{8}$, and we see from the table that 4 would be the U.S. number for such a stop, and not No. 4 be $\frac{f}{11\cdot314}$, as both "G. D. K." and Mr. Atkins think, and as erroneously shown by Mr. Burton's table on the opposite page.

I trust I have made everything clear for your two correspondents; but, if not, I shall be glad (if the Editors consider the subject of sufficient importance) to give any further explanation. As Mr. Atkins must see the error he has made in attempting to correct the headings of my tables, I hope he will be as ready to acknowledge this as he has been to find unjustifiable fault.—I am, yours, &c.,

Leeds, December 11, 1883. S. A. WARBURTON.

PHOTOGRAPHIC LENSES: THEIR FOCI, APERTURES, AND ANGLES.

To the EDITORS.

GENTLEMEN,—I am sorry I did not see the letter of "G. D. K." soon enough to enable me to answer it last week. I am glad that he has afforded me the opportunity of explaining an error which exists in the table of exposures of mine to which he refers.

This was written after the Parent Society had determined upon the proportions of standard stops, but before the results were published. I remembered that the unit adopted was $\frac{f}{4}$, and, further, recollected that beyond that each stop was to be so much smaller than the one before it as to require an exposure double as long. My impression was, however, that these stops were to be called No. 1, No. 2, No. 3, No. 4, &c., &c. As a fact, they are called 1, 2, 4, 8, &c., the numbers bearing a direct proportion to the lengths of exposure required.

If "G. D. K." will read in my table for No. 1, 1; for No. 2, 2; for No. 3, 4; for No. 4, 8; for No. 5, 16; for No. 6, 32; for No. 7, 64; for No. 8, 128; and for No. 9, 256, he will find that my table agrees with that of Mr. Warburton.—I am, yours, &c.,

December 7, 1883. W. K. BURTON.

AWARDING PRIZES AT EXHIBITIONS.

To the EDITORS.

The remarks in your last issue by "Exhibitor" and "Flaneur" induce me to say a few words upon this subject.

I was one of the numerous exhibitors at Brussels in August this year, and I may say one of the few unsuccessful ones, an award of some kind having been given to almost everybody. I had, nevertheless, the most flattering testimonies tendered me from people who visited the exhibition, asserting that my collection was the largest and, of its kind (as everyday studio work), the best show there.

Not even an honourable mention did I receive, and I felt more surprised than disappointed. I could not assign my failure to any particular cause, until some weeks after a brother professional spoke to me on my doorstep and said—"What a shame you have been snubbed! Such a splendid collection of really artistic work!" And he went on to tell me that he had seen one of the jurors of this exhibi-

tion who had confessed to him that the work was grand all through, but the show too numerous and "loud"—too much of the large, golden lettering, "Vandyke, Liverpool," about it, and they resolved in a chorus to pass by my show unnoticed, as it had the appearance of trying to outdo others.

I thought they were appointed to criticise the photographs and not the manner in which they were displayed.—I am, yours, &c.,

Liverpool, December 11, 1883. VANDYKE.

BRISTOL PHOTOGRAPHIC EXHIBITION.

To the EDITORS.

GENTLEMEN,—Unlike your correspondent "Exhibitor," I feel sure that the selection the Bristol executive have made in respect of the gentlemen chosen to officiate at the forthcoming exhibition has given, I might say, universal satisfaction. Every photographer to whom I have spoken on the subject agrees with me that there ought to be more "photographic element" attached to juries than has recently been the case.

I am glad to see practical photographers selected in preference to so many painters and scientific men, because they are better able, I consider, to judge what constitutes a good photograph. Do they not also know what is artistic? It is of such men, I beg to say, that photographic juries should be composed—men who have had large experience in photography, and also know what "art" is.

Do painters judge photographs as a photograph ought to be judged? My experience tells me that they do not; and why do we, photographers, say they do not do so? The reason is, I beg to submit, because they do not understand sufficient of the details and manipulation of photography. A man must be trained in the knowledge of photography to master all its details, and to be able to decide what is and what is not a good photograph. Therefore, I say, with the Bristol executive, that one painter is sufficient in a jury of five gentlemen.

Your correspondent does not give the other gentlemen much credit for knowing anything of what is artistic. For myself, and for what I am interested in, I feel quite contented to leave the matter of judging, with the utmost confidence of its being done well, in the hands of the five gentlemen the Bristol executive have chosen.—I am, yours, &c.,

December 8, 1883. AN OPERATOR.

EXCHANGE COLUMN.

I will exchange a Lancaster's whole-plate instantaneous lens and shutter for a good square half-plate bellows-body camera, with double slides, suitable for studio or field work.—Address, N. WEBB, chemist, Calne, Wilts.

I will exchange a coke furnace for vitrified enamelling, by Crucible Company, and a whole-plate mahogany water-tight bath holder, full of good negative silver bath, all in perfect order, for anything useful.—H. A. H. KIRK, High-street, West Cowes, I.W.

Wanted, balustrade complete, also other accessories, in exchange for club frames or any special sizes required; also Ross's rapid symmetrical lens, 12 × 10, in exchange for books, new sofa, what-not, new frames, or fire-proof safe.—Address, PHILIP SELLICK, 15, Marmion-road, Southsea, Hants.

Offers solicited for superior folding tripod, seven 9 × 7 oak printing-frames, two 11½ × 9½, two 13 × 11, one 17 × 14, all fitted with plate glass, folding retouching desk. Wanted, Entrekin burnisher (Oborne), Ross's 5 × 4 or 6 × 5 ordinary angle doublet, rotating stops.—Address, ALFRED, 20, Storks-road, S.E.

I will exchange a strong rustic stile and a good cabinet burnisher. Wanted, posing-chair or light painted landscape background. Offers wanted for Horne and Thornthwaite's portable stereo. camera, with four double dark slides and two lenses, one long and one short focus.—Address, T. HAYWARD, 8, Maryport-street, Devizes.

I will exchange the following lot of second-hand goods for Dallmeyer's 3D lenses, 10 × 8:—Balustrade and pedestal, worth £2, small ornamental round table, worth 15s., what-not (fancy) worth 15s., quarter-plate camera and lenses, tripod stand, and single dark slide, worth £2 5s., also eye rest, worth 7s. 6d., all nearly new.—Address, ALEXANDER F. CLARK, photographer, 18, Glamis-road, Forfar, Scotland.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHS REGISTERED—

Noah Webb, Calne, Wilts.—*Photograph of Hare and Hounds, called "Caught at Last."*

Emma Caroline Lawford, Fulneck, near Leeds.—*Photograph of Water-Colour Painting of Moravian Chapel and Ladies' School at Fulneck.*

FINIS CORANAT OPUS.—In the present uncertain state of the law as regards copyright we cannot hazard an opinion.

W. H. WILSON.—Under-exposure is quite sufficient to account for all the trouble you have met with. Double the exposure, at least, in the next experiment.

X. J. K.—You had better send us a print, or, better still, one of the negatives. From your very brief description we cannot trace the cause of your difficulty.

A. H. SHORTER.—If you send the pictures to our office, together with a postal order for one and sixpence for each one, we will effect the registration for you.

N. W.—1. The print appears to be somewhat under-printed, and forced too much in the development.—2. The crystals are not, as you imagine, protosulphate of iron, but ferric-potassic oxalate.

A CONSTANT READER OF THE BRITISH JOURNAL OF PHOTOGRAPHY.—We know nothing of the light in question. You had better get someone who has to do with lime light to give you a little practical instruction in its manipulation.

R. T. WATSON.—Damp the prints by laying a sheet of wet blotting-paper (the size of the print) on them for a few hours. At the end of that time they can generally be removed with care. The margin of the mount must be kept dry.

VIGNETTE.—Any very light tint will answer well for a vignette background. Unbleached calico does admirably. If this be used it is well to shade the lower part by coating it with a mixture of lampblack and whiting, with a little thin size as a medium.

I. S.—Unless a distinct charge has been made for taking the negative the sitter has no right whatever to it. If your order was only for a certain number of *cartes* the sitter has no title to the negative from which they were printed; that is your property.

H. J. FORDER.—In boiling the emulsion the gelatine, from some cause or other, has become decomposed. It is now worthless. You can, if you choose, add fresh gelatine to it; but as the quantity is small you will, on the whole, find it more profitable to add it to your residues.

W. DUNN.—You cannot do better than repeat your advertisement. We may add, however, that the salary you offer for an operator, even for the winter months, appears ridiculously small. Certainly you must not expect an efficient man for anything like the salary mentioned.

T. W.—We can see no objection to the interior of the studio being stained and varnished. The varnished surface, however, must not be made too glossy; otherwise, when the sun is shining, it is apt to cause unpleasant reflections, should they happen to fall on the eyes of the sitters.

R. ENMORE.—The spots on the negative are undoubtedby caused by its being insufficiently washed to free it from the hyposulphite of soda; hence it has become stained with the silver paper. No varnish is sufficient to prevent this, if the film contain any hyposulphite whatever.

CLEPHOS AND TWO OTHER CORRESPONDENTS' queries remain unanswered as they have not conformed to our rule by sending their names and addresses. We are continually mentioning that unless correspondents enclose their names and addresses their communications will not receive attention. Answers can always appear under a *nom de plume*, if preferred.

SEPTIMUS.—The sample you send is certainly "pot opal," but it is not such as is employed for the better class of opal pictures. What is used for them is that known as "smoothed pot opal." It is the same glass as yours, but one side has been finely ground. You can procure the proper kind from any glass merchant who makes photographic glass a speciality.

OMEGA.—The simplest plan of recovering the bromide from spoilt emulsion is, first, to melt it, and then add three or four ounces of sulphuric acid to each pint. Stir well, and allow it to stand. In a short time the bromide will all settle to the bottom of the vessel. The fluid portion is then decanted; and the bromide washed in two or three changes of water. The bromide can then be treated as you now do the chloride from the washings of silver prints.

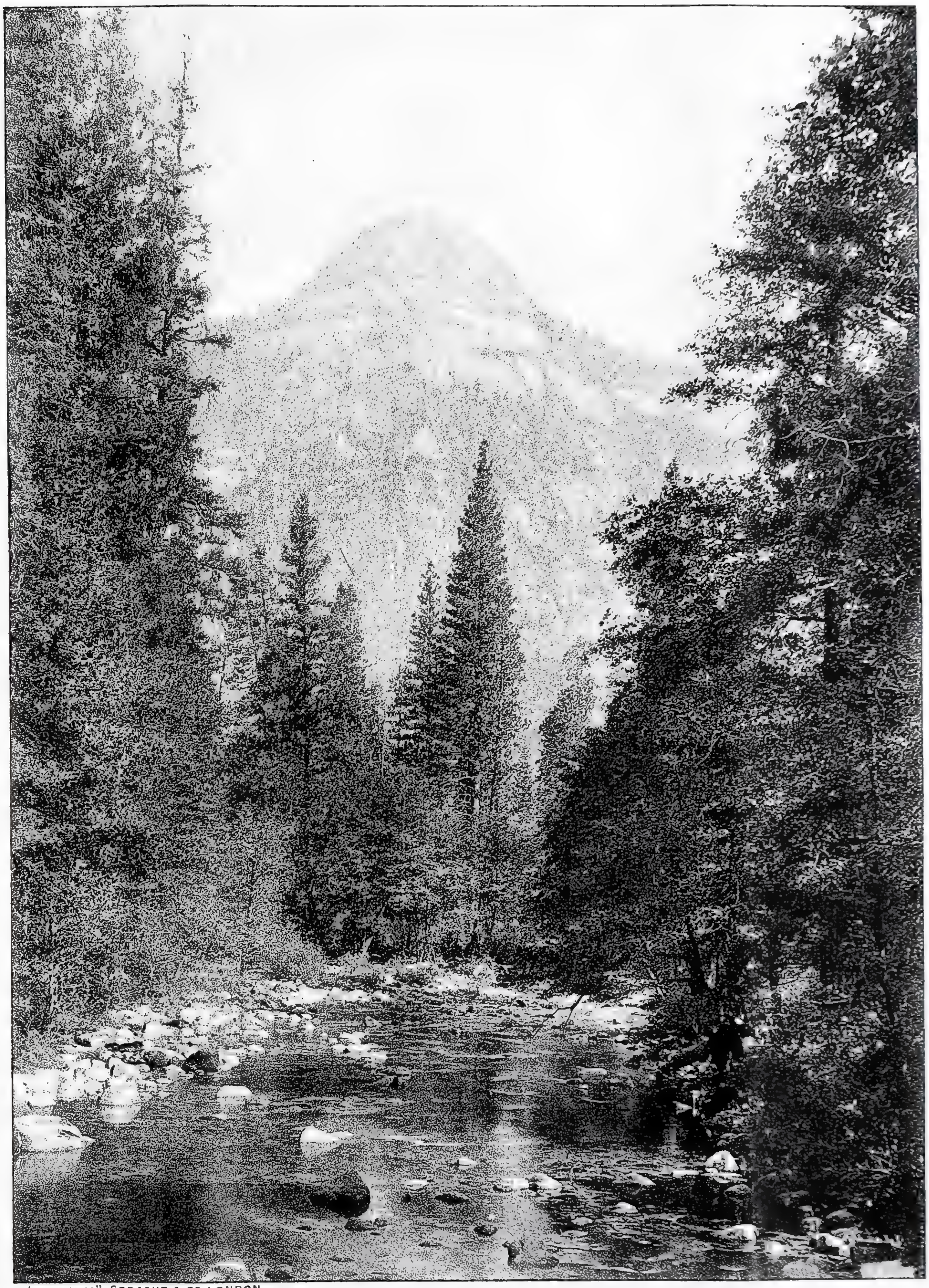
RECEIVED—Andrew Pringle; W. H. Harrison; T. J. L.; R. Pringle; H. M. Ashley. In our next.

PHOTOGRAPHIC CLUB.—On Wednesday next, the 19th inst., the annual dinner will take place at Anderton's Hotel, Fleet-street, E.C., at which address the meetings of the Club will in future be held. As the number of tickets are limited, an early application should be made to the Hon. Secretary by those desirous of attending. December 26th being Bank Holiday no meeting will be held.

A NEW PHOTOGRAPHIC SOCIETY.—An amateur photographic society for Burton and district was formed on Thursday, the 6th inst., with the Rev. J. Bramell as president, Mr. A. Siddals as treasurer, Mr. H. E. Hunt as hon. secretary, and a committee composed of the following gentlemen:—Messrs. W. Sims, A. Jones, and W. Jones. It is intended to hold monthly meetings in the winter, and excursions with the camera during the summer months, and to forward as much as possible the art and practice of photography amongst amateurs.

SO-CALLED "ARCHITECTURAL PHOTOGRAPHERS."—If any servants, left in charge while the family are out, chance to observe a person with a camera prowling around; if this person further announces himself as an architectural photographer, and asks for orders to take the front of the house, with the milkcan on the area railing, the cook, the cat, and the butcher's boy thrown in to give an aspect of vitality to the surroundings, then these servants, if they are wise, will allow him to "take" what he likes—except money. "One of his many victims" omitted this precaution, and having now neither the photograph nor the money, wishes to warn others.—*Globe.*

CONTENTS.



INK-PHOTO", SPRAGUE & Co, LONDON.

RIVER MERCED & NORTH DOME, YOSEMITE VALLEY.
By A. Pringle.

THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1233. Vol. XXX.—DECEMBER 21, 1883.

PHOTO-ENAMELS.

From a report of the proceedings of the London and Provincial Photographic Association, to be found in another page, it will be seen that a useful and interesting demonstration of the method of producing photo-enamels as practised by Mr. A. L. Henderson has been given by that gentleman. For the precise details of this method we refer our readers to Mr. Henderson's paper. We may state, however, that the operations seemed easy, while the results were successful; and as the fire-clay gas furnace by which the vitrification was effected was but small and not necessarily expensive, the presumption is that many will be induced to add the practice of this fascinating branch of photography to the other departments of their work. We embrace the occasion of the subject of vitrified enamels being thus introduced to add a few remarks in other directions than those to which Mr. Henderson confined himself in his communication.

There are four distinct methods by which photo-enamels may be produced:—First, the transferring of a toned collodion transparency to an enamel tablet or *plaque*, and then burning it in by the fusion of the enamel surface or that of a flux. Secondly, the formation of a photographic image by the system now so well known as the "dusting-on" process, in which the powder dusted on the partly-moist or tacky image consists of a vitrifiable or ceramic substance of any desired colour. Thirdly, the carbon process, in which the carbon and other coloured pigments are superseded by a vitrifiable powder. Fourthly, the photo-engraving and lichtdruck processes. Under this system we include the cognate one in which ceramic powders are mixed with sensitive resinous bodies, the ceramic powders taking the place of the pigment in the ink with which the impressions are taken on paper to be afterwards transferred to the porcelain—in a manner similar to that adopted in the ornamentation of our ordinary table ware.

The first of whom we have any account as having connected photography with enamelling was M. Lafon de Camarsac. Although this artist had been engaged in photo-enamel work since 1851, it was not until June 11th, 1855, that any public communication was made of the processes he employed. This publication was made in *Comptes Rendus* of the date mentioned. As we do not remember of any account of it having appeared in The British Journal of Photography we append a brief synopsis of the process. Operating both upon the enamel tablets, such as are at present employed, and also upon pottery and glass, M. Camarsac made a transparency upon collodion, albumen, or gelatine, and toned the silver image by means of salts of tin, gold, lead, or chromium. This was followed by the firing in a muffle. But he also employed what we may term a "resin process," by compounding a coating capable of becoming tacky in various grades of adhesiveness when exposed under a *cliché* to the light.

When ceramic powder was dusted over a surface treated in this manner it adhered in greater quantity to the shadows than the lights. These enamel powders, said M. Camarsac, brushed over the entire surface of the picture translate faithfully all the delicate lights and shadows. The powder is fused by the application of heat, and thus forms a vitrified image upon the *plaque*. Bitumen of Judea dissolved in turpentine was the sensitive material which at that time (1855) he employed as best satisfying the conditions of success. It is worthy of notice that M. Camarsac also reversed the usual condition of things by operating upon black as well as upon white enamels. In the former case, he, of course, formed the image of a semi-opaque white ceramic pigment.

From the foregoing it will be seen that M. Camarsac had at the very commencement of his career as a photo-enameller obtained a comprehensive grasp of the subject. It is only an act of justice to this distinguished foreigner to say that some even of his early works have never yet been surpassed in beauty.

After the discovery was made that certain organic substances, when mixed with bichromate of potash and exposed to light, became damp or adhesive in the inverse ratio of their exposure to light under a negative—a method now rather uneuphoniously designated the "dusting-on" process—an application of this principle to ceramic powders was patented in 1860 by M. F. Joubert; and in the same year M. Poitevin obtained a patent for a method of preparing plates by means of perchloride of iron and tartaric acid in conjunction with collodion, in which the same principle of discriminative absorption of moisture in proportion to the lights or shadows of the *cliché* prevails. Upon these two broad systems—the collodion transfer and the dusting-on processes—many changes have taken place; or, perhaps, it is more correct to say, that many manipulatory details tending to improvement in working or obtaining greater variety in effects have been made. To the more important of these we now direct attention.

It will have been observed that, although M. Camarsac was reticent in regard to the details of his method of operating, yet he communicated sufficient to secure for himself the honour of being the founder of the photo-ceramic systems now most in practical use. M. Tessie du Mothay, having entered upon a series of experiments, ascertained the colorific effects of several other toning agents than those mentioned by M. Camarsac; and in 1864 he obtained a patent for the application, for this purpose, of platina and gold salts. The patent of Herr Grüne—obtained two years afterwards for a similar application—recognised, perhaps, more forcibly the potency of the platinum salt which formed the basis of the toning operation. The transparency film, by this system, having been removed from the glass by immersion in a vessel of diluted sulphuric acid (one part to twenty-five), is placed in a solution of—

Bichloride of platinum	1 grain.
Water	10 ounces.

The solution must be neutralised with bicarbonate of soda, and then be rendered slightly acid by nitric acid. In this the transparency remains until the silver is all converted as far as possible. The image is now of a deep black tone. Seeing that the hydrochloric acid liberated during this process attacks the silver in the image and converts a portion of it into chloride, an immersion in a solution of hyposulphite of soda for a brief period is necessary in order to have it removed, for the presence of silver in an image to be vitrified imparts a yellow colour not always desirable. If burnt-in as it now stands the image would be of a neutral black tone. To secure a warm black tint the toned film is immersed for a very brief period

in a solution composed of one drachm each of a five-grain solution of nitrate of uranium and a five-grain solution of ferridcyanide of potassium added to a pint of water. A fifteen grain solution of permanganate of potash applied instead of the former will impart a rich, deep brown. A mixture of equal parts of A and B in the following formula made immediately before using—

A

Perchloride of iron	60 grains,
Water	1 pint,

B

Ferridcyanide of potassium	60 grains,
Water	1 pint,

will impart to the platinum-toned image the property of burning-in of a brownish black.

Some fine enamels which gained for MM. Tessie du Mothay and Marechal a medal in the Paris Exhibition of 1867 were toned by a solution of chloride of platinum, to which a solution of chloride of gold had been added. Some have obtained good results by substituting iridium for the platinum, the following forming a formula for the preparation of the toning bath:—

Saturated solution of bichloride of iridium..	4 drachms.
Of a one-grain solution of chloride of gold...	2 „
Water	6 ounces.

By whatever toning bath the image has been treated the film must, after being washed, be floated upon the enamel tablet, then dried by a gentle heat or spontaneously, and be finally placed in the previously-well-heated furnace for a short period, by which the collodion is burnt away and the image united with the glazed surface of the enamel.

Poitevin's dusting-on system consists in dissolving—

Solid perchloride of iron	4 drachms.
Crystallised tartaric acid	96 grains.
Distilled water	5 ounces.

The perchloride is dissolved in one half of the water and the acid in the other half. The solutions are then mixed in the dark, and so kept. A plate having been coated with plain collodion and dried is moistened and coated with the above in a dark room, after which it is dried, and exposed under a negative for from about five to ten minutes. Now allow the plate to remain exposed to the atmosphere of the dark room for a few minutes, by which time it will be found that the parts acted upon by the light have become damp. Finely-powdered enamel colours are next dusted-on and spread all over the surface by means of a large camel's-hair brush, and when sufficient has adhered to cause the image to look vigorous the operation is discontinued. The picture is then rinsed in water containing a little alcohol and hydrochloric acid. The transferring of the image to enamel is effected by coating the picture with collodion and placing it in acidulated water until it becomes loosened from the glass, and then proceeding as already described.

At page 227 of The British Journal Photographic Almanac for 1884 will be found several other formulæ for preparing plates by the dusting-on process, in which the bichromates of ammonia or potash, combined with honey, dextrine, gum, or albumen in various proportions, form the sensitive layer, and to these we refer the intending photo-enameller.

THE REPRODUCTION OF NEGATIVES BY MEANS OF GELATINE PLATES.

"The first thing I do when I get a negative of 'A 1' quality, or one that will require doctoring by intensification or reduction, is to make a transparency by contact." Thus writes Mr. Andrew Pringle in the Almanac, and very good advice it is; for, as Mr. Pringle points out, the possession of a transparency is a safeguard against any subsequent accident, as from the positive a duplicate negative can be readily made.

Few amongst photographers, whether amateur or professional, but have, at one time or another, when too late, regretted the neglect of this simple precaution; and even where a regular practice is not made of securing transparencies from all negatives of value it is frequently useful to do so for some special purpose, as, for instance, the production of an enlarged or reduced negative. To make a transparency from every negative taken may possibly be urged by some as an expensive and useless system; but against this it may be fairly argued that as a transparency, if properly made, is infinitely better than a paper print, a collection of such pictures would possess a value and an interest from an artistic and ornamental as well as a utilitarian point of view; and the constant practice in the production of transparencies leads to a perfection of result that will be appreciated when, in consequence of accident or otherwise, it is necessary to produce a duplicate negative.

"But," we hear some body exclaim, "a reproduced negative is always inferior to the original!" It may or it may not be. It is obviously impossible to *improve* a *perfect* negative, and it might possibly be difficult to equal its qualities in a reproduction. But how often do we meet with a "perfect" negative? Has such a thing ever been seen? We think not. There are few negatives, however good they may be, that are not susceptible of some modification or improvement; and with suitable means at command it is by no means difficult to carry out such modifications in so satisfactory a manner as to practically lead to an improvement upon the original. We do not mean to imply that any negative, however bad or defective, is capable of improvement in this manner, because, obviously, there are faults which do not come within the scope of such treatment—such, for instance, as spots and mechanical objects of all kinds; but where a negative is too dense, or has a tendency to hardness or the reverse, it is generally possible by judicious treatment, either of the transparency or the duplicate negative, to compass a result which will be classed as an improvement.

For this purpose the gelatine process lends itself with peculiar adaptability to the requirements. Its great sensitiveness enables it to penetrate the densest lights and render details which no other process is capable of touching, while the great latitude in exposure and control over the development give a power and elasticity which are certainly not present in other methods of reproduction. In the matter of local treatment for the purpose of subduing or modifying particular portions, whether of lights or shadows, there are many methods which can be adopted, though these, as a rule, require great skill and judgment in their application—not, however, to a greater degree than similar operations in connection with other processes.

The first operation consists in the production of the transparency, and in a general way we prefer the method of contact printing, whether the reproduction is required of the same size as, or larger or smaller than, the original. *Primâ facie*, a transparency of the same size affords the opportunity of replacing the original negative at any time in case of accident, while it is just as available as the latter for the purposes of enlargement or reduction. It is, at the same time, a simpler plan than the camera method, and affords greater facilities for "masking" and similar modes of local treatment.

The class of transparency we have found best suited for reproduction is just such a one as will give greatest satisfaction from a pictorial or ornamental point of view; that is to say, one which, while it is bold and vigorous, is still full of detail, soft in the half-tints, without being either flat or heavy in the shadows. The highest lights only must be clear glass, with a regular gamut of tints to the deep shadows.

In order to secure such a result a full exposure should be given, as the subsequent treatment is then more completely under control. Over-exposure is now so easily remedied by chemical means that no fear need be felt on that score; whereas under-exposure can only be supplemented by forced development, under which conditions it is equally impossible to preserve purity of the lights or brilliancy of the shadows, while the risk of securing over-intensity in the latter is always present. A little experience, which may be gained in the development of only two or three plates, will provide the necessary judgment as to the exposure. This should be such as to enable a tolerably well-restrained developer to bring out the middle tints pretty rapidly; and now comes the time when the skilful management of the operation enables the desired result to be attained and the peculiarities of the original to be modified.

Let us suppose we are working with the usual ten-per-cent. solutions of ammonia and bromide. In addition to these we have also a ten-per-cent. solution of sulphurous acid (one part of commercial acid to nine of water) and a solution of similar strength of citric acid or citrate of ammonia. The sulphurous acid serves to preserve the purity of the lights; and the solution of the strength given above, we find, requires one minim of strong ammonia (or ten minims of the ten-per-cent. solution) to neutralise each thirty minims, and this allowance must be made in compounding the developer. The citric acid or citrate of ammonia enables the development to be instantly arrested at any desired stage; but is only necessary in cases of decided over-exposure, the bromide solution being, as a rule, quite sufficient.

With the plates we are in the habit of using we make up the developer as follows:—Three to six grains (according to the character of the subject to be treated) are placed in the developing-glass, one drachm of the sulphurous acid and three minims of the bromide solution are added, and the bulk made up with water to two ounces. This is poured on to the plate and allowed to soak for half-a-minute; one drachm of the ammonia solution is measured into the glass and the developer poured back, and after thoroughly mixing returned to the plate. This quantity of ammonia leaves, roughly, an excess of ten minims over and above that required to neutralise the sulphurous acid, and this should suffice to bring up the image in something less than a minute. If only the high lights appear and the half-tones be slow in coming a little more ammonia must be added, the object being to produce a thin image of the whole picture with the exception of the finest details in the high lights, density or contrast being a matter of comparatively little importance at this stage. When the picture is fully out and only the high lights are represented by unaltered bromide, the further action of the developer is checked by means of a large addition of bromide—say ten or fifteen minims of the solution given—and after allowing this to act for half-a-minute a further addition of (say) ten minims of ammonia solution is made. Under this treatment—further additions of ammonia *and bromide* being made as required—it is surprising what an amount of density can be got in the shadows, with due gradations through the whole range of half-tones, while the highest lights remain perfectly clear; in fact, this strongly-restrained solution appears to possess a truly selective power, acting chiefly on the deposit already formed, and possessing little, if any, real developing action.

By accurately judging the proper time to check development the effects desired are readily secured. Thus, where a negative is thin, flat, and wanting in contrast, the development of the positive will require to be checked sooner than in the case of a hard and chalky original; but on this point actual experience is the only guide. By using full doses of bromide, with each successive addition of ammonia, all chance of green or other fog is avoided, and the sulphurous acid prevents any pyro. stain, or reduces it to such a degree that any of the ordinary clearing solutions will remove it entirely. The solution of citric acid or ammonium citrate is only resorted to when the image flashes up too rapidly, a small measure containing the requisite quantity—one or two drachms—being kept handy for immediate use.

Next week we shall have a word or two to say on the production of the duplicate negatives.

LANTERN TRANSPARENCIES BY THE ALBUMEN PROCESS.

It has always been a matter of surprise that the old albumen process is not more extensively employed for the production of lantern slides than it is at the present time, seeing how well it is adapted for the purpose. No greater praise can be bestowed on this process, as a process, than that. However good slides made by any other may be, more is rarely claimed for them than that they are nearly or quite equal to those produced on albumen. In no instance have we ever heard it claimed that transparencies made by any other process whatever are *better* than those on albumen.

If further proof of this excellence be required, we have only to look to the commercial side of the question (always a practical test), and we shall find that transparencies by the albumen process—whether they be slides for the stereoscope or for the lantern—realise at least double the price of those made by any other method, however good they may be. At one time the price charged for the celebrated stereoscopic views by M. Ferrier was fifteen shillings and upwards, and the cost of lantern slides was then seven-and-sixpence. Although the price is now considerably reduced, lantern slides on albumen, at present, realise something like three-and-sixpence or four shillings each, while the very best by other processes rarely exceed half that sum, and many really good slides are to be had, retail, for very much less; hence it may fairly be assumed that albumen is the standard of excellence for transparencies.

In view of this we cannot but feel surprised that the process is not more extensively worked than it is, and it may be well to inquire into the cause. One reason for its not being worked is, doubtless, that very little of late years has been published on the subject. Most modern works on photography either ignore it altogether or treat it as obsolete. In the last edition of Hardwich's *Photographic Chemistry* the albumen process is not even mentioned. If any work does touch upon the subject it is generally only given in a brief outline in its most antiquated form, or as it was worked at the time anterior to the introduction of the collodion process—no allusion whatever being made to the more recent modifications, which simplified matters very materially, and reduced it to an easily workable process.

Another reason for its not being more generally employed, we believe, is that most photographers who have given but little attention to it imagine that the albumen process is a complicated one in working, and that it is beset with innumerable difficulties. Hence they have taken little or no interest in the subject, and so the process has practically lain dormant for a number of years in this country, and its practice, at present, is chiefly confined to the continent.

Many years ago it was currently reported that M. Ferrier, in order to avoid dust on his plates, actually divested himself of the greater part of his clothing and even anointed his body with oil, and always had his operating-rooms washed out each morning before commencing work. Absurd as this may appear, it was really credited by many. It is the imaginary difficulties (and they are imaginary only) that have deterred very many from experimenting with albumen. There is no disguising the fact that in the albumen process, as originally worked, there were grave difficulties to contend with, but they now no longer exist. Dust was one of the greatest bugbears in the operations; for, if a particle settled on the plate at any time while the albumen was moist, a spot was almost certain to be found in the finished picture, the albumen appearing to have a singular affinity for floating particles. An old worker once facetiously said in our presence that "if there were but one particle of dust in the room, and that in its farthest corner, by some unaccountable means it found its way on to the plate, and thereby caused a blemish."

Another great inconvenience in working, as the operations were then conducted, was that the plates had to be dried in a horizontal position. Consequently they had to be carefully levelled, otherwise the film would prove unequal in thickness, precisely the same as a gelatine plate will be if the slab upon which it is put to gelatinise is not perfectly level. In the gelatine process the plate need only be kept in this position until the coating has set, whereas with albumen it was necessary for the plate to remain horizontal until the film was perfectly dry. As a matter of course, when the moist plate is long in a horizontal position there is a far greater chance of floating particles settling upon its surface than when it is standing vertically.

Some quarter of a century back a valuable improvement was made in coating the plates with albumen. It was found that by first coating the glass with collodion and simply washing away the solvents in a dish or bath of water, and then coating the still wet collodion with the iodised albumen in the same manner as in the

Taupenôt process, the plates could be dried in a vertical position, and even quickly, by holding them in front of the fire. The collodion appears to absorb sufficient of the albumen to form the image. This simplified very much the operation of coating and drying, and there was something more gained; for it was found that, if any particle of dust did by chance settle upon the film, the albumen, as it dried and contracted, appeared to transfer the dust from itself to the collodion. And as the collodion merely acted mechanically (serving virtually as a substratum) and formed no part of the image, the particle became inert, instead of producing a speck in the picture. Although all these advantages were known to several who profited by them in practice, it was not published for a very long time afterwards. Indeed, within the last dozen years the albumen process, with this modification, was sold as a secret process for making transparencies for enlargement.

From time to time it has been mentioned that albumen transparencies are liable to fade, and at a recent meeting of the Photographic Club Mr. J. T. Taylor exhibited some very marked examples of their fading. Although many slides have undoubtedly faded, they are the exception rather than the rule, and we have by us many transparencies that were produced (by Ferrier and Soulier) over a quarter of a century ago, which are as perfect now as they were at first. With regard to the permanence of albumen pictures: they will certainly compare very favourably with those by most processes, and they are decidedly more permanent than many that are made on collodion and toned afterwards.

We purpose at an early date—possibly next week—to give full working details of this excellent process as it is at present practised by those who are familiar with its latest modification.

BACKING PLATES.

From remarks lately made it is evident that the effect of the gelatino-bromide film upon incident light is as far from being thoroughly understood as the defects liable to follow in its train suitably combated. The subject is one that has been of perennial interest ever since the introduction of bromide plates, and, indeed, before their advent; but it has assumed its chief importance since bromide plates became of widespread interest. The terms "blurring" and "halation" have been indifferently used to signify the same defect, and very many years ago its cause was shown and the cure indicated.

Blurring was familiar to a few workers in the old wet collodion days, and a study of the cause why some photographers experienced it while others did not will afford information and go a long way towards solving many difficulties in the present practice of photography. "To begin at the beginning": we may assume that our readers are fully conversant with the view that halation or blurring arises from a reflection, at the back of the glass, of light that has passed through the film. Whether there is not a further and a considerable action quite irrespective of this we will not now discuss; we only wish to treat of the former phase of the question, which may be dealt with first by discussing how the light so acts, and, next, how to prevent or remedy the effect.

When an image is thrown by the lens on to the sensitive plate any pencil of light must either be entirely or partly arrested at the film surface. If entirely arrested any ordinary film will, when looked at from the back, appear more or less luminous according to the thickness and other qualities of the film. If partially arrested the portion that does pass through will, upon reaching the back of the glass, be reflected back again on to the front—that is, the film—and will form a reversed image as much out of focus as if the glass were double the thickness and the image thrown upon its back instead of the front. A similar effect can often be seen when looking at the moon through a thick sheet of plate glass—such, for example, as a railway-carriage window. A distinct pair of moons, one much brighter than the other, is often seen, the chief portion of the rays from the bright orb passing through the glass, and so enabling an image to be formed by the eyes, but a similar set of rays, much weaker in power, being reflected from the side furthest from the moon on to the other surface, and thence back to the eye.

This sort of reflection, we believe, is the least important; turning to the other kind we find the greatest source of evil. If, upon placing a plate in the dark slide in the camera, and, scrutinising from the back its appearance when the image falls upon it, we discern a fairly strong-looking picture, it is simply by means of light that passes through the film; and it may be accepted as a fact that a portion of the light which has passed through the film has been arrested and reflected back to the film—not as an image, but as a diffused light. This is the light that causes most of the evil. Now it is evident that if the film were an extremely thin one very little of an incident pencil would be arrested, and so there would be less diffused light reflected, the reflection being always greatest in the immediate region of the bright part of the image. As the thickness of the film, however, came to be increased, more of the pencil would be arrested, the film would become more luminous, the brightness of the diffused light equally increased, and the power of the reflected light intensified in the same proportion. By still further increasing the opacity of the film a point would gradually be reached when the reflection of diffused light would be too weak to have any perceptible effect.

Plates are made of all degrees of opacity, and, *cæteris paribus*, it is evident that the very opaque and the very transparent ones would be the best. As very thin plates possess, however, certain disadvantages which the thick ones do not, it is evident that the thicker coated ones will give less trouble from halation than any; in many cases it will not be appreciable.

Having briefly shown the mode in which reflection occurs, we are in a condition to discover why it sometimes is seen and at others is not. We have shown that the luminosity apparent at the back is the factor of importance, and how it is affected by the thickness of the film. It must be evident that a similar variation in this luminosity will be brought about by alterations in the brightness of the image as depicted on the ground glass or the sensitive film, and that this variation will be governed—first, by the intrinsic brightness of the object itself, and, next, by the angular aperture of the lens, or, in other words, the size of the stop. An object so bright as with full aperture of lens to give an image so luminous that the light reflected from the back of the glass would certainly fog any dark part of the image, might cause no ill effect if the lens were stopped down so as to render the image faintly luminous only. Thus it is seen that three factors—opacity of plate, brightness of object, and size of stop—any or all, govern the occurrence or absence of the annoying evil, which a man might possibly photograph for years without witnessing.

We now come to modes of remedying the evil. If the film were spread on opaque glass no light would be reflected, and, indeed, even if it were spread on "opal" plates no harm could happen, for then the reflection could not spread, and it would pass through the film without having the opportunity to spread or diffuse. If, instead of opaque glass, we had flashed glass—the flashing being of a colour that only allowed non-actinic rays to pass—the light that would be reflected from the back of this flashing (the film being supposed to be on the clear glass side) would have been coloured by passing through, and would be still more coloured by repassing after the internal reflection, so that when it arrived at the film it could not harm it.

An extra sheet of coloured glass would not answer in a similar manner, as the reflection takes place at the first surface that has a layer of air touching it. If we removed the air by fusing the two surfaces into one we should get the same effect as flashing would give. This we cannot do; but we can do as well in another way. Instead of joining the coloured glass by melted glass we can place between the two a liquid that acts upon light in the same manner as glass, and then the action would be identical—that is to say, the double piece would be just as useful as flashed glass.

This, however, would be a troublesome plan to adopt, and in practice it is replaced either by (so to speak) melting opaque powder to the glass by means of a liquid that will dry hard, or by pouring on to the plate a suitably-coloured liquid that will, upon drying, leave a film which will only transmit non-actinic light. If the opaque pigment be of suitable colour it will be equally efficacious with the coloured transparent film; but many of those recommended—

venetian red, ochre, &c.—do not fulfil that condition, and with a bright image might reflect sufficient light to fog. A good black, however, woud be opaque and non-luminous.

It thus becomes a mere matter of convenience which method to adopt to prevent halation—paint or varnish. Either one or the other will prove rather a nuisance when a number of plates have to be developed, the time spent and the trouble involved in removing the "backing" being great annoyances. With some plates and some subjects backing becomes a necessity, and the operator must choose the one that most suits him. We have given a formula on a previous occasion for making a coloured collodion for the purpose (it is repeated in our ALMANAC for 1884, p. 212), and we will conclude by recalling our description of a plan for a temporary and easily-removed backing, suitable for studio use, which we once saw employed. It consisted simply in the squeegeeing on to the plate a piece of black mackintosh by means of as small a quantity of glycerine as possible. All reflection is prevented, and the cloth peels off instantly when required.

In conclusion: we would say that with the best plates in the world it will, with such a subject as includes a bright cloud crossed by a narrow dark object—such as a branch, a rope, &c.—be next to impossible to avoid halation without having previously backed the plate, and cases occur where even that remedy is not complete.

THE question of the degree of solubility of the "insoluble" salts of silver in ammonia and other liquids is often of considerable importance to experimentalists, but the data are not readily obtainable; they are absent altogether in some works, very incomplete in others, and in none are they arranged for ready reference. The following table by A. Longe, will, therefore, be valuable and interesting to all who wish to work out experimental results with the silver haloids.

Solvent.	Temp.	Silver Salt.	A.	B.
Ammonia, 5 p.c., sp. gr. 0·998	12°	Cyanide	433·17	431·73
	,,	Chloride	430 20	428·64
	,,	Bromide	8,805·55	8,779·37
	25°	Iodide		
	,,	Bromate	28·49	28·14
	,,	Iodate	42·73	42·39
Ammonia, 10 p.c., sp. gr. 0·96	18°	Cyanide	192·52	184·59
	,,	Chloride	13·46	12·76
	12°	Bromide	300·33	288 46
	,,	Iodide	27,420·35	26,327·54
	25°	Bromate	2·254	2·162
	,,	Iodate	2·388	2·202
Water....................	,,	Bromate	597·73	555 31
	,,	Iodate	27,821 88	27,728·94
Nitric Acid, 35 p.c., sp. gr. 1·21	,,	Bromate	262·83	320·36
	,,	Iodate	859·81	1,044 32

A, is the number of cubic centimeters of the solvent required to dissolve 1 grain of the salt.
B, is the number of grains of solvent required to dissolve 1 grain of the salt.

ALUM—still in such great request by photographers as a remedy for frilling and other evils—as usually found in commerce, is in large crystals, which do not very readily dissolve. It is, therefore, far better to purchase it in the powdered form, and it is so kept by many dealers; but at many chemists' shops—the universal refuge of the photographer for any out-of-the-way chemical—till it becomes common and gets retailed at store prices elsewhere it is, perhaps, less likely to be found than the dried alum; that is, alum freed from water and powdered, in which state it is a much whiter-looking preparation. Dried alum, though not of necessity useless for photographic purposes, is often so on account of its partial or almost total insolubility—neither of which conditions, according to a writer in the *Pharmaceutical Journal*, ought to exist in a properly-made preparation.

ALUM, however, for preventing frilling should not be the ordinary alum of the shops, but *chrome-alum*, a one-per-cent. solution of which is quite sufficient to "tan" a plate with considerable frilling proclivities. This proportion is equivalent, roughly speaking, to a quarter of an ounce to the pint, and is as efficacious as a saturated solution of ordinary alum.

ACCORDING to H. Struve, when albumen is dialysed through a bladder filled with it into chloroform water, which preserves it from putrifying, the whole of the albumen passes through the bladder, leaving only the cell-walls and the fat; and from the experiment he deduces the result that the distinction drawn between crystalloids and collöids is without foundation. In experiments performed some years ago by ourselves with parchment paper, so far from finding the albumen to pass into pure water, it very quickly assumed the form of insoluble clots, a very small portion only of the albuminous matter passing through.

WE referred last week to an account in *La Nature* of a rediscovery of Mr. Warnerke's old plan of preserving iron solutions from the action of the air—sulphate of iron being referred to in the article in question. Last week another communication to the same journal states that a small quantity of tartaric acid added to sulphate of iron solution will enable it to remain unchanged for an indefinite period so long as it is kept in full daylight.

OUR PICTORIAL SUPPLEMENT.

OUR ink-photo. illustration this week is from the camera of Mr. Andrew Pringle, an account of whose travels *Round the World* is filling an occasional page in this Journal. Mr. Pringle writes:—

"The negative from which the ink print has been produced was obtained by me at nine a.m. on the 21st of August last. The mist that usually hangs over the valley during the morning hours had just lifted, and the river was illuminated by a beautiful, soft light. The granite face of the North Dome, rising 3,633 feet above the valley, was not so strongly lighted as to produce harshness, while by a little manipulation of the lens cap I endeavoured to compensate for the dark shadows of the foreground foliage. I had much difficulty, and spent a considerable time, in fixing upon a standpoint for the camera. When I went down into the river-bed the top of the Dome would not come into my picture. Finally: I erected my camera on a wooden bridge spanning the river; but here, again, I was much bothered by the passive interference of wooden beams supporting the bridge. At last I fixed my camera on a cross-junction of two of the beams, focussed, and exposed lying on my side on the bridge. The result amply repaid me for the trouble I took at the time."

CERAMIC PHOTOGRAPHY.

[A lecture given before the London and Provincial Photographic Association, accompanied by a practical demonstration.]

THE subject this evening is, no doubt, more interesting to you from a photographic point of view than any other. Believing such to be the case I will only just refer, *en passant*, to what is known, or not, of the early history of the art.

Ceramic pottery or ware is so old that in tombs which have lain unopened since the time of the Pharaohs vases and jugs have been found. The manufacture of porcelain is of later origin in Europe, although known in China nearly 2,000 years ago. The manufacture and decoration of porcelain in Dresden dates from about 1710. It was a secret process, and the workmen were sworn to secrecy till they went to their graves.

Many attempted to imitate the Dresden and China porcelain, and the French some 100 years ago discovered a fine clay at St. Yrieix, near Limoges, very suitable for making porcelain. The early English porcelain was glazed with a composition of sand, obtained from the Isle of Wight, and was mixed with clay, flint, glass, and lead.

A manufactory of porcelain was carried on at Chelsea, and these works were removed to Derby, in 1748. A company was formed in Worcester for this manufacture, and at a later period Staffordshire could boast of large works. Wedgwood's discoveries and researches were fully and universally acknowledged, and were followed by many others—notably by those of Minton, Doulton, Copeland, &c.

I think I have stated sufficient to show that to no single individual or country can the credit be given for the discovery of pottery, porcelain, or ceramics. The term "hard" or "soft" porcelain is twofold. The "hard" is a substance that is brittle or

difficult to fuse; the "soft" is quite the reverse, differing only by the amount of solid body or infusible material contained in the flux or glaze. All vitreous substances laid on or supported by metal are usually called "enamel." It is the soft porcelain or enamel that I will have specially to deal with to-night. It is to M. Lafon de Camarsac we are indebted for ceramic photography, he being the first to produce photographs fixed by fire (about 1856).

His method, so far as I can learn, has never been published, and is still considered a secret process. Many operators have called upon me offering their services, and who professed to have been working on enamel in M. Camarsac's employ, but in no case have they produced presentable results. His (Camarsac's) method, I have little doubt, is what is usually called the "dusting-on process;" that is, a glass plate is first coated with collodion and then with a mixture of sugar, honey, and bichromate of ammonium. The plate is exposed under a transparency, the affected parts become somewhat hardened or less tacky or hygroscopic by the action of the light. The plate is then dusted over with an enamel colour finely ground, when the image will appear, the colour adhering to the moist portions. It is then placed in acid and water to remove all soluble matter, transferred to the permanent support, and placed in the kiln.

When the carbon process was introduced, at the first glance it seemed as if enamel or porcelain photography would receive a great impetus; but the difficulty of burning off the gelatine was almost insurmountable. Mr. Firling, of Dorchester, about sixteen years ago, showed me some promising results by the carbon process. Some later advances, however, have been made in this direction by using saponaceous substances to prevent the cracking and blistering of the gelatine.

The second method of producing vitrifiable photographs is known as the "substitution process;" that is, a transparency is taken on wet collodion and various chemicals are allowed to re-act on the silver, thereby depositing and substituting metals in lieu of the silver, which if left in the picture would give a disagreeable tone. (Silver gives a bright yellow colour.) Of the two processes named I would give preference to the "dusting-on," as a greater range of colour can be obtained.

The third and last method is that devised by the author of this communication. It is with some difficulty I can find a name for the method. I might call it a "mongrel process," as it comes between the first two. Before demonstrating this method I would like to quote a few editorial remarks on enamel photography from the *Art Journal:*—

"If the ancients had been masters of this process it would not have been so difficult to settle the truth of history. Medals half devoured by rust have saved the names of many great men; the features have altered whilst a *souvenir* remains; but enamels would have given us a perfect portrait and precise date. Consider the pictures of the greatest masters; fire has destroyed some, and time and restoration have already altered those by which their date are the farthest removed from our time. The painted glass windows of our churches, on the contrary, have preserved unchanged the outlines and the colours which the artist fixed in the vitrifiable materials. The old enamelled medallions on the shrines and coffers of the Middle Ages have lost none of their freshness, and attest the immense advantages offered by a permanent product. But we are told the glass painters of those days did not possess the means of reproducing half-tone, and consequently their art was superseded by painting in oil. Now, however, the case is widely different, and, thanks to photography, we are enabled to fix upon vitrifiable materials portraits the most striking, which lack no artistic quality."

Here I have a collodion transparency very thin, as you will see; the high lights are perfectly clear glass, and the shadows not heavy—such a transparency as would look best as a lantern picture. It was developed with—

Sulphate of iron	5 grains,
Acetic acid (Beaufoy's)	15 minims,
Water	1 ounce,

Saturated with common alum.

I will place it in a solution of a platinic salt, prepared as follows:—

Bichloride of platinum, or its compound...	5 parts.
Bichloride of tin, or its compound	30 „
Iodide of potassium	30 „
Iodine, to saturation.	
Acid (such as hydrochloric)	960 „
Silicate of potash	20 „
Acetate of lead	40 „
Water	8,000 „

Saturate the whole with boracic acid.

The platinum and tin will to a certain extent take the place of the silver as well as depositing on what is already there. I can at any moment apply solvents—say nitric acid—that will not act on the platinum and remove the silver; and even after its removal the depositing action will still proceed. Should the silver be in a form (say chloride or iodide) that will not dissolve in nitric acid, I can oxidise or reduce it to the metallic state by heat, so that it will be amenable to treatment. It is seldom I have to resort to the removal of the silver, as there is such a small amount present, and it improves the tone rather than otherwise.

As soon as there is sufficient density I remove the picture from the solution, immerse it in a five-per-cent. solution of sulphuric acid and water, saturated with boracic acid, and transfer it to the enamel tablet, dry it, and it is then ready for the fire. If one of the films be left in water for some days a peculiar action takes place; that is, the image will entirely disappear, leaving no trace of its colour in the water, and if the enamel, when placed on its permanent support, be left exposed, unfired, to the air for some time, the colouring matter will become soluble in water. As a rule it is better not to add any flux or glaze over the picture. Great danger is likely to arise, as the flux or glaze being so much easier fused blisters might occur; and, although it gives a little greater depth to the shadows, a much deeper print is necessary. One of the secrets of photo-enamelling is to put the glaze on the plate first.

Many here believe that the whole secret lies in the firing. I will fire one so that it is melting. I will now press a knife into it, while in the fire, to show what state of fusion it is in, at the same time showing that there is no loss of colour. I can place a photograph on (say) a Minton's tile and allow the image to sink into the glaze. I remove the image, leaving an impression on the porcelain, which might be inked and printed like a copper-plate. These enamels may be coloured by any artist with very little practice. Here is one—the first attempt. I think you will say it is fairly good. Of course a little knowledge is required as to which colours are to be applied first. To touch up an enamel or remove spots in the fired picture I use a brown enamel colour mixed with a small quantity of sesquioxide of iridium rubbed up with spike oil of lavender, refiring to fix the touching.

I may as well mention a few of the colours produced by some of the oxides:—Tin and arsenic give a white; gold, red or purple; copper, green or red; silver and titanium, yellow; cobalt, blue; iron, reddish yellow; platinum and tin, various tints of brown; iridium, black. The mention of iridium recals an amusing circumstance. I had occasion to send to a large London dealer for a few grains of an iridium salt for experimental purposes. My messenger brought back an entirely different compound, and on my calling personally for an explanation I was informed that they sent me that which was usually sold for photographic enamelling purposes as "Henderson's chloride of iridium." "Well," I said, "my name is Henderson, and I am a photo-enameller, but I have not been using iridium." The reply was that many persons called asking for the iridium similar to that used by Henderson. The moral is: If you wish to make dynamite, be careful where you buy your chemicals.

I am afraid time will not permit me to say anything more. I trust that I have made the matter clear; if not, it will afford me pleasure to reply to any questions. A. L. HENDERSON.

AN EASY METHOD FOR PRODUCING ENLARGED NEGATIVES.

[A communication to the London and Provincial Photographic Association.]

HAVING had a little leisure time on my hands during the last few days, I thought I would amuse myself by making some enlargements from my small negatives.

The first method I tried was that of making an enlarged transparency from the small negative, and then making from the transparency a paper negative which was waxed. This method, I believe, was introduced by Mr. V. Blanchard. However, I was not satisfied with the results obtained, as I could not entirely prevent the grain of the paper showing in the finished print.

I next tried the ordinary method of making a small transparency and enlarging from that; but the results did not satisfy me. Finally, I hit on an idea which, I believe, is novel, and which is the object of this communication.

I first of all take a print from the small negative on albumenised paper in the ordinary way, which print is toned and fixed as usual. I then mount this print on glass, face downwards, with gelatine. This mounted print is then placed in front of the copying or enlarging camera and an enlarged negative is taken from it. Owing to

the print being in such close contact with the glass the enlarged negative does not show the grain of the paper, and I find this way of enlarging to be by far the most satisfactory of any that I have tried.

At present I have only made a few enlargements in this manner, and I have sent two negatives and the prints from which they were made for your inspection. From my experiments I think that this will prove a very satisfactory mode of enlargement.

One thing I have already discovered, and that is that it is necessary to avoid as far as possible having air-bells intervening between the print and the glass; for if they come on the sky portion of the mounted print they will show on the enlarged negative.

C. E. Abney.

AN IMPROVED CARRIER FOR LANTERN SLIDES.

[A communication to the Edinburgh Photographic Society.]

Nature again looks frowningly upon all that pertains to the photographic art. The landscape is bare, and the camera is rarely to be seen outside the studio, the lens of which, even there, wears its cap over its eye perhaps a little too long for the professional photographer. Nevertheless, we have little cause to grumble. The light of science shines even brighter in these dark December days. At least, as far as photography is concerned, we can well afford the sun its few weeks' retirement in the regions of mist and cloudland so familiar to the sons of "Caledonia, stern and wild." But the footprints of the tripod are still upon the mountain's brow. Though the click of the instantaneous shutter is heard no more, there must be mental as well as photographic impressions amongst us of where we have been with the camera, and the question naturally arises—How shall we impart to our fellows a share of that pleasure which the modern appliances of our art are capable of bestowing upon all true lovers of Nature? The answer is, by means of the lantern—the optical lantern or "sciopticon," as the modern instrument is now called—for which every photograph of interest should be produced in the form of a slide, if there be a desire on the part of the artist to see it to the best advantage.

The management of the lantern at public exhibitions does not seem to get that share of attention which ought to be bestowed upon it, and photographic societies should endeavour to take the lead in this direction. It is with the desire of stimulating ours to greater activity that I venture to approach you on the subject.

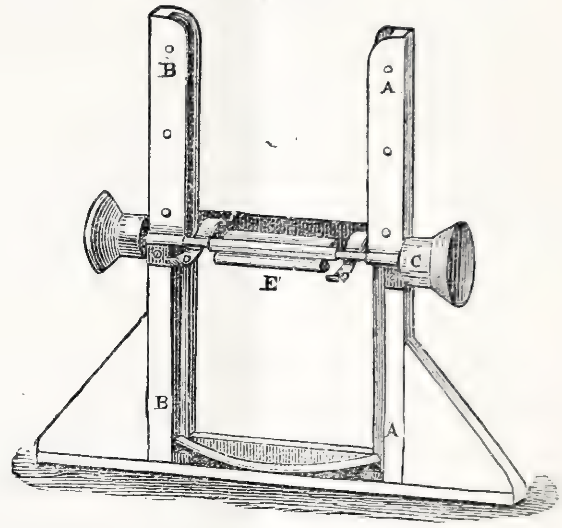
The lantern slide carrier may sound to some of your ears as a very unimportant part of the lantern outfit, yet to my mind it is the very backbone of a successful entertainment. Mr. W. J. Chadwick, who has done so much to simplify lantern manipulations, has overcome, to a certain extent, the difficulty of exhibiting slides of various sizes; and we all join with him in the lament that slide-makers cannot agree as to the size most convenient for this purpose. Here is a matter to decide at the proposed International Photographic Congress at Brussels. A universal size of slide would do much to advance the interests of photography, and remove a load of anxiety from the mind of the lantern conductor. We would then be in a better position to exchange slides with other nations, and be sure of exhibiting them without any special arrangement in the form of our carriers.

Mr. Chadwick's improved carrier, as you are aware, is simple and effective enough when two lanterns are used; but for the mere purposes of exhibiting a series of photographic views there is no need of two lanterns, unless it be for the purpose of *effect*, and that is no small matter in a lantern entertainment. To see a picture come on the screen in its proper place and remain there quietly till the lecturer has passed his remarks upon it, and to pass as quietly away, is a pleasure we seldom enjoy under present circumstances. When a single lantern is used we are accustomed to see the pictures pass along the screen in regular, and sometimes irregular, succession, with an ugly streak of black between each—caused, you are aware, by the binding of the two glasses and the round or cushion-shaped mask between them. Why this has been so long the form of mounting slides is difficult to understand. It is much better to leave out the mask, and with the picture close up to the edge, bind only the top and bottom of the slide; and if the push-along process of exhibiting them be adopted we have something more approaching a panoramic effect, while the eye will not be so painfully impressed with what in reality appears more prominent than the picture itself, namely, its mask and binding. This, with the single lantern, will be found a practical way of getting over the difficulty when slides of various sizes are to be exhibited; indeed, there need be no limit to the length of the landscape slide, though for portraits the mask is indispensable. A universal size of slide, after all, would be the most acceptable.

I shall now describe my carrier and the mode of using it. The only difficulty in the way of its being immediately adopted is that a special arrangement is necessary to be made with that part of the lantern which bears the lens. The improved sciopticon requires no alteration except in the hood which shades the light between the condenser and the objective. After seeing the carrier at work you will find it requires no great amount of mechanical skill to effect the desired alteration, and to introduce what I venture to hope you will consider an important improvement in lantern slide carriers. The following sketch will give some idea of the shape and mechanical arrangement of the carrier in its improved form:—

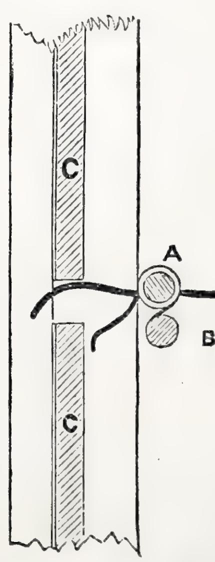
A A and B B, *fig.* 1, is the frame, which may be made of either wood or metal. C C is a spindle which passes from side to side of the frame, terminating at each end with a suitable thumb-screw, by which it is turned in the act of changing the slide. D D are two

FIG. 1.



metal plates passed through the above spindle, which act as levers in pushing away the slide E may be called a self-acting balance lever, the form and action of which will be better seen in *fig* 2. F is a spring to counteract the force of the falling slide, upon which the successful working of the carrier much depends, in adjusting which be careful to give it a slight turn inwards, so that the slide on falling may not be forced outwards. *Fig* 2 is a full size section of the principal part of the carrier as seen from the side. A is the spindle; B the self-acting balance lever, which is simply a plate of metal bent round the spindle in the form represented, the round black part of which is filled with lead, thus causing the lever to press against the slide C, and hold it in position till forced away by the spindle levers in the act of changing the slide.

FIG. 2.



In using the carrier drop a slide in at the top of the frame at A and B, *fig.* 1, till it rests on the spring F. That being exhibited on the screen, drop another slide in at the top as before, while the spindle levers are lying in a horizontal position, thus preventing the top slide from coming in contact with the bottom one. The lecturer having finished his description of the view on the screen, gives the signal, while you give the thumb-screw C a slight turn, and, in a flash, the scene is changed.

If I have made the description plain enough, you will perceive the slide on being expelled from the carrier falls forward upon a cushion or pad, from which it is removed during the description of the succeeding slide, and so on till the close of the lecture.

I ought to say that to some the idea of exposing the slides in this way is not new. My carrier, in its original form, was shown to some of the members of this Society five years ago. Since then there was something similar spoken of in the journals, though I have sought in vain for a description. This, and the desire to introduce an improvement in our lantern exhibitions, is the only apology I have to make in bringing before you a lantern innovation.

J. M'Kean.

ROUND THE WORLD.

No. IV.

However much I was impressed with the nocturnal appearance of Ohinemutu when we arrived there on the evening of April 17th, I was very much more surprised when, at daybreak on the 18th, I sallied from my bedroom upon the verandah of the most comfortable hotel, the Lake House. It was slightly frosty, there was not a breath of of wind, and the view before me was filled with great jets of steam—not only close at my feet, but several miles away. It was, perhaps, the queerest sight I ever saw. In the hotel garden there are two boiling springs—one supplies the hotel baths, and the other forms a tank where clothes-washing is made easy. The temperature of the bath spring is 212°. A few yards ahead, just "over the garden wall," is the Maori Village, with many more springs, a meeting house, and a little further away a burial ground. The lake also lies in this direction, the shore being close to the village, and the water extending for some miles into the distance. About two miles off, slightly to the right, is another hot-spring establishment and another Maori village, known by the sweet and short name of "Have a Care, Demon!" (Whaka-rewa-rewa). *Whaka* is Maori for a canoe, and *rewa-rewa* is a tree which the colonists call honeysuckle, which is about as similar in appearance to our honeysuckle as Polonius' cloud was to a whale.

Now a very mysterious affair occurred to me this frosty morning. I erected my camera in the gallery, got a very nice picture on my ground glass, and, as I fondly imagined, made a most deliberate and accurate exposure. But never have I been able to find any plate bearing signs of having been exposed here; I have not even found a blank plate dated about this time. Either I was asleep or some of the spirits which I am certain must haunt so weird a region must have exercised their diabolic influences on my camera. Anyhow, my view of Ohinemutu is *non est*.

In the forenoon of this day Mr. Graham, the most hospitable and agreeable manager of the Lake House, took my friend and myself for a walk round the district, and with such a guide we thoroughly investigated and appreciated the wonders of the place. We examined the springs on the lake shore, over which the Maories have built their *kopas*, or kitchen-ranges. Maori cooking is done entirely with heated stones and steam; so it is easy to conceive with what facility their culinary devotions are performed where a boiling spring can be found anywhere. I am not given to travellers' tales, but I state as a fact that we could stand at a certain point, catch fish in the lake, cook them in a spring, and eat them without moving a foot. We examined Tamati Papua, the Maori meeting-house, all stained in symmetrical patterns with red and black dyes; and outside we saw a lot of their idol images, about which the less said the better, either in the matter of beauty or decency. All along the lake shore the earth is a yellowish crust of sulphur. Every here and there the boiling sulphur had broken up through the crust and formed minature volcanoes, making very curious objects for study, and emitting a smell that not only was unpleasant to the sense but far from conducive to a healthy appetite; in fact, I felt quite squeamish during my first day or two among the hot springs.

We visited two springs under the particular supervision of Government—one called "Madame Rachel," from its beautifying effect on the skin, and consisting of chlorides and silicates; and the other called "The Priest," strong in acid sulphates. The acid is so strong that coins placed in the bath blacken in less than a minute. We bathed in "The Priest," which was quite warm, though exposed to the air in a tank twenty or thirty feet long. In order to gain the benefit of "The Priest," one ought to remain in the water "till the body becomes as red as a lobster." After more than half-an-hour in the water my body remained in its pristine purity of colour, so I suppose that either the grog was too much watered or else that rheumatism has no power over me. Whaka-rewa-rewa resembles to a great extent Ohinemutu, so I need not expatiate upon it.

The Maories will not allow one to sketch or photograph in this district—given to the Arowa tribe by Government in recognition of their services during late wars. At least they demanded such exorbitant sums for permission that it was "not good enough" for an amateur. I tried cajolery—I even tried *rum*—but to no purpose. It will be easy to imagine my good wishes towards these foolish, pig-headed Maories, who are doing the very thing to prevent their country becoming a great resort for travellers. Not only do they insist on payments such as I mention, but their charges for guides and conveyance to the sights are simply preposterous, though much lower and better regulated than they were a few years ago.

After lunch, on the 18th, we drove about eight miles to a place called Te Wairoa, whence is made the excursion to the "Terraces," the lake Rotomahana, &c. Our first proceeding was to visit a waterfall of no great account, conducted thither by a little Maori boy, who sang "Hold the Fort" very well. Then we arranged with "Kate"—one of the two official guides—for a trip to the Terraces next day.

At about 7.30 a.m., on April 19th, we started for Rotomahana, with six Maories, and "Kate" to act as guide. Kate is a half-caste. Her real name is Margaret Middlemas, and she and I both claiming Scotch blood were at once great cronies. I find that same Scotch origin superior to any amount of Freemason grips and passwords; you may forget the latter, but your tongue will keep you and others in mind of the former. After a good, long row on Lake Tarawara we landed at a certain point, then walked about a mile to the White Terrace; but how I am to describe this I do not quite know.

The terraces are formed by the overflow from a large basin of boiling water strongly impregnated with sulphur. The water flows from terrace to terrace, gradually cooling, and leaving behind the sulphur salt in the form of white crystals, which have coated the faces of the terraces, and which cover any article laid in the cooler basins. Ferns, mosses, sticks, and even a puppy's corpse have all been so coated, and form beautiful and interesting, though fragile, objects. You are not allowed to pocket anything; price for so doing, £5. Kate was fined £20 a year ago for winking at such a proceeding.

All round the White Terrace are boiling springs, sending water high up into the air, roaring fearfully in many cases, especially in one place, called the "Devil's Hole," where no water comes to the surface, but the din is terrific. There are holes full of brown boiling water, such as the "Coffee Pot;" and little hills of seething clay and mud, as the "Porridge Pot." At Kate's advice I tasted the "porridge;" well, I prefer the *plat á la* oatmeal. After lunch—consisting not of the infernal brew, but sardines, potted meat, potatoes (boiled, of course, in a hole in the ground)—we went in a canoe across the warm Lake Rotomahana to the Pink Terrace. This terrace is like the other, but of a beautiful pink colour. We bathed here, getting a fine gradation of temperature, beginning about four basins from the top and going gradually higher. We did not, however, *quite* reach the top basin, of which the temperature is 212° Fahr. Then we returned to Te Wairoa, after a day of what I call real and wonderful sight-seeing. The Terraces, and the boiling spring country generally, simply defy description.

As my friend and I were now close upon the less-frequented part of Maoridom, and as we had fallen in with another enterprising traveller, we thought we might in company explore the other lakes in the district, and try to gain a further insight into Maori life. Anyone who wishes to follow the journeyings of which I am now about to give a brief account will require a good map on a fairly large scale, and even then it is doubtful if he will discover the names of all the places I mention. We chartered a boat with a half-caste guide and a crew of one Maori soul, and, a group having been duly taken, we set sail in the good ship "Bessie Bell," ten tons, Captain Ted Elmslie, a very handsome half-caste, and crew Kaka, a far from lovely Maori. We crossed Lake Rotorna to Mokoia—a densely-wooded island in the lake. Here, being anxious to get to the top of a hill to secure a view, we set off, each his own way, cutting paths through the scrub with our sheath knives. As I was caparisoned *à la* Maori—that is to say, with a shawl of many colours worn kilt-wise—I got to the top with my lower extremities well "*rétouchés á l'aiguille*," as M. Lièbert says in his capital treatise on *Photography*, or, in plain English, jolly well scratched and bleeding. As the scratches were mostly produced by *manuka* scrub (a slightly poisonous shrub) my legs festered a little in a day or two, but it served me right.

Having duly admired the view at the top we returned to the "Bessie Bell"—*by a track*, this time—and left the Island of Mokoia. We then sailed to an outlet of the lake called the Ohau river, down which we sailed to lake Roto-iti. (Roto, "lake;" iti, "small;" rua, "double;" mahana, "hot;" wairau, "double water," and so on.) We camped for the night under canvas near a hot spring called Manupiroa, and having discussed a supper of tinned beef, sausage meat, and tea, we went and lay in the hot spring, where at last I fell sound asleep, and was awoke an hour later to play *euchre* in the tent till bedtime.

At 8.15 next morning we struck our camp and set sail once more for a Maori settlement called Wai-iti. This we reached after a great deal of tacking and a stoppage at a Maori village, where I tried to get a pheasant or a wild pig, but failed in both. I would not allow anyone to come near me when I carried the gun, because the two barrels were so full of brotherly love for each other that one refused to go off without the other; and, if the left barrel did not "come up to the scratch" exactly at the same time as the right, it would shortly repent of its churlishness and deliver itself about three minutes later in the day. By that time the bird or pig would be *almost* out of range, even if I had "covered" it during the gun's hesitation. We arrived at Wai-iti at 3 30 p.m., and after landing what provisions we expected to require we went to inspect our quarters for the night. We found ourselves among a clan of Maories, pretty much as their ancestors were found by Captain Cook, except that they were dressed to a certain extent. One ancient dame had never seen a white man before, and my head, which is "thin at the top" as to hair, was the wonder, admiration, and amusement of all beholders. About twenty times that evening I had to uncover for the inspection of all who came from neighbouring settlements; and the entertainment never seemed to pall on even those who had seen the sight oftenest. I felt myself a second Gulliver, and nobly earned my Maori name "Te Marama" or the "Full Moon." Sometimes this was varied with "Pumpkin-head," but I felt the latter *soubriquet* derogatory—quite! My sheath-knife—which from an unoffending-looking weapon opens to a very vicious-looking thirteen inches of steel—also created quite a sensation among them. We slept this night and the following in a wharé, ourselves numbering four, and having as companions seventeen Maories, men, women, and children—

from an infant of a few months to an aged crone of perhaps seventy summers—all lying close together like sardines in a box, and all smoking. I say "all," for the children smoked too. A woman with an infant unable to walk will take a few draws at her pipe, and then hand the "cutty" over her shoulder to the infant for his delectation; and boys and girls of ten carry their own pipes and tobacco. That is civilisation!

The 23rd being wet, we remained in our quarters all day, my companions and the Maories playing *euchre*, and all cheating religiously. On the 24th we set off in a canoe to see more lakes. We paddled a mile or two, walked a mile or two through bush, rode a mile on a pony across the corner of Lake Roto-ehu ("black lake")—and then walked some more to Wairiki—a hot, effervescing spring. This was very like zoedone, and contained iron evidently. Then we got into the wreck of a canoe, which we caulked with sods, and sat upon them to keep the water out, and went down a creek to Rotoma ("white lake")—a very beautiful scene, which I much regret not being able to photograph. I could not have brought my camera through all these vicissitudes of land, bush, and water; and even then I might not have been allowed to photograph. The Maories have very happily named their lakes. Roto-ehu was a dismal-looking tarn, with even gloomy stories attached to it of massacres and *tapu* (taboo); while Rotoma was all smiling, and the water clear to a degree I dont think I ever saw before. Being in want of cups to drink out of we took stones from the shore, and with our knives in a few seconds hollowed out first-rate and elegant vases. This is also a fact: the stones were soft pumice. Then evening approaching made us retrace our steps to Wai-iti, which we reached after a meal of crawfish (kohura), with a Maori tribe at a place called Tapu-a-e-aruru. I was preparing to shoot some wild ducks here, but was peremptorily stopped, being told that at this spot ducks are "tapu"—that is, sacred or tabooed. No doubt there is a story connected with this, but I could not understand what the Maories said about it, the guide being absent at the time.

On the 25th, having executed (photographically) a group of our kind Maori hosts and some of our own party, we started backwards for Ohinemutu, taking on board on Lake Rotorua a party of sawyers, who, though men of good education, swore and blasphemed in a manner not to be equalled—nor, I think, approached—in any other place or station in life. "Happy Jack"—a member of this august party—"landed" in prison that night for breaking windows with stones. I doubt if he needed stones, for his oaths would break any plate glass window I ever saw. We finished the evening with songs, dancing, and a protracted bath in the Lake House natural bath, and I do not expect ever to regret our short tour in Maoriland.

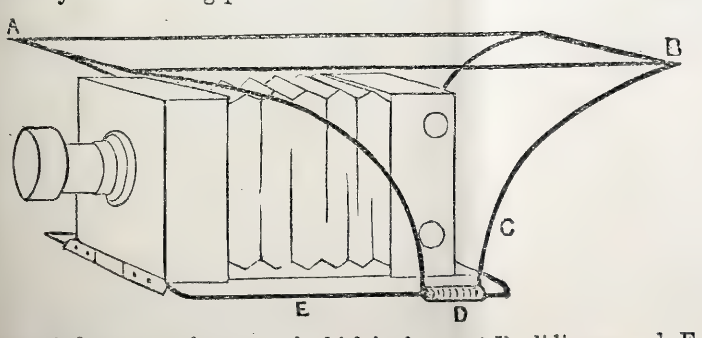
Soon after we again took to coaching, driving ninety-five miles through the barest land I ever saw, being chiefly the bottoms of now dry volcanic lakes. Thus we got to Cambridge, whence, having stayed two or three days, we went by coach to Hamilton, and thence by train to Auckland.

ANDREW PRINGLE.

A FEW PHOTOGRAPHIC CONVENIENCES.

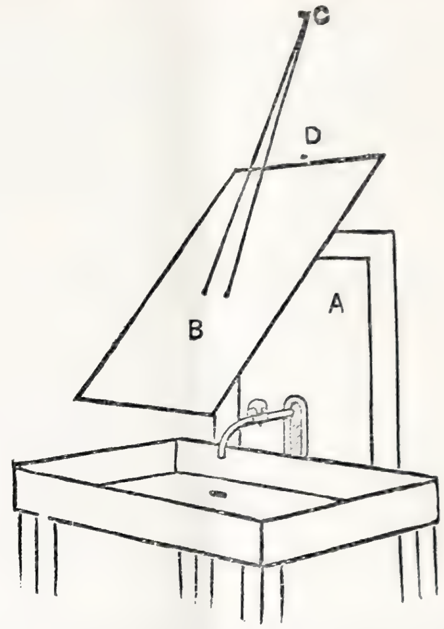
[A communication to the Edinburgh Photographic Society.]

I TRUST that the title of my short paper has not led you to expect anything very original, but the little conveniences I shall have the pleasure of describing to you this evening I have found to work well, and with the aid of the black-board I shall endeavour to make myself as clear as possible. You may have noticed, occasionally, startled expressions in portraits, more especially in those of children. I would feel inclined to attribute this to the fact of their having seen something alarming. Now, to get a pleasing expression, the eyes must rest on something homely and agreeable, and this is certainly not to be found in a photographic operator who has just had his head wrapped up in a black cloth, and comes out of it in a hurry. No doubt an animated object is the best means of attracting the sitter's attention (for instance, a friend might accompany them to the studio), but nothing so animated as our friend from under the cloth, whose toilet has become disarranged to a considerable extent, and makes one think of a Skye terrier peering through his locks. However, this little grievance can easily be overcome by the following piece of mechanism:—A B C, frame of wire,



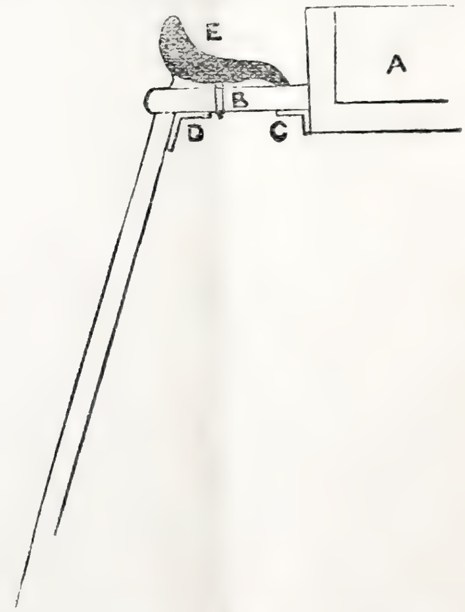
supported on two tubes, one of which is shown at D, sliding on rods E. The dark cloth is thrown over all. It answers a twofold purpose, forming a shade for the head while focussing, and drawn forward shades the lens from a flood of light during exposure.

The next contrivance is also intended to battle with a flood of light; but this time it is in the dark room, and shades the eyes when developing.



What I use is in connection with the window, and can also be applied to a lamp. A, dark room window; B, piece of light board, suspended by a string from a nail at C. The top of B is caught by a nail at D, giving it the desired slope. A lamp may take the place of A.

Before leaving the dark room I might describe a little invention which partakes more of the character of a luxury than a convenience,



namely, a seat of the following construction to rest one's weary limbs during development. A, section of sink; B, piece of wood about twelve

inches long and one and a-half inch thick, hinged to sink at C, and to leg or support at D. E is a bicycle saddle fastened on B in the usual way.

Those who use a stand and pole for adjusting a point of sight for the sitter will find two American clips, fastened at right angles with each other, answer the purpose admirably; one can be moved up or down the pole at will, and the other holds any attraction you may consider suitable.

The following convenience occurred to me one hot summer's day while varnishing negatives at the fire, and will be found to possess the double qualification of coolness and cleanliness:—A tin vessel being shaped as the foregoing illustration, a very small quantity of hot water heats this vessel at once. It possesses many advantages over an open fire.

I might here give a hint with regard to showing negatives at the request of the sitter. Place the negative, film side downwards, in a black developing tray containing a little water. If the image be visible at all it will be seen to the best advantage by this means.

W. Crooke.

THE PAST, PRESENT, AND FUTURE OF PHOTOGRAPHY IN NATURAL COLOURS.

[A communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

The subject that I have chosen for this paper is undoubtedly one of general interest. The solution of the great problem of photography in natural colours will, when it comes, affect not only the members of the photographic profession and their amateur brethren, but also the public at large.

When in the year 1839 Fox Talbot and Daguerre simultaneously succeeded in fixing—the one on prepared paper, the other on a silver plate—the image of the camera-obscura, they rendered photography a fact, and their discoveries gave rise to great expectations. By far the greater number of these expectations have now been realised, even beyond the hopes of the inventors who fulfilled them; but some few have not, and among the latter stands pre-eminently foremost the possibility of obtaining photographs in natural colours.

Who is there who has viewed the gorgeous tints with which nature paints the world, reflected in all their pristine glory on the screen of a camera-obscura, and has not longed for the means to fix them as they are? Many, no doubt, have wished for such a possibility; some few have attacked the problem, but no one as yet has completely solved it. The ordinary photographic plate is not sensitive to colour—that is to say, on its colour simply, as with more or less intensity according to its actinic value; and thus, as yet, photography can only paint nature in monochrome.

In order rightly to understand the difficulties of the problem, or in order to properly estimate the value of what has so far been discovered, it is extremely necessary to have a clear conception of the physical nature of light and colour.

According to the now universally accepted undulatory theory, the sensation that we call light is merely a form of vibration, as is sound. All space is believed by scientists to be prevaded by exceedingly attenuated and elastic matter, to which the distinctive name of "ether" has been given. Now light is understood to be a form of vibration or wave-motion of this ether, in exactly the same manner as sound is known to be due to the vibration of the atmospheric air.

Again: differences of colour is due to what is called difference of wave-length, or difference in the rapidity of the ether vibrations. This, when we follow the analogy of sound, corresponds with difference of tone or pitch, exactly as a high note in music is due to extreme rapidity in the atmospheric vibrations, and a low note to less rapid vibration. So with light: a violet colour is the result of extremely rapid ether vibrations, and a red colour the result of less.

In violet-coloured light there are no less than 59,750 ether vibrations per second, in comparison with 37,640 for red-coloured light. These are the extreme cases, and between them come in order after violet, indigo, blue, green, yellow, orange, until the red is reached. There are thus seven primary colours, and from combinations of these all other tints can be obtained.

Next let us consider why objects appear to the eye to be of different colours. The explanation of this is very simple. White light is not really homogeneous as it seems, but is composed of seven different coloured lights, and a piece of white paper appears white, simply because it reflects all these colours in equal proportion. Coloured objects, on the other hand, are only capable of reflecting certain colours, while they absorb the others. Thus a red surface absorbs lights of all colours except red, which it reflects; a blue object absorbs all but the blue, and so on. A perfectly black surface, if such were obtainable, would absorb all the rays, and reflect absolutely nothing at all.

Now what is wanted for the solution of the problem of photography in natural colours is clearly some substance which, when submitted to the action of light of any definite colour for a certain length of time, will acquire the property of thereafter absorbing from white light all other colours, and reflecting only that one colour to which it was exposed in the first instance. In other words, the substance, after having been exposed to light of a certain definite wave-length, must afterwards be capable of reflecting light of that same wave-length only. Looked at from this point of view, the problem does not seem to offer insuperable difficulties, and, as we shall see later on, it is of comparatively easy attainment. There is, however, another and equally important point to be examined. If a plate of such a substance as has been above described be exposed to a variety of coloured lights—as, for instance, to the image of a landscape thrown upon it by a photographic lens—the image will become impressed upon the surface of the plate, and a photograph in colours will be obtained. To some, perhaps, the problem will appear solved; but this is not the case, for, to use a technical expression, the image is not yet fixed, and it is this question of fixing the colours after having obtained them that presents by far the greatest obstacle to the attainment of coloured photography.

As long as the coloured plate be preserved in absolute darkness the image will remain intact, but the substance of which it is composed is still sensitive, and if exposed to light of any colour it will soon become of that colour itself, while if exposed to white light it will turn white.

To secure permanency of the coloured image, this further action of light must evidently be prevented; but how to do this without destroying the image is a problem as yet unsolved.

From the above it may be gathered that what is required for the solution of the problem of coloured photography may be divided under two heads.

Firstly. We require a plate so sensitive to colour that, after it has been exposed for a few seconds in a camera, it shall show a coloured *facsimile* of the image that was thrown upon it by the lens.

Secondly. A means of fixing the colours, so that after the plate has been once impressed, it shall no longer be sensitive to light of any description. Let us see what has been done towards the fulfilment of these necessary conditions, and what yet remains to be accomplished.

The first discovery of a substance sensitive to colour dates a long way back. As early as 1810, Professor Seebeck, of Jena, discovered that chloride of silver, when exposed to the coloured spectrum produced by passing the sun's rays through a glass prism, became coloured in a corresponding manner, the red and blue being especially distinct.

In 1839, Sir John Herschell exposed to the solar spectrum paper covered with violet sub-chloride of silver obtained by floating the paper on solution of sodium chloride and silver nitrate, and subsequent exposure to light, and obtained a coloured spectral photograph. A. A. Campbell Swinton.

(To be concluded in our next.)

ON ENLARGING.

[A communication to the Photographic Society of Ireland.]

The subject of enlarging, on which we are about to enter this evening, is one of ever-increasing interest. There are, we know, many processes of enlarging, each having in its turn its admirer, enthusiast, and advocate, that known as the "autotype" having probably received the largest share of attention. But now another agent has stepped to the front—a sturdy competitor, which bids fair to outstrip all its rivals. I refer to the preparation known as gelatino-bromide, the merits of which we are shortly about to investigate, and which, for convenience, economy, and permanence, will hold its own with any in the world. Mr. J. Traill Taylor—a name well known in photographic circles, who has done so much for the advancement of our art—in a paper recently read before the Photographic Society of Great Britain, speaks of the large sizes taken direct in the American studios, 24 × 20 being a common occurrence. Probably now that gelatine has been so generally adopted, larger sizes will gradually creep into our own studios—a circumstance which, I think, is very desirable.

But it is for field work that gelatino-bromide will be found specially adapted as regards enlarging, where it would be impossible to drag cameras of the size I have mentioned into the field; but I venture to think that gelatino-bromide paper is destined to play a more important part still in the history of our photographic future. I refer to direct printing, and to show how favourably this opinion is held by those whose knowledge is extensive in matters photographic, I cannot perhaps do better than quote from the editorial notes of the *Photo. News*, of November 30th last, which reads as follows:—"There can be little doubt that gelatino-bromide paper will be used largely for the direct printing of negatives in the pressure-frame. When sunshine is rare and a whole morning fails to give a single print upon albumenised paper, it is something to know that you can, if need be, print hundreds of impressions by the light of a candle upon gelatino-bromide paper—impressions, too, that are likely to prove more permanent than albumen. Care, no doubt, is required in exposing and developing; but so it is in the other process." And again in the *News*, of the 7th inst., we find the following:—"We have frequently referred to the circumstance that gelatino-bromide or gelatino-chloride paper is likely to attain a position of some commercial importance, more especially when it may be necessary to produce a considerable number of prints in a short time. But very few photographers have yet learned to appreciate the power placed in their hands by the introduction of paper coated with gelatine emulsion."

Now, ordinary gelatine papers were not found suitable for this direct printing. There was one fault—lack of brilliancy in the developed prints. Mr. Goodall, some time ago, commenced a series of experiments, with the view of producing a paper with a high gloss, and, after many attempts and many failures, was at last successful in producing an enamelled argentic paper, adapted either for enlarging or direct printing. I now submit to your inspection some direct contact prints on this paper, the exposure of these pictures to a naked gas jet varying from five to nine seconds; and, whilst they are not, perhaps, the very best that might have been obtained, I exhibit them to show what has already been done in this direction.

We must all remember that this direct printing upon gelatino-bromide paper is now in its infancy—it is, in fact, our youngest child. Let us take it by the hand; let us bear with its little weaknesses; and in a short time it will arrive at manhood, and repay us a hundredfold for our patience. The whole key to success lies in that one sentence of the *News*, stating that "care, no doubt, is required in exposing and development." It requires extreme care in the handling, particularly avoiding all possible trace of hypo. till it arrives at the last operation, namely, fixing. A little error in exposing is sufficient to spoil the resulting picture. Over-development will do the same; but, carefully and intelligently handled, the paper is capable of giving splendid results. I might here remark, as a guide to the successful using of this paper, that the developing solution—that is, oxalate of potash and protosulphate of iron—should be thoroughly saturated; that the paper should be well washed; after development placed in the alum bath and allowed to remain five minutes; then taken out and

slightly rinsed, and fixed in hypo. one ounce, water six ounces. After fixation it is washed in running water for three hours, immersed again in a fresh alum bath for a few seconds, slightly rinsed with clean water, and placed to dry. With these precautions you need have little fear of the permanence of your print.

The beautiful opal next claims our attention; and to those whose taste is refined—those to whom the hidden beauty of a club picture has never been revealed; to those who view with pain the attempts at colouring by those whose ideas of art are certainly not on the highest footing; to such, I say, the eye will turn with satisfied relief to the chaste, pure, and simple opal. I believe Mr. Goodall was the first to introduce matt surface opals as an article of commerce to the photographers of Great Britain about three years ago, and ever since that time there seems to have been an increasing demand for this class of picture. I have not time to dwell longer on the subject this evening. I hope to make an opal enlargement in your presence, when those who have not seen the operation will, I think, be surprised at the result to be obtained for such a slight expenditure of trouble.

We have now arrived at the concluding part of my paper, which refers to artists' canvas. Owing to the greasy nature of their surface acting as a repellent, it was at first found difficult to give them that equal coating so desirable; but, after a series of experiments, this has been at last surmounted, and without injuring what is known as the prepared surface. Gelatino-bromide canvases capable of giving equally as fine results as other mediums are to be had.

I cannot close this communicaton without referring to what is deemed by some a drawback to portraits on this paper, namely, the tone. We hear of experiments constantly going on in laboratories and elsewhere, with a view to the production of warmer tones. Professor Towler remarks, in the *Silver Sunbeam*, speaking of processes, that collodion will always remain the predominant mode of working in the studio. That was twenty years ago. We all know how thoroughly he was mistaken. I believe that we shall advance more rapidly with our toning experiments than many think, and that before half that time gelatino-bromide pictures will be produced having those delicate tints and fleshy effects we are so accustomed to see in the best silver prints. J. McGhie.

Exhibitions.

THE BRISTOL INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

The second triennial exhibition of the Bristol and West of England Amateur Photographic Association was opened on Monday last, the 17th instant, with a *soireé*, in the Fine Arts Academy, Queen's Road, under the patronage of Mr. J. D. Weston, Mayor of Bristol.

The Mayor, in declaring the Exhibition open, made a few remarks on the subject of recent advances in photography, stating that the present collection of photographs is the largest ever brought together in the United Kingdom, numbering, as it does, between 800 and 900 exhibits.

The judges were Messrs. William Bedford, Valentine Blanchard, W. Harvey Barton, J. Jackson Curnock, and William Radcliffe, and the following is a list of the awards:—Gold medal for the best series of pictures in the exhibition, Mr. Adam Diston, Leven, Fife, for Nos. 445 and 446, *Industry* and *Gloamin'*. The silver medal for small landscapes, Mr. H. B. Berkeley, for No. 67, *Noontide*, and No. 69, *In Norbury Park*; the bronze medals in the same class going to Messrs. Andrew Pringle and Edward Brightman. For large landscapes Mr. W. McLiesh takes the silver medal, and Messrs. E. Dunmore and H. A. H. Daniel the two bronze medals. The silver medal for the best landscape or seascape was awarded to Messrs. West and Son for their yachting views in the Solent; and the bronze medals in the same class to Messrs. Cobb and Son for their instantaneous street views, and Mr. T. G. Whaite for his Breton studies. In the extra class, for seascapes, Mr. F. Sutcliffe, of Whitby, takes the silver medal, and Mr. W. Mayland, of Deal, the bronze medal. M. Herman Ruckwardt, of Brussels, is awarded the silver medal for interiors for his *Interior of Buhl Castle* (No. 107), and Mr. H. Manfield receives the bronze medal for his interiors of English cathedrals.

The silver medal for small portraits goes to Herr Taeschler, of Vienna, Messrs. Day and Sons, of Bournemouth, taking the second award. For large portraits Mr. R. Faulkner, of London, gains the silver medal with a fine study, *Phyllis Frere* (No. 416), Mr. H. S. Mendelssohn, of Kensington, taking the bronze medal. In the *genre* class the silver medal has been awarded to Mr. J. Hubbard for his well-known picture, *Mother's Love* (No. 576), and the bronze medal to Mr. H. P. Robinson for his equally well-known *Wayside Gossip* (No. 556).

Mr. W. F. Donkin's enlargement of the *Dent du Geant* (No. 288) receives a silver medal, as does also Mr. T. J. Dixon's *Tiger at the Zoo* (No. 618). The bronze medal for the best transparency is well earned by the Sciopticon Company, of London. Four additional bronze medals for "meritorious productions or processes" were given to Messrs. Fred. Hollyer, for his decorative flower studies; A. Cowan, for transparencies; Geo. Hare, for his new camera; and Herr Graf, of Berlin, for portraits.

The greater number of the exhibits are well known, having appeared previously in other exhibitions. We shall, however, next week endeavour to review the important novelties in the Exhibition.

MANCHESTER PHOTOGRAPHIC SOCIETY,—SOIRÉE AND EXHIBITION.

The labour and expense of the exhibition of the Manchester Photographic Society, held two years' ago, have not deterred the members from once more collecting the best pictures of the recent exhibition in London, and, with the work of some of its own members, forming a very interesting collection of recent work. The success of the exhibition in 1881 suggested one on a similar scale during the present season; but it was thought that the exhibitions at Newcastle and Bristol would interfere, and it was therefore concluded to have a *soirée*, and to continue the exhibition for a second day only, reserving the funds of the Society for a more important display to be held next winter in the Manchester City Art Galleries.

The origin of the present Exhibition may, perhaps, be traced to the fact that one of the members of the Society has recently returned from a two years' tour round the world, and that he collected in Canada, America, Japan, China, Ceylon, and India many thousand specimens of photography, most of them of considerable size, and all of great beauty and interest. In the collection are many large prints of temples in Japan and India—all full of wonderful detail, and exhibit skill of no ordinary kind in the manipulation of plates of so large a size. Possibly on no previous occasion have so many examples of the kind been seen on the same walls; and certainly it may be said that very rarely could the work of so many portrait photographers be compared as in this collection. Here may be seen the best work of all the first artists from Canada to New York and San Francisco. It would be tedious to give a mere list of names, and still more tiring to go into details of the excellence of each man's work. They are here seen side by side; all are choice specimens of each artist's work, including in many cases portraits of the artists themselves.

It may naturally be asked—In what does the charm of this work consist? and the remark is often made—"It is the light that does it." True, it is "the light that does it," but there is something more than the light can do. The artists are skilful in posing, perhaps more skilful in retouching, and the subjects selected are generally actresses—handsome women, superbly dressed, and the whole "get up" picturesque; and then the "light" is called upon to do its work. Compare this excellent work—for there can be no doubt that it is excellent—with what may be called the *domestic* photography of the same artists, and it will be found to be no better than can be seen in any of the best studios in England. Our American *confrères* have the advantage of many more working days than we have; they are seldom prevented working on account of fog; but it can safely be said that on any fine day in England photographs can be taken that will equal those of any other country, and the time of exposure is no longer here than elsewhere. In fact the glaring light of some studios is a disadvantage.

Where all are so good it is difficult to select for criticism. One interesting portion of Mr. Harris's collection is the portraits of Japanese ladies. If we form our estimate of the personal appearance of the ladies from the drawings by native artists, our decision would not be in favour of their beauty; but amongst the Japanese—and it is probably the case all over the world—there are types of face which may be called beautiful. Mr. Harris also shows some very large prints of the public buildings in Washington done by a process called "phototype." It is difficult to say by what method these excellent prints are produced, but they are better than anything of the kind of the same size we have before seen in this country.

Upon the walls and tables we find most of the pictures which were awarded medals at the exhibition of the Photographic Society of Great Britain in November last; and it is pleasant to be able once more to examine this excellent work more at leisure than when we saw it in London. We do not agree with all that has been said about the way the *Chittywee* was taken. That little picture is a very beautitul one, no matter whether it was secured by a "fluke" or otherwise. Is it not in accordance with the experience of all of us that out of twenty pictures there will be often one that is superior to all the others? And he would indeed be a clever photographer who could exactly say why that one picture is better than all the others. Still it is better; and so is the *Chittywee* better than any others in the same frame, excepting for one defect, and that could have been rectified in cutting the print. There is no reason why the sea should not be level at the horizon.

Space will not permit of further or detailed reference to the pictures from the London exhibition, further than to say that we find here the work of the School of Military Engineering, the London School of Photography, Messrs. Annan, Chaffin, Robinson, Marsh Brothers, Bullock, England Brothers, and Diston; and it would have given us pleasure to have spoken in detail of these exhibits if they had not already been criticised in these columns.

In the absence of a catalogue, and as some of the prints are not named, it is difficult to speak of many of the pictures exhibited.

Mr. J. W. Leigh and Mr. Coote, as on previous occasions, take the lead in landscape work. Both of these members, at one time, gave the preference to collodion-albumen plates; but both now, we believe, are workers with gelatine, and both do equally good work by either process.

Classed with the two gentlemen referred to must be the name of the President of the Society, Mr. J. Pollitt, also at one time a worker with collodion-albumen; but, we presume, the excellent specimens of interiors shown here are from gelatine plates.

Mr. Chilton has a few small prints from plates of his own making, also a good enlargement. Mr. Blakeley makes a good show of his prints, chiefly taken during a recent trip to Holland and Belgium. For technical detail we can scarcely expect to find better work. Mr. Wade also makes a good display, chiefly of small pictures; but, though small, their quality is excellent. Mr. Broughton illuminated the entrance hall by means of his ethoxygen lime light with excellent effect.

On one of the tables was displayed an interesting collection of positives on glass, including landscapes and a portrait of Mr. Nasmyth, all of them taken, very soon after Archer's process was made known, by Mr. Joseph Sidebotham.

We must not omit to refer to Mr. W. I. Chadwick's prints enlarged from quarter-plate negatives. Mr. Chadwick, we believe, gives the preference to this small size, as it is suitable for printing direct for lantern transparencies; and, as he generally secures perfect negatives, the enlarged prints can scarcely be distinguished from those taken direct.

Space prevents further detail, but we may state that amongst other members of the Society are the names of Messrs. Openshaw (who shows chiefly prints by the platinotype process), Schofield, Greatorex, Wilson, Lees, Livsey, Kenworthy, and Cheetham, Rev. H. Macdona, and some others.

Portraiture does not appear to be very popular amongst the members, as with the exception of a very pretty group by Mr. Emmett—a portrait of the Mayor of Manchester—and one of a lady on canvas, by Mr. Brothers, there is almost an entire absence of local portraits.

During the evening a demonstration as to the working of the stannotype process was given by Mr. Woodbury, and appeared greatly to interest all present. It is a matter of much interest to members of this Society that Mr. Woodbury is a native of Manchester, and that the process which bears his name was worked out in all its details in that city.

We come now to an important and interesting feature in the arrangements of the evening—the presentation to Mr. W. I. Chadwick, the Hon. Secretary of the Society, of a valuable gold watch and chain. A more indefatigable secretary no society could possess, and to him is largely due the present flourishing condition of the Society.

Previous to the darkening of the room for the lantern exhibition Mr. Harris gave a short address, in which he referred chiefly to the portraits of the Canadian and American photographers.

The exhibition of photographs in the optical lantern has always been popular in Manchester, and there appears to be no dimunition of that interest if we may judge from what we saw on this occasion. Some of the views were of great artistic excellence, and there is evidently some rivalry amongst the members as to who can produce the best results, as when a picture of unusual excellence appears on the screen all are eager to know by what method it was obtained. Mr. Coote, Mr. Wade, Mr. W. I. Chadwick, and others showed their best work of the past season, very much to the gratification of all present. There was a very large attendance of members and their friends, and the pleasure of the evening was much increased by the performance of vocal and instrumental music. Thus concluded one of the most interesting and successful *soirées* ever held in the Memorial Hall. The interest was sustained to the last, and all appeared to be unwilling to leave, although the hour was late.

The Exhibition was continued during Wednesday, and was visited by many persons during the day. There was a lantern exhibition at 8.30 p.m.

RECENT PATENTS.

NOTICE TO PROCEED.

No. 3,906.—"Improvements in the Reproduction of Writings, Drawings, or the like, and in the Apparatus Employed Therein or Connected Therewith, in part applicable to other purposes." J. HENRY JOHNSON; a communication from J. Marquis de Camerasa, Madrid.—*Dated August* 11, 1883.

GERMAN PATENTS GRANTED.

No. 25,565.—"A Talbot Process." H. NICKEL, Chemnitz.—*Dated May* 1, 1883.

No. 25,327.—"Apparatus for Angular Adjustment of Pictures or Mirrors." P. WIEDERER, New York.—*Dated March* 28, 1883.

AMERICAN PATENT GRANTED 27*th November*, 1883.

289,029.—"A Camera Plate Holder." FRED. G. SARGENT AND A. C. SARGENT, Graniteville, Mass.—*Dated October* 21, 1882.

NOTICE TO PROCEED.

No. 5,709.—"Improvements in the Manufacture of Hydrogen." SYDNEY PITT, Sutton; a communication from E. J. Jerzmanowski, New York.—*Dated December* 11, 1883.

No. 3,948.—"Improvements in Pliable Plates and Surfaces for Photographic Purposes." J. J. SACHS, London; a communication from FICKEISSEN AND BECKER, Villingen, Germany.—*Dated August* 14, 1883.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 26	Bristol	Studio, Portland-st., Kingsdown.
" 27	London and Provincial	Masons' Hall, Basinghall-street.
" 27	Oldham	Hare and Hounds, Yorkshire-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

AT the technical meeting of this Society, held on Tuesday last, the 18th instant, the chair was occupied by Mr. T. Sebastian Davis.

Mr. W. E. DEBENHAM showed a transparency printed out direct on a citro-chloride gelatine plate. The print had not been subjected to any toning solution, but, nevertheless, resembled in colour a tint produced by gold toning. This peculiarity he only found to exist with plates that had been kept for some time before exposure. When plates from the same batch had been exposed whilst fresh, the colour without toning was almost of a yellow-brown. A gentleman who had had some of the same plates found precisely similar results to accrue from keeping; and this gentleman used fresh hypo. for every plate, so that the effect was not produced by such an extraneous cause as the toning action of old hypo. He thought that the fact of such a change in the constitution of the film by keeping as to give quite another colour to the fixed image worth notice and investigation.

Mr. T. BOLAS inquired whether the hypo. had been tested for acidity. If acid were present, the image might be toned by sulphuration.

Mr. DEBENHAM replied that it had not, but that he would repeat the experiment with hypo. made purposely alkaline. Similar solutions, however, had been used in the two cases, when fixing newly-prepared and kept plates. The example shown had been kept about a month after coating before exposure.

The CHAIRMAN said that the occasion suggested a question—What is the best tone for transparencies for the lantern? As a rule the best results were not obtained upon gelatino-bromide plates. Again, was there less facility or more in producing them upon wet collodion?

Mr. DEBENHAM thought that the photographic action of the lens was never quite perfect, and that, therefore, contact printing should give the finest results.

Mr. A. COWAN thought that there was some loss with the camera. He understood that Mr. York now preferred contact printing in all cases where it was applicable—that is to say, where the print was to be of the same scale as the negative.

The CHAIRMAN said that, while on the subject of lantern transparencies, he would suggest that the quarter-plate size ($4\frac{1}{4} \times 3\frac{1}{4}$) was preferable to the $3\frac{1}{4}$ square, as there was room for a descriptive label on the end, which need not be printed so small as to be difficult to read in the light available for the purpose. He thought that there was an advantage in having a large negative, and in printing a diminished transparency from it.

Mr. Bolas inquired what advantage was likely to result.

The CHAIRMAN replied that minor blemishes were less evident when reduced to a smaller size.

A question was read from the box:—"Mr. J. H. Newton, of New York, suggests the following as an accelerator with his carbonate of soda and pyro. developer:—Add two or three minims of a mixed solution of sixty grains of bichloride of mercury in four ounces of water and ninety grains of iodide of potassium in one ounce of water. He states that this developer shortens the exposure in the proportion of twenty-five to five. Have any experiments been made in this direction?"

It was resolved that the questioner be invited to name the publication giving the statement attributed to Mr. Newton, and some of the members announced their intention of making the experiment suggested, and reporting the result at the next technical meeting.

Mr. A. MACKIE said that some gentleman had stated that an exposed plate might be fixed, and after all the bromide was dissolved out the image be developed.

Mr. BOLAS said that that was so with a collodio-bromide plate and acid development with free silver.

Another question was read:—"What is the cause of gelatine plates becoming insensitive to light in those parts which have had slips of paper placed at the edges (in the packing), and which, in consequence, remained semi-transparent after development?"

Mr. DEBENHAM said that, as Mr. Warnerke had long ago shown, the result was due to pressure.

A MEMBER suggested that if pressure caused transparent markings when plates had strips of cardboard between them, then the same mark should occur on a large scale when paper was placed between the plates.

Mr. MACKIE said he had found that certain plates which had been packed with tissue paper between them did show the grain of the paper.

Mr. W. M. ASHMAN said that he had some plates which were packed with strips of card—cuttings from old photographs—between the edges. In some cases these slips had shifted across the plate; but where they had been the mark in the negative was more opaque than the surrounding parts.

Mr. BOLAS remarked that in every case that he had observed the effect of the pressure of the card was to make a transparent mark. Mr. Ashman's results might be due to a phosphorescence in the slips of card used, or more probably to some hyposulphite contained in it.

Mr. DEBENHAM said that the reason why the pressure of card at the edge of the plate was more likely to produce transparent markings than that of paper covering nearly the whole plate, was that in the latter case the same amount of pressure was distributed over a much larger space, and was therefore less everywhere. A possible explanation of the semi-opaque results on Mr. Ashman's plates was that, as he stated the cards were in some cases shifted, they might have caused some friction or abrasion.

The CHAIRMAN stated that before deciding as to the cause of the effects in question, they must be sure that the paper employed was pure. Swedish filter paper was the only one that he knew of as suitable for careful experiment.

Mr. T. FALL said that having sent a parcel of photographs to India with a slip of brown paper over the face of each, and having from some cause received these photographs back through the post, he found that where the paper had been in contact the print was faded quite yellow.

The CHAIRMAN remarked that it was established that unless paper was pure it should not be left in contact with photographic surfaces.

Mr. ASHMAN stated that brown paper absorbed a good deal of moisture.

Mr. FALL replied that the particular paper which had been used was of a very hard, highly-glazed kind.

It was announced that at the technical meeting in February there would be an exhibition of lantern slides produced in various ways, and a discussion upon the methods employed.

LONDON AND PROVINCIAL PHOTOGRAPHIC SOCIETY.

AT the meeting of this Society, held on the 13th instant, the chair was occupied by Mr. A. Haddon.

A paper forwarded by Mr. C. E. Abney, on *An Easy Method of Producing Enlarged Negatives* [see page 776], was read by the Secretary.

The CHAIRMAN had seen photographs copied on a similar principle by placing an unmounted photograph wet against a plate of glass and copying it in that state.

Mr. W. COBB inquired what there was new in the method described in the paper. He had copied prints in the same manner for ten years, but he thought that to unmount a print specially for the purpose was to introduce great risk of fading.

Mr. J. BARKER damped a print and pressed it into optical contact with glass. He preferred for this method of copying to use a side light.

Mr. A. L. HENDERSON did not think that unmounting a print was likely to induce fading. He thought that immersion in hot water would get rid of any hypo. that might have been left in the print. and so prevent fading. On one occasion he had immersed an oil painting in a water bath and copied it through the water.

Mr. COBB would like to have the question discussed at a future meeting—Is hypo. left in the print necessarily an element of fading?

Mr. HENDERSON said that sulphide of silver was not an element of fading; he considered that it improved the chance of permanence in prints. He (Mr. Henderson) then read the paper which formed the third of the series of monthly lecturettes delivered before the Society. The subject was *Ceramic Photography*. [See page 771.] The lecturer went through the various manipulations described in the paper, and at the conclusion of the reading dried the tablet and immersed it in paraffine. After this had been drained off, and nearly dried by gentle heat, he fired the enamel which he had been toning and drying on the tablet during the delivering of the lecture. Mr. Henderson said that the collodion film must be laid on the tablet for firing in the same direction as it lay on the glass. If it were turned over, so that the upper surface lay on the tablet, it would fly off in the fire. The same result occurred if the tablet were not perfectly clean. It should first be rubbed with putty powder and then rinsed with alkali and well washed before floating on the film.

Mr. COBB, at the conclusion of the demonstration, inquired what would be the effect of insufficient washing.

Mr. HENDERSON replied that the film might crack off.

Mr. A. COWAN inquired whether the stay in the depositing solution could be too prolonged?

Mr. HENDERSON said that it scarcely could if the transparency were of right intensity. If it were too intense there would, by a long stay in the solution, be so much metal deposited that the resulting enamel picture would be hard—black and white. The use of tin in the depositing solution was that, combined with the platinum, it fixes the latter metal. The collodion he used was of a horny character, and it had kept good for some ten years.

Mr. J. G. TUNNY said he wished to express his pleasure at what had been shown, and his personal gratitude to Mr. Henderson for what he had learned from his production of enamel photographs. He had long worked at the process, but owed his first successes to Mr. Henderson's instructions. He had seen some productions by M. Lafon de Camarsac's process, which for beautiful quality he had never seen surpassed. If those present who intended to try their hands at enamel photography had as many sleepless nights as he had had they would not have a happy time of it. Mr. Henderson had certainly surpassed what he (Mr. Tunny) had been able to do.

Mr. LAWES remarked that he could only agree with what Mr. Tunny had said. There was one point in which his practice was different from Mr. Henderson's. He always turned the collodion film when placing it upon the *plaque* for burning-in. On one or two occasions, when this had not been done, the film had cracked away.

The CHAIRMAN said that he had profited by personal instruction from Mr. Henderson, and had met with some success, although his results were not equal to those which they had seen produced that night. As to the temperature of firing, if that were carried to too high a point the flux sank into the tablet. The process of Mr. Henderson was founded on a process fast dying out—collodion. At a future meeting Mr. Cowan had undertaken to demonstrate the dusting on-process, and that was a basis of another method of enamelling.

A hearty vote of thanks was passed to Mr. Henderson for the lecture and demonstration, and to Mr. T. Bolas for the loan of the furnace which had been used. The next lecture was announced to be given on the second Thursday in January, by Mr. W. M. Ashman, *On Printing*. It was resolved that on lecture nights business should commence punctually at eight o'clock.

EDINBURGH PHOTOGRAPHIC SOCIETY.

THE second meeting of the current session was held in 5, St. Andrew-square, on Wednesday, the 5th instant,—Mr. Wm. Neilson, President, in the chair.

On rising to open the meeting the CHAIRMAN said:—We meet to-night under a cloud—a dark cloud. At our last meeting a letter from Mr. Lessels was read, intimating that he resigned his position as President on account of ill health, but expressing the hope that he would ere long be among us again. That hope has been frustrated. In whatever circumstances death occurs it is a great calamity; but when it comes thus unexpectedly (we heard of his death five days after that letter was written) it comes like a double blow. One moment light, the next darkness—that was the feeling. Mr. Lessels had a winning simplicity of character. He was not a self-asserting man, but the force of intellect made him a man of prominence, and he held a distinguished position. As an architect he was in the front rank of the profession, and, besides other notable work, various parts of Edinburgh bear evidence of his taste and ability. As a man, his friends will admit that his character might be expressed by such words as judicious, upright, generous, honourable. He was one of the men who have no need to have a fiction put on their tombstones. And, withal, he had his place as a social companion; for his mind, besides being furnished with professional learning and stored with general information, was tempered with that pleasing thing—a quiet sense of humour. In short, his life was his eulogy, and it is a consolation to look back on that. You all know what he was here. He had the welfare of the Society at heart, and among his many engagements he never lost sight of that, but used his influence to promote its interests as the opportunity offered. I propose that a record of the deep sense of the loss the Society has sustained be entered on the minutes.

Mr. A. CRAIG-CHRISTIE expressed his hearty approval of all that had been said by the Chairman in regard to the loss the Society had sustained through the death of Mr. Lessels. In his opinion it would take a long time for the Society to recover from it.

Mr. J. G. TUNNY, in a few feeling and appropriate remarks, supported the motion, which was carried.

The CHAIRMAN then said:—I must mention another member and townsman who died since our last meeting—Mr. Colin Sinclair. For many years his was an honoured name in the Society. Restrained by the retiring disposition which so frequently accompanies an amiable character, he did not speak much at our meetings; but his influence none the less assisted the Society beneficially. He was a man who could take a judicious view of things. For two years he efficiently held the important office of Treasurer. The older members will remember that it was he who gave an impetus to photography in a new direction, being the first who had an establishment for publishing, and so spreading throughout the city high-class photographs. He had many friends, and they all held him in the highest esteem.

The minutes of the previous meeting having been read and passed, Messrs. John Smart, R.S.A., Edwin Pottage, John C. White, and Emeritus Professor Swan, LL.D., were unanimously elected ordinary members.

Mr. W. CROOKE read a paper entitled *A Few Photographic Conveniences* [see page 775], which he illustrated by diagrams on the black-board.

Mr. J. M'KEAN next read a paper describing a new lantern carrier [see page 773], illustrating its action by means of a lantern and a number of slides. The effect of this invention was most startling, as the transparencies exhibited in a single lantern were instantaneously exchanged without the slightest hitch, resembling a rapidly-acting dissolver with a double lantern.

Mr. J. M. TURNBULL said he thought very highly of the invention. He considered it one of those useful pieces of apparatus in connection with the lantern that only required to be known to be widely adopted. It did for the lantern what the drop shutter did for the camera, though in a different way. It was palpably a great improvement on the usual method of slipping the slides through the carrier. The ease and certainty with which the slides succeeded each other—and with a rapidity so great that the eye could hardly detect it—was something wonderful. He was aware that for the last five years Mr. M'Kean had used this apparatus, and he considered that all lantern manipulators would feel a debt of gratitude to Mr. M'Kean for having made the apparatus public property.

The CHAIRMAN presented the thanks of the Society to Mr. Crooke and Mr. M'Kean for their useful communications.

The walls of the room were hung with a large collection of pictures taken by members during the past year. They were examined with much interest, and there was a general expression of opinion that there should be an effort made to secure a regular annual display at this season of the year.

Some photographs by, and a portrait of, the late President were presented to the Society.

The following question was next discussed—"What is the best way to copy a photographic print?"

Mr. CROOKE said he found that prints of brown tone were very difficult to copy satisfactorily, it not being an easy matter to secure the detail in deep shadows. He preferred a good flood of light coming overhead from behind the camera, and no reflector. He had also followed the advice of one who advocated a strong side light, and fancied if there were any difference the result was more brilliant.

Mr. MITCHELL had also used the strong side light—and preferred to use with it a plane mirror opposite the light.

Mr. NORMAN MACBETH, R.S.A., recommended that the print be affixed to glass by means of glycerine, the glass to be inclined at a suitable angle to avoid reflected light from its surface.

"What is the best way to treat an over-exposed negative?" was another question. The replies were not very satisfactory, and tended very little towards a solution of the difficulty.

Mr. S. TAMKIN directed attention to the necessity that the hypo. solution should be quite fresh if it were employed to reduce a negative that had been intensified with mercury followed by ammonia, otherwise the exactly opposite result might be obtained. In this view he was supported by Mr. Crooke and others.

Mr. TUNNY exhibited some prints from waxed paper negatives taken thirty-five years ago. These and the negatives were very beautiful, and were examined with much interest.

A number of transparencies exhibiting cloud effects were shown by Mr. Crooke; also a large collection of landscapes taken this year on coffee plates by Mr. Robert Murray, C.E.

Votes of thanks to the exhibitors and the Chairman terminated the proceedings.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE first annual meeting of this Association was held in the Religious Institution Rooms on Tuesday, the 11th inst.,—Mr. Hugh Reid, President, occupying the chair.

The minutes of last meeting having been read and confirmed, Messrs. R. Rae, W. A. Coulson, D. Blakley, C. C. Coulson, and J. Mitchell were admitted as ordinary members.

The following report, which had been printed and circulated amongst the members was taken as read, and on the motion of the Chairman was adopted:—

Annual Report.

The Council, in presenting their first annual report, have reason to congratulate the members upon the success that has attended the first year's existence of their Association.

The Association was instituted on the 24th January, 1883, and since that date the applications for membership have been numerous—the roll of members now extending to 57. There are only three resignations to record.

Eighteen meetings have been held during the session now closing—six ordinary, four outdoor, six council, and two special. The outdoor meetings were held at Aberfoyle, Callander, Mount-Stuart, and Loch Lomond.

The attendance at the ordinary meetings has been satisfactory, but the outdoor meetings have not received the share of attention that was anticipated; and the Council would invite suggestions from members as to the best method of making these meetings more attractive.

The following subjects were brought before the Association at the ordinary meetings:—

A Demonstration of Platinotype Printing. By the President, Mr. Reid.

Remarks on Pyro. and Sulphurous Acid. By Mr. J. Y. M'Lellan.

An Exhibition of Dry-plate Cameras of Novel Construction. By the Members.

A Paper on the Lens and Diaphragms. By Mr. J. Y. M'Lellan.

The question-box has provided a large amount of matter for discussion.

The first annual exhibition of members' work was held in the Fine Art Institute Galleries, on the 16th and 17th November, and the Association may be congratulated on its success. There were about 250 pictures exhibited by 26 members, and the exhibition was visited by about 800 people. The prizes were decided by vote of members—a system which the Council consider very satisfactory.

As will be seen from the Treasurer's Report, the financial position of the Association is satisfactory.

In conclusion: the Council would call upon individual members to do their best to increase the number of members.

The election of office-bearers for the session 1883-84 was then proceeded with, the result being as follows:—*President:* Hugh Reid.—*Vice-President:* W. Lang, Jun.—*Auditors:* W. C. Hume and John Parker.—*Members of Council:* John Parker, W. Snell Anderson, J. Y. McLellan, A. B. Ovenstone, George Murray, and A. J. W. Reid.

Several alterations of rules were proposed by members, and considered by the meeting.

A discussion followed on the subject of the regulations for next annual exhibition, and it was resolved to leave the matter in the hands of the Council to frame new rules for the guidance of exhibitors. The meeting was then adjourned till the second Tuesday in January.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

The fifth general meeting of the session was held in the Religious Institution Rooms on Thursday, the 6th instant,—Councillor Robertson in the chair.

The minutes of the previous meeting having been read and approved, and the question-box disposed of, the Chairman introduced Mr. McCall, who exhibited a magnificent series of magic lantern slides, and described them in a very interesting lecture, which was received with great enthusiasm.

The meeting terminated with votes of thanks to Mr. McCall and the Chairman.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES PHOTOGRAPHIC ASSOCIATION.

The ordinary meeting of the above Association was held in the College of Physical Science, Newcastle-on-Tyne, on Tuesday evening, the 11th inst.,—Mr. Thomas Galloway in the chair.

The minutes of the previous meeting having been passed, Mr. C. F. Bulman (Gateshead) was elected a member by ballot, and the following gentlemen were nominated for membership:—Mr. Jos. Cowen, M.P., Mr. T. Nelson, J.P., Mr. B. S. Proctor, Mr. Jos. Gray, and Mr. Dean (Durham).

The nominations for the President, Vice-Presidents, Officers, and Council for next year were then proceeded with.

Mr. A. A. Campbell Swinton read a paper on the *Past, Present, and Future of Photography in Natural Colours.* [See page 776.] On the proposition of Mr. Pike, seconded by Mr. Pae, the discussion on this paper was adjourned to the next meeting.

The Secretary gave notice of a motion to alter Rule VI., by making the annual subscription for ladies 5s. per annum. He (the Secretary) stated that Mr. Borrows, one of the members, and winner of Mr. Maling's medal, had offered a medal for competition at the outdoor meetings next year, if decided to hold such; the same to be for the best set of three pictures taken at the meetings.

The medals and diplomas were then presented to the successful competitors at the exhibition recently held by the Association, and several questions found in the box having been discnssed, the meeting terminated with votes of thanks to Mr. Swinton and the Chairman.

Messrs. Reynolds and Branson's phœnix shutter, showing the latest improvements, was brought before the notice of the meeting by the Secretary, and was much admired.

PHOTOGRAPHIC SOCIETY OF IRELAND.

The usual monthly meeting of this Society was held in the Royal College of Science, Stephen's Green, on Friday, the 14th instant,—Mr. E. P. Johnson in the chair.

The minutes of the previous meeting having been read and confirmed, Messrs. John Chancellor, Dr. Pearsall, and C. J. Smith were elected members. Messrs. J. Dollard, Jun., William Rigby, J. C. King, and P. Crosthwaite were nominated, and will be balloted for at the next meeting.

Mr. J. McGhie, of Glasgow, read a paper *On Enlarging* [see page 776], and, with the assistance of Mr. Halvey, gave a most interesting demonstration of enlarging both on opal and paper, the former proving a very successful experiment, and was greatly admired.

Dr. Scott exhibited a most efficient apparatus for photomicrography. His arrangement consisted of a small camera which was attachable to any microscope, and which enabled the operator to take the photographs the same size as they appeared in the microscope. They could then be enlarged to any size desirable.

Mr. Mayne exhibited Messrs. Hare and Dale's new multiplex changing camera, and also a new tripod stand.

Mr. J. V. Robinson exhibited Mr. S. D. McKellen's new camera.

Mr. McGhie also exhibited two new tripod stands, two new negative washing apparatus, and a new drying-box, all of which were much admired.

It was proposed by Mr. H. Bewley, and seconded by Mr. Watson—"That the best thanks of the Society are due, and hereby given, to Mr. McGhie and Mr. Halvey for their most interesting communication and demonstrations."

The next meeting will be held on Friday, January 11th, 1884.

LEEDS PHOTOGRAPHIC SOCIETY.

The annual meeting of this Society was held on Thursday, the 6th inst., in the Library of the Philosophical Hall,—Mr. Washington Teasdale, F.R.M.S., in the chair.

The following are the officers elected for 1884:—*President:* T. E. Thorpe, Ph.D., F.R.S.—*Vice-President:* J. W. Ramsden.—*Treasurer:* J. W. Reffitt.—*Hon. Secretary:* Thos. W. Thornton, 22, Carr-road, Leeds.—*Committee:* Messrs. Bedford, Branson, Denham, J. W. Ramsden, H. Rodwell, J. W. Reffitt, W. Teasdale, F.R.M.S., Dr. Thorpe, F.R.S., T. W. Thornton, and S. A. Warburton.

The meeting shortly afterwards adjourned.

HALIFAX PHOTOGRAPHIC CLUB.

The monthly meeting of the Club was held on Monday evening, the 10th instant,—Mr. Caw in the chair. After the usual formal business was transacted,

Mr. J. E. Jones was called upon to read his paper, entitled *A Four Days' Photographic Trip in Wensleydale and Swaledale.* The lecture proved to be of great interest, being rendered all the more attractive by the large number of photographs exhibited, the joint production of the lecturer and Mr. Fred. Smith, a very active member of the Society, who accompanied him during his rambles. The route followed and the places visited were Knaresbro', Harrogate, and Leyburn, with its shawl walk and noble limestone cliffs. After inspecting the famous Queen's Gap—the spot reputed to be where Mary Queen of Scots was retaken after escaping from Middleham Castle hard by—they next paid this fine old fortress a visit, and then proceeded to Redmire, Wensley, and Bolton, pausing to visit the extensive ruins of the Castle. They directed their course towards Hay Garth Force. A heavy flood being on, the Force presented a magnificent spectacle of a boiling, seething torrent, the broad stretch of terraced cascades sparkling like drawn-out glass in the bright sunlight. As this district is essentially a land abounding in streams and falls, our friends next journeyed on to Burton Falls—a spot at once lovely and romantic; and after securing a good picture they hired a trap and drove to Askrigg, and without delay cameras were planted in front of the almshouses, which is a grand specimen of old Yorkshire domestic architecture in the shape of a four-storied, gabled, mullioned, and transomed edifice of quite an unique character. This secured, they journeyed to Mill Gill Foss—a sparkling cascade embosomed amid festoons of feathery foliage, the fall being sixty-nine feet. The song of many waters, the joyous note of the gladsome thrush, the tangled brake and ferny dell, the blushing rose and sweet-smelling hawthorn, all tended to lure on our friends deeper into the shady depths of the greenwood, until at last each became aware he was alone; and it was not until after many a startling echo had resounded over hill and dale that a responsive "halloa!" again brought the wanderers together. Mr. Smith was fortunate enough to find his way to Whitfield Foss—a waterfall of surpassing beauty—and secured a picture of which he may be justly proud. They next proceeded to Hawes, visiting Highdraw Scar and Waterfall—a grand silver streak, falling perpendicularly a distance of a hundred feet into a deep and darksome pool. From thence they wended their way back to Leyburn and on to Richmond, visiting the fine old castle of historic note, securing many a fine bit of Norman tower and picturesque gable, of winding river and woodland slope. Their last plate exposed was on the venerable ruin, the abbey of St. Agatha, Nasby. The trip was most pleasant, profitable, and economical, costing slightly over £3.

Mr. E. Gledhill proposed a vote of thanks to the lecturer, which was seconded by the Chairman. Mr. Gledhill remarked that, although a native of Yorkshire, the district referred to in the lecture was new ground to him, and the views exhibited had by their great beauty caused him no little astonishment.

The Chairman had gone through the district, and was confident no words could too highly sing its praises.

Mr. W. C. Williams, when examining the photographs for the first time, and not knowing the district represented, was by their character led to suppose he was looking at pictures of some waterfalls and rapids of note belonging to the Highlands, and was once more forcibly reminded of the possibility of "the country" having no honour in the "eyes of the prophet,"

and so reversing the old adage, and of the folly of Yorkshiremen looking so far afield for the artistic and lovely in nature when a very mine of both combined lay at their very door.

Mr. Whitely presented the Club with a very handsomely-finished question-box, and received the thanks of all present for so useful a gift.

Mr. WILLIAMS (the Secretary) then reminded the members that the first annual exhibition and competition would be held early in the ensuing year, and as the Club had now grown largely in numbers and possessed an unusually-large proportion of veteran workers in the art, all would strive to make their first exhibition an unqualified success.

The meeting was then adjourned.

Correspondence.

COMPARATIVE COLOUR SENSITIVENESS OF IODIDE AND BROMIDE OF SILVER.

To the EDITORS.

GENTLEMEN,—At the meeting of the Photographic Society of Great Britain, last Tuesday, Mr. Jabez Hughes stated that Sir John Herschell had many years before said that iodide of silver must give way to bromide on account of the different range of sensibility of the latter compound to the rays of the spectrum. The claim of great difference of relative susceptibility between the two salts, and the processes—collodion and gelatine—which depend, respectively, mainly upon the one or the other, has been continually repeated; and it is this repetition which has induced photographers to believe that a red light is necessary when working bromide plates. I believe the claim to be unfounded, and that its maintenance has had much to answer for in the matter of injury to the eyesight of very many.

I have a very great respect for the scientific acquirements of the late Sir John Herschell; but a still greater respect for what I believe to be the truth induces me to state my belief that he may have been mistaken in estimating the proportionate difference of the sensitiveness of the two salts to different colours, and to challenge the statement (which has been so persistently made for so many years) that bromide and iodide of silver differ greatly in their relative susceptibility to various colours as they exist in natural objects.

Unless it can be shown that the light coming through red media has less effect upon the sensitive compound in proportion to the luminosity which it possesses to the eye than that of another colour, the reason for its use ceases to exist. That it has not less effect I believe I have satisfactorily proved, and the experiment is open to anyone to verify. I am happy to know that in many cases the experiment has practically been made by the substitution in the dark room window of green and yellow media for ruby and orange, and, in every case that I have yet heard of, with success; and great satisfaction is expressed at being relieved of the supposed necessity for working in a light of a colour so trying as ruby. In one case a friend tells me—"After working for an hour or two in the light I formerly used, I could not see to read in the evening. Now I can go to my books from my dark room as though I had not been there."

Amongst the thousands employed in the dark rooms of busy photographers, and the coating and packing rooms of the plate manufacturers, there are in all probability hundreds whose sight is being seriously injured and who in a very few years will find themselves—unless the present conditions are changed—incapacitated by failing sight from engaging in useful and profitable occupations. The statements recently made by Dr. Herschell and Mr. Ackland support me in this view; and if, as I believe I have shown, a light of a less injurious character has actually less prejudicial effect upon our plates than the fiery-red hitherto generally used, it behoves all concerned to adopt without delay a less sight-spoiling illumination than that which they have been accustomed to.—I am, yours, &c., W. E. DEBENHAM.

London, December 17, 1883.

PHOTOGRAPHIC LENSES: THEIR FOCI, APERTURES, AND ANGLES.

To the EDITORS.

GENTLEMEN,—I must thank Mr. Burton for his ready and simple explanation in this matter. Mr. Warburton must pardon me for saying that he has somewhat jumped to conclusions as to what my thoughts were, and I would ask him to kindly read my letter once more.

I was most careful to avoid giving any opinion as to which table was correct and which was incorrect. I simply drew attention to the discrepancies between them. I had my own idea in the matter as to which table was right in the general acceptation of the term "uniform system," but this idea I kept to myself, and only stated that I was puzzled to account for the differences.

I would say to Mr. Warburton that I fell into no error, as he remarks I have done; and in regard to his expression—"It is due to Mr. Burton to say that he does not state that these numbers, 1, 2, 3, 4, 5, &c., are the U. S. numbers of the apertures, as 'G. D. K.' says he does," I would ask him to understand what I wrote, which was as follows:—"In this column he (Mr. Burton) deals with the U. S. numbers up to 9." I spoke of the U. S. numbers in connection with Mr. Burton's table, because, from the heading of his first column, I think it must be plain to all that he intended these numbers 1 to 9 to represent the U. S. numbers, and the confirmation now given by Mr. Burton proves my correctness in having assumed this to be the case; but I did *not* say that Mr. Burton *stated* that his numbers were the U. S. numbers.

Finally: Mr. Warburton must excuse my taking exception to his reading of my mind when he says—"'G. D. K.' thinks that number 4 should be $\frac{f}{11.314}$." I have not said or inferred that such was my thought, nor, indeed, has it been so. I may say that I have at the present time a lens $8\frac{3}{4}$ inches focus, and my largest stop has an aperture of $1\frac{3}{32}$ inch; that, of course, gives $\frac{f}{8}$, and I have for some time had the number 4 on that stop.—I am, yours, &c., G. D. KORTRIGHT.

90, *Lupus-street, London, December* 16, 1883.

To the EDITORS.

GENTLEMEN,—The letters of Mr. Burton and Mr. Warburton in your last issue convince me that I wrote what I did in answer to "G. D. K.'s" letter under the misapprehension that the stops of the universal system were numbered consecutively instead of in the value of the exposure, and I hope the latter gentleman will accept this as an acknowledgment of the error which I made. I would not have written as I did had I been able to refer at the time of writing to the quotations to which he asked my attention.

I am not sure but that there are others who up to this time have thought as I did, and no doubt this correspondence will have done good in drawing special attention to the new system.

I may say that it has been my practice to stamp the aperture value in terms of focus upon all stops as soon as I acquire a lens, as it simplifies exposures very much; but the U.S. is better, inasmuch as it starts from a definite point.

In conclusion: I hope Mr. Warburton will accept these remarks in the spirit in which they are offered. That I wrote, as my wording shows, upon a false hypothesis is undeniable, and that, consequently, the reasoning based thereon is untenable. But I am inclined to think that an error such as this might be expressed in a gentler manner than by the two last words of his letter.—I am, yours, &c.,

Sheffield, December 15, 1883. G. W. ATKINS.

EMULSION MAKING.

To the EDITORS.

GENTLEMEN,—In your last issue Mr. W. K. Burton expresses a wish to know who first suggested dissolving silver nitrate *crystals* in bromised gelatine for the purpose of making emulsion.

In THE BRITISH JOURNAL OF PHOTOGRAPHY for 1879, page 235, Mr. T. Sebastian Davies is reported to have stated, at a meeting of the Photographic Society of Great Britain, 13th May, 1879, that "he had found it unnecessary to dissolve the silver before adding it to the emulsion, whether of gelatine or collodion. By adding it in a coarsely-powdered state he found that he secured an emulsion in which the silver bromide was in the finest possible state of division."

This is the earliest published description of the method that I am aware of.—I am, yours, &c., W. J. WILSON.

2, *Westwick Gardens, Hammersmith, December* 17, 1883.

PHOTOGRAPHY AND SOLAR ECLIPSES.

To the EDITORS.

GENTLEMEN,—Will you kindly permit me to draw the attention of your readers to an error in the abstract of my communication on the subject of *Photography and Solar Eclipses*, which appeared in your last number? The error is an important one, but originates, I believe, in my own abstract, though it was not made at the meeting of the South London Photographic Society. In line 23, second column, page 759, "photosphere" *should be* "chromosphere." I need hardly say that it is the "photosphere" which emits the main portion of light given out by the sun, the "chromosphere" being the surrounding envelope that gives rise to the dark lines.

I shall be much obliged by your kindly inserting this correction, or I shall be "dropped on," possibly, by your critical readers.—I am, yours, &c., C. RAY WOODS.

December 17, 1883.

GAS FOR HEATING PURPOSES.

To the EDITORS.

GENTLEMEN,—My attention has been called to some papers published a short time ago on the use of gas for warming rooms.

The writer of the paper referred to must be rather behind the age in his information. We have made a great many thousands of warming stoves for laboratories, drying-rooms, sitting-rooms, bedrooms, and many other purposes. We have ourselves used these to the practical exclusion of coal for a long period, and there is nothing more certain than the fact that perfect and satisfactory gas-heating arrangements

can be, and are, made, both for dark rooms, studios, drying-rooms, &c., and that these are sufficiently economical in use to pay well as compared with any other fuel which can be used.

I am quite prepared at any time to supply a gas stove or gas fire to do any specified work and to be submitted to any possible test, provided the conditions under which the arrangement is to be used are specified, and that I am permitted to select a suitable form from stock patterns. If the stove be tested thoroughly, the writer of the article will, undoubtedly, revise his opinion as to the use of gas for warming. —I am, yours, &c., THOS. FLETCHER.

Warrington, December 17, 1883.

EXCHANGE COLUMN.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPH REGISTERED—

John Owen, Newtown, North Wales.—*Photograph of Painting of the late Rev. J. Williams, Baptist Minister.*

R. A. WESTON.—See latter part of answer to A. Alston.

FRED.—You will find an article on the subject in our ALMANAC for 1884.

A PHOTO.—Certainly not. What advantage would it be to our readers?

HUGH.—You will find all the information you require on ammonia on page 254 of our ALMANAC.

H. S.—We know nothing more of the process than that furnished by our contributor, which appeared in the Journal.

B. C.—Schlippe's salt will scarcely answer for portrait or landscape work, as the density it gives is so great as to unfit it for any but pure line work.

OPALOTYPIST.—You should experience no difficulty in getting "smoothed pot opal" in squares as large as twenty-four inches by eighteen. We have seen carbon pictures on opal much larger than this.

OXIDE.—You had better advertise in the columns allotted to the purpose, stating in the advertisement your qualifications. We fear you will have to be content with a small salary at the commencement.

J. CLARK.—The gelatine you have employed is much too soft a variety. For the collotype process a hard gelatine is most essential. Try Nelson's X opaque, and we have no doubt you will be more successful.

A. FARRER.—The prolonged exposure you have to give is, doubtless, due to the time the collodion has been iodised. Few collodions will remain in good working condition after being iodised "a couple of years or so."

CYGNUS.—The fault does not lie with the collodion, but with the plate, which has not been effectually waxed. Try treating the plates with French chalk instead of wax. Perhaps you will get on better with that.

W. S. SCOTT.—Any working optician will supply you with a condensing lens of the kind you require for less than half-a-sovereign. You had better get him to fit it into a cell for you, as this will help you very much in securing it accurately centered.

G. H. M.—The proportion of ferrous sulphate is far too large; hence the yellow deposit, which consists of ferrous oxalate. You will find it better to employ the two solutions in the proportions of four of oxalate to one of iron.

J. E. G. W.—The burnisher is a very good one, indeed; but opinions differ as to whether it is the best. It is very much a matter of taste. The prints need not be rolled before burnishing, though some prefer to pass them through the press first.

VAUXHALL.—The bath should contain thirty grains of nitrate of silver to the ounce of water, and be made decidedly acid with nitric acid. Any good commercial collodion may be used. A very suitable developer will be found on page 227 of our ALMANAC.

WILLIAM RICHARDSON.—If the lens be only chipped to the extent you describe it will not affect its working in the least; and, as you can get such a large reduction on account of the chip, by all means have it instead of the other and more costly instrument.

NOVICE.—As you ask our advice, we certainly advise you to begin with a "blow-through" jet. After you have gained some experience with lantern matters generally, and also with the management of the light, then you may adopt the "mixed" jet with safety.

CAUTION.—The cause of the explosion is ter-iodide of nitrogen. This dangerous substance is formed by digesting iodine in strong ammonia; and but for the fact that, as you state, you continued stirring the mixture from the commencement, the results might have been more serious.

A. ALSTON.—The "old chlorate of potash and manganese" are still the best materials with which to make oxygen on a small scale. You cannot do better than keep to what you style the "old-fashioned way." Place the bags in front of the fire, keeping them moving, so that they do not scorch. This will soften the rubber, and render the bags pliable.

R. W. S.—Editors of technical journals, we imagine, have something more to do than "putting you up to the compounding of some of the useful household specialities that command such a ready sale." It will, therefore, be useless to furnish you with the address. You had better purchase a copy of Spong's *Workshop Receipts*, or Cooley's *Cyclopædia of Practical Receipts.*

G. E. (New York).—There is no fault whatever with the nitrate of silver. Of course, if you add ammonia to a solution of it a brown precipitate is thrown down, which is the oxide of silver. If the crystals be very acid the first addition may not cause a precipitate, as the acid will neutralise the ammonia in the first instance. You would have found it the same with English or any other nitrate of silver.

RECEIVED.—*The Chemical Effect of the Spectrum.* By Dr. J. M. Eder; translated by Captain Abney. Also communications from Wm. Brooks; T. E. Espin, B.A., F.R.S., &c.

ROYAL INSTITUTION OF GREAT BRITAIN.—In connection with the lecture arrangements before Easter, 1884, it is announced that Captain Abney will commence a course of six lectures on *Photographic Action Considered as the Work of Radiation.*

PHOTOGRAPHIC CLUB.—The annual dinner of the Club was held on Wednesday evening last, at Anderton's Hotel, Fleet-street. About fifty sat down to an excellent repast, the Rev. F. F. Statham, M.A., presiding. After the usual preliminary loyal toasts, the Chairman proposed the toast of the evening—that of the Photographic Club—at considerable length. As an evidence of its material prosperity he said the number of members had now reached eighty, and was still increasing. The proceedings were agreeably interspersed with songs and recitations, and a most enjoyable evening was spent, the party breaking up at a late hour.

METEOROLOGICAL REPORT.

Observations taken at 406, Strand, by J. H. STEWARD, Optician,
For two Week ending December 19, 1883.
THESE OBSERVATIONS ARE TAKEN AT 8.30 A.M.

Dec.	Barometer.	Wind.	Dry Bulb.	Wet Bulb.	Max. Solar Rad.	Max Shade Temp.	Min. Tem.	Remarks.
6	30·05	N	34	33	—	37	33	Snowing.
7	30·57	NE	35	33	—	39	33	Overcast.
8	30·53	W	35	33	—	39	33	Overcast.
10	30·03	W	44	43	—	50	43	Overcast.
11	29·37	W	45	44	—	51	44	Cloudy.
12	29·75	NW	44	42	—	47	42	Cloudy.
13	29·96	W	51	49	—	56	41	Overcast.
14	29·67	W	53	51	—	56	49	Very Cloudy.
15	29·89	W	41	39	—	47	39	Fine and Clear.
17	30·24	N	37	33	—	40	35	Cloudy.
18	30·47	NW	37	34	—	45	34	Cloudy.
19	30·37	NW	41	30	—	44	33	Overcast.

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THE BRITISH JOURNAL OF PHOTOGRAPHY.

No. 1234. Vol. XXX.—DECEMBER 28, 1883.

THE PAST YEAR.

The present number completes our thirtieth volume—thirty years of active work—a period which covers almost the whole history of practical photography. It would be impossible, as it is unnecessary, to allude to the numerous changes which have occurred during that time, although it is next to impossible to avoid casting a retrospective glance upon what *was* and comparing it with what *is*.

One great result of such a retrospect must be to show us how that, now-a-days, photographic progress is made by shorter strides than formerly, and that year by year its advance becomes less and less perceptible. Taking the year now closing as an example, it is impossible to point to a single event or occurrence of apparent importance in connection with photography; and yet it would be a bold assertion to state that photography is on that account at a standstill. On the contrary, probably a greater amount of activity prevails now amongst all classes of photographers than at any previous period of the history of our science; but it is the activity of practical matter-of-fact work rather than of speculation or inventive genius. Photography has, in fact, reached a stage at which it is necessary in a measure to pause and rest—to collect, as it were, the scattered forces after the forced march of the past few years. But the rest does not mean idleness.

Gelatine emulsion has been for some years past the all-prevailing topic and may still be considered so; but nothing during the past year has occurred to compare with the surprises we have had to record on former occasions. Scarcely even a new emulsion formula has been published—a fact the more noticeable since this was formerly a most prolific field. Instead of new formulæ and processes however, attention has been more especially directed to the improvement of existing conditions of working, and such subjects as development, intensification, and fixing have received their due share of careful notice; while green fog and other of the mysterious weaknesses of the gelatine process have been submitted to systematic examination. Though the results of this class of research may not be so immediately apparent, they are quite as valuable in the long run as the more brilliant achievements of the inventors of new processes; and the steady, plodding worker is of as much service as the genius who gives the cue.

Gelatino-bromide paper for printing purposes has advanced in popular favour during the year, and is coming into very general use for many purposes. The platinotype process is also gaining ground, an improvement in the method of working, by means of which a sepia tone is secured, having, no doubt, partly conduced to this result. Photo-mechanical processes—especially phototypic—have also received a fair amount of attention in this country as well as abroad, though it must be confessed that we in England are still far behind in this and similar branches of photography. The stannotype process is being worked on a small scale, but has not yet come into general use, though there is every prospect of its gaining popularity at an early date. Other printing methods remain practically unchanged. Silver, which has been in a supposed moribund condition for several years past, is in apparently just as good, if not better, odour than ever, and seems likely to continue so to the end of the chapter, despite its alleged want of permanence. Carbon, for some reason or other, appears to be unable to progress beyond a certain line; and, though the process is largely employed for some classes of work, its applications are confined within restricted bounds.

In the higher branches of scientific photography considerable activity has prevailed during the past year. In addition to the successful photographic observations of the eclipse of the sun last May—described in our columns by Mr. H. A. Lawrance, one of the English party—several notable achievements in celestial photography have been placed on record; such, for instance, as Dr. Huggins's photographing the solar corona, and Mr. A. A. Common's successful rendering of the great Nebula in Orion. Photomicrography, too, has received more than an ordinary share of attention, the recent advances in the technical branches of photography having opened up new facilities for the microscopist, of which the latter has not been slow to avail himself.

Six new societies have come into existence during the year—further proof of the activity in connection with photography—while one, the West Riding of Yorkshire Photographic Association, has, let us hope only temporarily, lapsed into oblivion. Photographic exhibitions, also, are growing so largely in popular favour that there is scarcely a society now-a-days so devoid of ambition as to be without its annual exhibition, and scarcely a week passes without a record or announcement of some such collection of more or less importance. As the year closes there are still two or three exhibitions announced to open shortly, in addition to the eight or nine which have already taken place.

The obituary of the year includes the names of Thomas Rodger, T. J. Pearsall, F. Southwell, Joseph Wake, C. G. Collins, John Beattie, William Keith, John Lessels, Colin Sinclair, Philipp Remelé, and, recently, Alfred G. Pettitt—all of whom were well known in their different branches of the art-science.

In closing the present volume we have only to assure our readers that in the future no pains will be spared to preserve the old character of The British Journal of Photography as the weekly record of all that is new and valuable in connection with photography; and, in bidding farewell to the past year, to wish them one and all— A Happy New Year.

LANTERN TRANSPARENCIES BY THE ALBUMEN PROCESS.

In concluding the article, last week, directing attention to the superiority of lantern slides made by the albumen over those by most other processes, we intimated that we should take an early opportunity of giving practical working details of the process, with all its more modern improvements and simplifications. Therefore, we now take the earliest opportunity of redeeming our promise.

Although the term "modern improvements" has just been employed, it must clearly be understood that the simplifications embodied in the details to be described were introduced something like twenty or five-and-twenty years ago, although they were not published for a considerable period afterwards. It may be interesting to many to know the old system of working, so that they can realise the difficulties attendant upon it, which gave rise to so much prejudice against the albumen process, particularly amongst amateurs. Accordingly, before commencing the details of the modern method, we shall digress for a moment to give a brief outline of the old process, so that the more "recent" improvements may the better be understood and, therefore, appreciated.

In the earliest methods the plate was coated with plain uniodised albumen, and then dried. The iodising of the film was afterwards effected by exposing it to the vapour of iodine, in the same manner as in the daguerreotype process, until it became decidedly of a yellow tint. It was then sensitised by immersion for a short time in a solution of nitrate of silver strongly acidified with acetic acid, similar to that employed in the calotype process. An improvement on this plan was effected by adding an iodide to the albumen itself, which simplified matters considerably, as it did away with at least one troublesome and disagreeable operation. The method of working was this:—A certain quantity of albumen was taken, and to it was added the proper proportion of iodide of potassium. The addition of bromide was also made by some workers. The whole was then whisked into a stiff froth. The directions usually given

for this part of the operations were that the albumen should be whisked until the vessel containing it could be inverted without the contents running out. After standing some hours for the albumen to subside it was ready for use.

The plates were coated in the following manner :—They were first affixed to a plate-holder, which consisted of a piece of gutta-percha fastened on the end of a stick, as pneumatic plate-holders had not been invented at that period. The gutta-percha was made sticky by melting it in the flame of a spirit lamp, and the plate attached. The albumen was now poured on and distributed, and afterwards equalised by centrifugal force, by giving the plates a rapid rotary motion by spinning the stick between the fingers. The plate was then detached, and put into the drying-box. This consisted of a box containing a number of grooves into which shelves of porous wood fitted horizontally, the box being mounted on levelling-screws. Previously to using the box the shelves were removed, and placed, together with the box, either in the sun or in front of a fire to thoroughly desiccate them, so that the wood should be rendered as absorbent as possible. The shelves were now replaced in the grooves, and the box carefully levelled. It was then ready for the reception of the plates, which, it will be seen, were dried entirely by the moisture from them being absorbed by the wood of the shelves and box.

Now it is clear that if the box were not accurately levelled, or if the shelves had become warped, the films would be of unequal thickness, and the plates, consequently, useless. Up to this point dust was the greatest enemy, for the smallest particle settling on the film was almost certain to cause a spot, and it will be noticed that up to this time the plates were always in a position to favour floating particles coming into contact with them. The sensitising was effected in a bath of aceto-nitrate of silver in much the same manner as at present. But the development was materially different to that now practised, inasmuch as the picture was brought out with a saturated solution of gallic acid, with a few drops of aceto-nitrate of silver added, instead of, as now, with pyrogallic acid. The time occupied in the development of a picture by gallic acid was rarely much less than half-an-hour, and it frequently took as much as a couple of hours if it were at all under-exposed. But, by the method about to be described, it does not take much longer to develope and fix an albumen than it does a gelatine plate.

Having thus given a short outline of the old-fashioned albumen process, we shall proceed with the details of the present system of working. In the first place, we commence with the preparation of the albumen itself—say of ten ounces. This will require from a dozen to fifteen eggs, according to their size. These, if available, should by preference be "new laid," though good French eggs will answer nearly, if not quite, as well. The eggs must be broken, and the whites carefully poured away from the yolks, keeping the latter in the shells. The germs should then be separated. To ten ounces of the albumen half-a-drachm of glacial acetic acid in half-an-ounce of water is added, and the whole intimately mixed by stirring with a glass rod. No attempt should be made to cause it to froth, which if done would give rise to trouble. Half-a-minute's stirring is all that is necessary. The acid will produce a precipitate, and render the albumen exceedingly limped. After standing a few hours it is passed, first through a piece of muslin to remove the coagulum, and afterwards filtered through a piece of sponge plugged in the neck of a funnel. After filtration forty minims of ammonia, ·880, is added, which causes the albumen to regain much of the viscosity the acid had destroyed. Albumen thus prepared will keep quite good for many months, if preserved in well-corked bottles. This method of preparing the albumen, if our memory serve us correctly, was first published by Mr. William Ackland.

For use, the albumen is iodised by adding one drachm of iodide of ammonium dissolved in half-an-ounce of water; sometimes ten or twelve grains of bromide are also added. The albumen being ready, we proceed to coat the plates. For this purpose some old iodised collodion is required. Any commercial sample that has been iodised for a length of time will answer, provided it yield an even and structureless film. If it be very old it will possibly give a thin and tender film, in which case, a little fresh pyroxyline must be added to give it body.

The glass plates being thoroughly cleaned and ready to hand, one is taken and coated with the collodion. After this has been allowed to set the plate is immersed in a dish of common water, where it is allowed to remain, with occasional agitation, until all greasiness has disappeared. It is then rinsed under the tap and placed standing on a pad of blotting-paper to drain, while another plate is being collodionised. Now take the drained plate and pour over it, beginning at one end, a little of the iodised albumen. Flow it over in a wave, so as to carry the superfluous water before it, which, with the albumen, should be allowed to run off into the sink. Drain the plate somewhat closely and apply a second lot of albumen, avoiding air-bubbles, and keep it in motion on the plate for half-a-minute or so in order that the albumen may penetrate into the collodion film. Then pour off into a measure, and stand the plates in a rack to drain. The second lot of albumen from one plate will do for the first application to the next, and so on. By this means the albumen will be economised.

After a dozen plates have been coated, take the first one and hold it in front of a clear fire until it is dry, and so, in turn, with the remainder. When the plates are dry it is a good plan to make them as hot as the hand can bear, for this treatment will prevent the films from blistering in the after operations, which, otherwise, they may have a tendency to do with some samples of collodion. Instead of drying the plates by the fire some prefer to allow them to dry spontaneously; but, in this case, it will be found a good plan to make them thoroughly hot, for the reason just mentioned. Plates thus prepared will keep for years if preserved in a dry place. It need scarcely be mentioned that all these operations may be performed in open daylight.

For want of space, and wishing to make these instructions as complete as possible, we are compelled to defer until next week the details of the sensitising, development, and toning of the plates.

ATMOSPHERIC CONDITIONS AND PHOTOGRAPHY.

Christmas Day, eighteen hundred and eighty-three, adds another to the record of "unseasonable" days. We trust it may not have rendered itself memorable to photographers by injured negatives and damaged prints. During the greater part of the present month the state of the weather generally has, for the time of the year, been most favourable to photographic work, and the portraitist, at anyrate, should have had a "good time," there being most perceptible a growing tendency among the public to utilise his productions to a considerable extent, either in addition to or in lieu of the usual elaborations of decorative and literary art that fill the postman's bags in an ever-increasing degree.

Usually the photographer at this period has to face two great enemies—fog and humidity; and at times they are almost unconquerable. No one who has not had experience of fog—in the metropolis, for example—has any conception of the extent to which it puts an end to all operations photographic. A day may open out fine and bright, and give promise of prints and sittings in plenty. A few hours elapse and the printing light becomes *nil*, while the time of exposure for portraits is counted by minutes instead of seconds. This is a condition of affairs which permits no remedy beyond a vastly-increased sensitiveness in all the processes involved. The marvellous reduction of exposures that gelatino-bromide plates have rendered possible makes us hesitate to say that further benefits in that direction may not be expected; but for actual prints the outlook is most decidedly favourable. We see no reason why, before another Christmas comes round, the portrait photographer should not be able to receive with equanimity the most pressing orders for large numbers of prints, if even brought in during the prevalence of deep fog and only a few days before they are required—all owing to the increased convenience of gelatino-bromide paper.

Gelatino-chloride, also, has a future, as yet less strongly indicated, though we cannot but think that processes of transfer from glass to paper may yet be adopted, and with no small advantage. Recently, on looking through an album, we saw a number of *cartes-de-visite* produced at Disderi's studio almost a score of years ago by an adaptation of the collodion process, the pictures being first developed

on glass and then transferred to paper. Though a little colder in tone than would be generally approved of, they are extremely delicate, and in effect appeared as bright and free from fading as upon the day they were first sent out. As such printing, however, requires camera and lens for each negative, with the necessary focussing and adjusting, it could not have a widely-extended application; but, with printing by superposition, with or without a preliminary glass support, the amount of printing is only governed by the number of printing-frames and the extent of the personal staff. We have a fair expectation that, as we say, twelve months more may see such an improvement as to make gelatino-bromide printing a practicable working process for pictures of high quality from negatives for that sheet-anchor of the portraitist—the *carte* and cabinet picture.

Returning, now, to the other aspect of fog—that state of the atmosphere which, while not robbing the light of so large a portion of its actinic power, gives it such other objectionable qualities that good work cannot be done with all classes of indoor subjects: we refer to the penetration of the fog into the studio—which, except the lens be brought very close to the sitter, with all the concomitant evils of the method—causes the shadows of every negative taken during its prevalence to be entirely wanting in richness and transparency. This state of affairs can be greatly remedied by well heating the apartment where the sittings are given; for, though it has been shown that fog—that is, precipitated water particles—may continue to exist when the temperature of the air and its hygrometric condition would allow of the whole being vaporised, it yet can be greatly modified and, sometimes, destroyed by raising the temperature to a considerable extent, the combined action of the heat and the motion imparted to the air helping to produce a fairly-clear atmosphere within, though outside all may be dull and foggy. The anomalous effect alluded to being due to the spherules of water receiving from the atmosphere a film of tarry matter owing to the ever-prevalent smoke.

Where the conditions present will allow of its being efficiently done, gas used as a heating agent is naturally most useful at such times, heating by hot water involving an outlay that is quite out of question for the ordinary amateur and for many professionals. Coal fires are greatly to be deprecated, owing to the fact that one slight down draught, such as is liable to occur at one time or another, even in the best-regulated chimneys, suffices to injure the atmosphere for portrait work for an hour or two afterwards.

We have been in large establishments where open fire-places have been used, and where, if well attended to, they have made the rooms comfortable and the atmosphere clear, but there has always been the fear of a whiff of smoke coming out at a most inopportune moment; while on the same day in other studios, heated by hot water, there has been equal comfort and ease of working with no fear of an imperfectly-transparent atmosphere from untoward draughts of smoke.

This is a point of far greater importance at the present time than it was a few years ago; seeing that, whereas while collodion reigned supreme in the studio the winter work of many establishments was simply insignificant, scarcely paying expenses, now that gelatine is so well to the fore winter photography is beginning to be more cultivated, as with average light a very few seconds' exposure will suffice for obtaining a first-class negative. It is very desirable that such should be the case; for what with the fancy dress balls of the season and the family portraits used as Christmas and New Year cards added to the ordinary demand, the photographer with skill and tact should, despite the average atmospheric conditions of the season, be able to make winter time show a far better balance on the right side than ever he has hitherto been able to do. That each and all of our friends may so find it, and to an increasing extent, is the most seasonable wish we can offer the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY.

WE gave an extract some little time ago from an old communication by Professor Cooke, upon the possibility of the present atomic theory giving way on the point of the invariability of the weight of atoms—a possibility having an interesting bearing on the subject matter of the strong discussion upon the atomic weight of cadmium which appeared in our pages a year or two ago. A well-known scientific periodical sums up the case as follows:—"Professor Cooke is forced to admit that while he regards the weight of evidence in favour of the atomic theory, and that it is the only basis on which a consistent philosophy of chemistry can at present be built, still he is rather drawn to that view of nature which *refers all differences between substances to dynamical causes*, and which regards the atomic theory as only a temporary expedient for representing the facts of chemistry to the mind. This is essentially the view of most of the able chemists now living."

SOME of our most cherished principles are thus in the utmost danger of being abandoned. In the same columns from which we quote the above is a still more heteredox idea broached by Professor Thompson, one of the foremost minds of the day. If there be one thing more than another of a theoretical nature that a photographer puts his trust in, it is the ether whose vibration he knows of as light, heat, and soforth, and that light and electricity are qualities of matter rather than matter itself, such as is the universal ether, infinitely attenuated though it be. Yet, after exhibiting a number of experiments on the 8th instant, before the Fellows of the Physical Society, Professor Thompson summed up the inferences to be drawn from them by telling his hearers he was "led by the hypothesis to infer that either the ether is electricity or that the ether is electrified, and that the former seemed the simpler conclusion."

AT the November meeting of the American National Academy of Sciences, recently held at New Haven, one of the most interesting displays was Professor Rowland's exhibition of photographs of the solar spectrum obtained by his concave gratings, to which we have on a former occasion referred. It is stated that he had prepared a map of the spectrum much more detailed than any before secured, and free from the defects of scale found in previous photographs.

ANOTHER matter brought before the same meeting should, when full details are to hand, possess elements of interest for emulsion workers. Professor Bolwer has been making experiments, extending over five or six years, upon the subsidence of particles in liquids. He brought some of the results before the meeting, showing the action of saline and organic matter, of acids, and of freezing upon the precipitation of sediments, some of the matters having been over five years at rest yet still showing opalescence.

WE learn from the programme which has been prepared by the London Section of the Society of Chemical Industry for next year that, on May 5th, papers will be read by Dr. Percy Frankland, *On the Composition and Illuminating Power of Coal Gas*, and by Mr. W. J. Dibdin, *On the Examination of the Illuminating Power of Gas Burners, especially those of large size.* On June 2nd, Mr. J. M. Thompson will read a communication entitled *Hints on Photography for those Engaged in Industrial Pursuits.* These papers and the discussions which follow will be very interesting to photographers.

PYROGALLIC DEVELOPMENT, THE DARK ROOM, &c.

ALTHOUGH pyrogallic acid is so very much cheaper than in former days, it is a very considerable item in the photographer's chemical bills during the year. To the amateur photographer it is also expensive, as he has no return for his outlay. I remember the first ounce of pyrogallic acid I bought cost me about six shillings. It can now be purchased for less than one-fourth of that amount, and I do not think I shall be far wrong in saying that where there were pounds used in the early days of the photographic art there are nearly as many hundredweights used at the present time.

With gelatine plates I have always considered that there might possibly be some way to economise the use of the pyrogallic acid. It will, perhaps, be remembered that when gelatine plates were first introduced the development by some workers was commenced

with six or eight grains of pyrogallic acid to the ounce of water, but after a time this quantity was gradually reduced. I very seldom use myself more than one grain and a-half to the ounce, and have found that quite sufficient for ordinary work. The saving involved in using this small quantity mounts up, perhaps, when returning from a tour. I often have as many as a hundred plates from $7\frac{1}{2} \times 5$ and over.

The orthodox way of working is to use fresh solution to every plate, on account of the yellow pyro. stain said to occur with discoloured solutions. I was once a strong believer in this doctrine, but my faith of late has been considerably shaken in regard to the said stain. During the past month I thought I would try and see how a discoloured pyrogallic solution would develope. In the first place I did not care to risk negatives that I valued; so I exposed some plates on a few test subjects, and developed them with the much-abused discoloured pyro. The plates in question were $7\frac{1}{2} \times 5$. I developed several plates that had been *properly* exposed. The third plate was developed with the pyro. solution, dark as it possibly could be—about the colour of bottled stout—and I saw but very little difference, if any, when compared with the one that was developed first with the clear solution, only the gradation was better, and, what colour there was, was cleared with the usual alum and citric I always use. I am perfectly certain that no one could have told that they had not been developed in the ordinary way.

After the above experience I was not afraid to put it into practice in my ordinary work, which I did not fail to do, even on some most trying work. I do not think there is anything more trying than to copy water-colour drawings. I had to copy some five- or six-and-twenty for a well-known artist, and most of them were low in tone—yellow, brown, and green—and some were distant mountains against a blue sky. I think all will agree with me that it would not be an easy task to find a more difficult subject. I only exposed one plate on each. No. 1 I commenced with freshly-made developer, and, without any alteration, I developed Nos. 2, 3, 4, and 5. On commencing No. 6 I found it a little slow. I then added a little more ammonia restrained with bromide, which I keep always ready mixed, and, to my mind, the developer worked far better than when new. I continued this system until I had finished the whole. As the solution diminished in bulk I added a grain or two of pyro. and ammonia as required, with water to make up the bulk. When the energy diminished I added more ammonia, and when density diminished I added more pyro. When finished the negatives gave me entire satisfaction. I calculated that I had developed in all twenty-eight $7\frac{1}{2} \times 5$ negatives with something under twenty grains of pyro., attended by several advantages which I will name.

I have no doubt that on this article I shall have many hostile criticisms, which I care little or nothing about. I am perfectly satisfied with the results I have obtained. The most marvellous part about it to me was this:—In one of the drawings at the top of the picture (an interior) there were a lot of gothic arches, which were of a bright blue ornamented with white scrolls, &c. The blue came out the darkest (in the print), showing the white ornaments before mentioned. In the other drawings, where brown, yellow, and green were all mixed up together, there was a perfect rendering of the gradation of tones. The yellow came out lighter than the green, the green lighter than the browns or reds, and, as before mentioned, white lighter than blue, and without any jumble or indistinctness, which I did not expect to get. I kept the developer in constant motion on the plate. I believe there is far more power in the developer in the discoloured state than is generally supposed.

In the intensification, has it ever been noticed with pyro. and silver that no intensification takes place until the pyro. changes colour, and that it intensifies more rapidly in this state than when colourless? I am alluding to either collodion or gelatine plates. There is also another advantage I found in working in this way: that I could work very sensitive plates in the dark room with only one thickness of ruby glass by keeping the plate well covered with solution—say about one-eighth or one-quarter of an inch (using daylight outside the window, and not artificial light). Midway between myself and the window I have a screen standing up from the sink, which I develope over first and shade the dish, bringing the dish up when I examine the plate; but with the dark developer I do not believe the screen is required. I am now saving my waste pyro. solutions for further experiments, which I think well worth following out.

I omitted to mention that with an under-exposed plate staining will always occur, no matter whether a fresh solution be used or not, and I have not yet seen a plate that will not. I fully believe that I can make one ounce of pyrogallic acid go as far as fifteen ounces in the ordinary way. I think it is well worth a trial, although it seems to clash with all past experience.

Wm. Brooks.

AN IMPROVED DARK ROOM LAMP.

The question of a good light, and one which will not be injurious to the eyesight, having been raised at several of the recent meetings of our societies, I worked out some experiments lately which have proved even more satisfactory than I anticipated.

Without going into the question of spectrum analysis, we know that there is a motive force in light which acts on the particles of silver bromide; that this force passes through blue glass almost unchecked; and that red glass partially absorbs or destroys its force. To prevent its action altogether we have to so weaken the light-giving power that to develope is both an uncomfortable and injurious occupation.

After trying the effect of several different mediums, &c., to obtain a safe, transmitted light, I decided to throw aside all coloured glasses, films, &c., and start on a new principle altogether, namely, to see what I could do with reflected light. I mean, instead of the light being transmitted through glass or other medium, to reflect white light on to a coloured surface which would strain off, so to speak, the actinic force of the light, and which would only transmit a light powerless to the sensitive film.

On the threshold of my experiments in this direction I found how misleading the results of photographing the spectrum—or, rather, the density given on a sensitive film by the spectrum—is when applied to practical photography, because the latter requires only a representation of colour reflected from different surfaces.

On a silver bromide plate the solar spectrum, when photographed, gives the greatest density between the blue and the violet; and the density gradually decreases towards the ultra-violet on the one side and towards the red on the other. From this fact I thought that by reflecting the white light on to an orange-coloured surface (which would give a brighter reflected light than the red, and would be less injurious to the eyesight), and as orange by transmitted light was safe for a wet plate, I believed it would do for practical purposes; but I found that light reflected from an orange surface gave nearly as dense a deposit on the film as from a blue surface. This would certainly tend to show that the action of light on a sensitive film is a heat force, or, rather, an expansive force. I afterwards found that brown and dark green gave, by reflected light, a more non-actinic colour than even red; indeed, bright yellow and red seemed to give about the same density. This was evidently a step in the right direction; but, as both brown and green absorbed so much light, I tried if a yellow would not give me a light safe enough for practical use.

In making my lamp I worked on the following theory:—I got a wooden box as in diagram. I painted the inside white first, to get the greatest reflective power possible; then I thought by painting over the white a transparent glazing colour to absorb the actinic power of the light I would get a safe light. For the glazing colour I was rather restricted in the number of tints. Gamboge, on account of its being a bad colour in oils, besides having a tinge of red in its composition (and after my experience by reflected light with orange), I did not try. Yellow lake was not tried for the same reason. This left me as transparent colours only

FIG. 1.

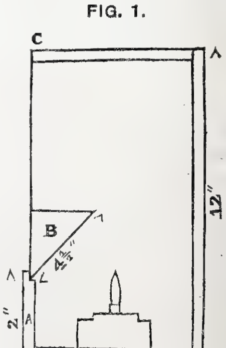


FIG. 2.

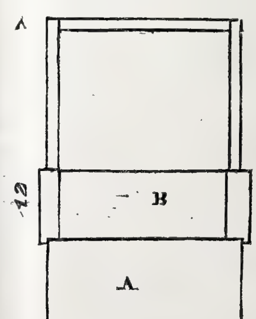
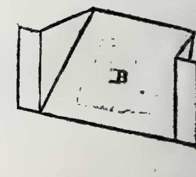


FIG. 3.



the siennas, Vandyke brown, and *terra vert.* Of these I decided on raw sienna, because it not only gave me a brown tint, but it was broken with yellow, which would give a much more luminous light. I therefore gave the interior of the box two coats of raw sienna mixed with plenty of gold size, because I was afraid that, if I did not, the oil in the colour would give a glaze, and thereby reflect some white light.

As an experiment with this lamp I put a plate three inches from the bottom of the lamp at the point where the reflected light was strongest. After an exposure on different parts of the plate from a-quarter of an hour to one and a-half hour, I developed the plate close to the lamp with my ordinary developer (ammonia solution five drops). After five minutes there was not the slightest deposit on any part of the film. I then added another five drops of ammonia solution—still no deposit. After five minutes another five drops of ammonia were added, and after twenty minutes in the developer there was no perceptible deposit on the plate. I then washed it and put it in the hypo. bath. On looking at the plate, besides clear glass one could see that there was the *faintest possible* deposit on the part exposed for an hour and a-half. I am so perfectly satisfied with the lamp that I would be pleased to sell my ordinary developing lamps cheap. With it there is far more light than I secured from the same burner through one sheet of ordinary ruby glass. The light did not seem to try the eyes any more than being in a room with bright firelight. Another important point is that the bulk of the light is reflected down on to the table where it is wanted, and every mark on the plate is most clearly seen.

My lamp is simply a small wooden box painted as described above, about 12 x 6. On the front is nailed a strip of wood about two inches wide, A, with a bead on the top edge, and on this rests a piece of tin, B, bent as in *fig.* 3. In the bottom of the box I stand the burner of a small colza oil hand lamp. Of course any small lamp would do. The only point to be careful about is that the lamp should be far enough to the front of the box to prevent any white light from the lamp passing between the tin, B, and the top front of the box, C, into the room. With my lamp I can see to do anything twelve feet off—such as opening a box, taking a negative out and putting it in a printing-frame for a transparency—and can see the form of everything distinctly about the room; indeed, it looks the same as if the gas had been turned down low. When not developing the piece of tin can be taken away, and we have a good white light in a moment without burning one's fingers, as is the case when opening the ordinary developing lamps, if one be not very careful.

If more light were required it would be better to procure a wider box, and have two or three small burners, as the light would be more evenly distributed over the interior of the box than if one powerful light was put in one place.

As I always develope by lamplight I have not tried the effect of reflected daylight; but I should think that white light—reflected first from a bright yellow surface to a raw sienna surface, and then into the dark room—would be safe for practical purposes. Instead of having a painted surface, probably it would be better to have coloured woollen or cotton material to reflect the daylight, as the oil in the paint might reflect white light (being a glazed surface); but, of course, it would be impossible to say what would do for every studio. Everything would depend on the power of the light from the window, the rapidity of the plates, &c.; and it would be absurd for anyone using a plate giving No. 16 on Warnerke's sensitometer to restrict himself to the weak light necessary to develope a plate giving 25 without fog.

In carrying out these experiments I have noticed a most curious fact, namely, by adding a small amount of *red* to either of the other primary colours there is a great increase in actinic power. For instance: *light reflected* from an orange surface has more power than from a yellow, and pink more power than a blue.

HERBERT S. STARNES.

P.S.—I have found since writing the above that the plate I exposed for an hour and a-half was much slower than I thought. The plates had evidently got mixed in the plate boxes, and it must have been one of a batch that had not been either boiled or emulsified with ammonia. I have since found that plates giving—

Sensitometer	10 can be exposed	25 minutes,
"	14 " "	8 "
"	16 " "	5 "

one foot from the lamp. Mr. Henderson and I tried the effect of putting a piece of light green cathedral glass in front of the lamp, which still gave a capital light. With a plate giving sensitometer 24 we got a faint deposit in five minutes about nine inches from the lamp. This would be equivalent to—

15 minutes	Sensitometer	20
26 "	"	18
50 "	"	16
80 "	"	14
240 "	"	10

I am still engaged on experiments proposed to me by Mr. W. E. Debenham and others, which, I think, will give even better results. —H. S. S.

COLOURING LANTERN TRANSPARENCIES.

No. II.

HAVING prepared two pieces of wood—one of them having a long, tapering point, that of the other being more obtuse and of dimensions suitable for being easily held by the fingers—wrap tightly round them a small piece of thin wash-leather. They will then present an appearance suggestive of crayon stumps.

I would recommend the beginner in this art to procure a number of good engravings of landscape scenery having a nearly uniform sky with a few light clouds; because, if he study these, he cannot fail to acquire a good idea as to the forms of and effects produced by such clouds. It will be well for him to practice with a pencil or a sheet of paper those forms best adapted for the special picture on which he is engaged.

Having thus previously determined upon the nature of the clouds—confining himself at first to those white, fleecy ones which are so frequently seen floating across a clear blue summer sky—let him apply the larger of the stumps, and, with a motion conforming to the curling outlines of the cloud, remove the sky-paint. There is room here for great artistic display; indeed, it is nearly the only stage in the whole course of painting a photographic transparency in which artistic taste can be shown. I have seen a transparency-artist point a common match with a penknife, wrap round it a bit of thin wash-leather, and in less than a minute pick out clouds in a picture which no amount of protracted labour could have improved upon. I called it "genius:" he said there was no genius in it, other than that which was the result of study and practice.

In many cases the mere suggestion of a cloud proves effective. Let the upper edge be clean and sharply cut, and avoid the bad taste of bringing the cloud up near to the projecting tree or spire and then breaking it off suddenly. Carry it boldly across the projection, which quite ignore. The advantage of doing so will be found when at an after-stage the colour is removed from the spire, by which the sky is thrown back, the other being brought near. It is so easy to clean off the sky with the stump that the tyro is often tempted to overdo his clouds; hence he must be cautioned against this.

I have spoken of pure white, fleecy clouds; at a more advanced stage he must try to back up the silver edges of his clouds with the more materialistic colour. For this purpose a little Payne's grey, warmed with rose madder very sparingly applied, will produce a good effect. It is not easy to impart a knowledge of cloud-making altogether by precept, so I would recommend the pupil to purchase a few well-painted slides and observe the special means employed to obtain such effects as are produced.

The sky being completed, remove by means of the fine stump all paint from the distant hills, trees, spire, and indeed from every portion of the picture except the sky. If there are distant mountains colour them with crimson and raw sienna, or crimson and blue, according to their nature, keeping carefully to their outlines. Observe that no dabbing need be had recourse to when painting the rest of the picture, unless it be a subject in which there is a smooth, unbroken portion, such as a lake or the sea. As this is supposed to give a reflection of the sky it must be painted in a similar manner. Observe, also, that every portion of the picture must be painted stronger and in brighter colours than would be the case were it a small picture which was to remain and be viewed as such, because by magnifying a three-inch picture up to twelve feet the colours become attenuated by the act of enlargement; therefore, the colours may be strongly applied in the certainty of their being toned down when projected on the screen.

To return to the mountains: while the distance is warm and of a ruddy purple keep the shadows cold, especially in the nearer ones. When painting the mountains avoid using the brush in such a way as to cause a ridge of paint to form an outline, but as far as possible work the brush from the margin inwards. By doing so the sky is left undisturbed. This also applies to trees. For these a green is employed composed of gamboge and Prussian blue. This will answer for the greater number of subjects in which there is foliage; but the addition of crimson lake will be necessary to obtain such warmth as that associated with autumnal tints. There are some specimens of foliage which may be fittingly coloured by lake and gamboge alone, but a judicious mixture of the three colours mentioned will serve every purpose.

It is not as if the painting were being made on clean or transparent glass. Here the foliage is composed of shades more or less dark, and, what is of importance also, of a tone that may range anywhere between a warm ruddy brown and a cold black, according to the method adopted by the photographer in toning. And this renders it impossible to say definitely what pigments ought to be employed in painting them. If the foliage be sombre and heavy the gamboge should then predominate. This applies also to a grass lawn or meadow. All that will be required for the trunk of a tree will be to warm it up with burnt sienna, well thinned.

T. J. Houston.

THE BRISTOL INTERNATIONAL PHOTOGRAPHIC EXHIBITION.

The second triennial exhibition of the vigorous West County Photographic Society, the opening of which we announced last week, must be set down as a decided success. Comprising as it does the best work —British and foreign—of the past three years, it necessarily differs very materially in character from our annual collections at Pall Mall, inasmuch as it may be taken to represent the "cream" of the last three Pall Mall exhibitions. To those acquainted with the pictures which have been shown in recent years at the Parent Society's annual exhibition the rooms of the Bristol Academy of Arts present a strangely-familiar appearance, though the pleasure derived by the uninitiated is in no way lessened by the circumstance, the only trouble, if there be one, resting in the *embarras des richesses* afforded. The well-known work of most of the medallists and chief exhibitors of the last year or two will be found here, including the flower subjects of Mr. Henry Stevens, Dr. Donkin's Alpine views, the landscapes of Messrs. Bedford, Berkeley, Sutcliffe, Brownrigg, and others, and the *genre* pictures of Messrs. H. P. Robinson, Hubbard, Gillard, Diston, Chaffin, &c. These alone suffice to make the visitor feel at home at once; but when the less important exhibits turn out to be nearly universally old friends his comfort is still more complete. As far as we can do so we shall pass over in our brief notice of the large collection before us those pictures which have been previously reviewed.

On entering the first room we have before us the work of Messrs. H. Stevens, Johnson Brothers, Bedford Lemere, and Donkin, all of which were in the recent exhibition in Pall Mall. Mr. Edward Dunmore is represented by two pictures—*Views in the Royal Gardens, Kew* (Nos. 11 and 12)—to which a medal has been awarded. These, though not equal to some of Mr. Dunmore's artistic landscape compositions, are fully deserving of the award, if only on account of their technical qualities.

Mr. Fred. Hollyer also takes a medal for some very clever work in subjects for decorative panels, some of which were exhibited in Pall Mall, though, as Mr. Hollyer was one of the judges, they were *hors concours*. The new ones—especially *Apples* and *Roses* (Nos. 13 and 15) —are particularly good; though *Lily* (No. 99), perhaps, continues to carry the palm.

A large number of church interiors are exhibited by Mr. William Ellis, who appears to make a *specialité* of this class of work, They are, as a rule, well executed.

Mr. W. G. Lewis, of Bath, shows a couple of very fine enlargements —presumably, though the catalogue does not say so, by the Autotype Company—of the *Roman Bath* at Bath.

Mr. E. Brightman's exhibits, which have been awarded a medal, include some frames that have been previously seen in London. We cannot, however, pass over his *Cloud Studies*, in several of which are represented swallows in every position of flight. Frame No. 44, by the same artist, includes some landscapes which are new to us, and strike us as the best of his collection.

Mr. W. C. Murphy, in No. 47, exhibits a dozen pictures of large size of *Landscapes in North Devon*, the best of which are a couple of pictures at Clovelly and Lynmouth respectively.

Mr. F. Bromhead exhibits half-a-dozen pictures, principally of Raglan Castle and neighbourhood. These are technically good, but are overburdened with elaborate frames, and their artistic merits are thereby lowered.

Mr. Alfred G. Pettitt has a very pretty frame of lake views, some of which we have seen before, but from amongst which we miss the best of the series we have seen on former occasions. Close by are several frames by Mr. T. A. Green—also from the lake district—two of which, *Great Gable* (No. 91) and *Coniston Old Man* (No. 97), are particularly good. *Grasmere and Rydal* (No. 95)—a panoramic picture "taken direct"—has much of its good effect spoiled by the manner in which the two negatives have been "combined;" otherwise it is a pleasing picture.

Mr. W. Harvey Barton, one of the judges, has a very fine collection of landscapes—of large size, mostly—but, of course, not for competition. Pictures of *Tintern Abbey* and *Chepstow Castle* are amongst the best, the whole series being equal to anything in the Exhibition.

The architectural subjects of Herman Rückwardt, to which a medal has been awarded, are rather disappointing. The interiors of Brühl Castle are some of them very good; but mere maps of ornamental ceilings scarcely come up to "medal standard." As for the exteriors, they are simply exaggerations of perspective.

Mr. Ralph O. Yearsley exhibits several very nice landscapes—English and West Indian. His views in Bermuda are, perhaps, the best.

The interior views of Malta Cathedral, by A. Tagliaferro, are deserving of more than passing notice; but the same artist presents us with an *instantaneous* panoramic view of Malta harbour printed from *two* negatives. Instantaneity is in itself a matter of serious question, but, when it comes to taking a picture "by instalments" instantaneously, we may with even greater reason question the correctness of the term. The junction, moreover, of the two pictures is managed in anything but a satisfactory manner.

Contemplation (No. 167), by John Taylor, is a picture that, we think, deserves some recognition. It is a simple little bit of nature—a rough-haired "tyke" contemplating meditatively a couple of rabbits with, fortunately for themselves, the bars of the hutch separating him from them.

Mr. W. Trenemen has two frames of very effective views tastefully got up on black and gold-bevelled mounts. These are good examples of what can be done by a judicious selection of mounts.

Mr. John Jackson shows a number of landscapes in Jedburgh, Cumberland, and Westmorland, the best of which are his views of Derwentwater.

The Rev. H. B. Hare shows very careful as well as artistic work. The composition of *The Ford* (No. 282) is especially good; in fact, that is, perhaps, his best picture, though there are one or two others which run it pretty close.

In No. 307 Mr. W. Clement Williams has a series of instantaneous seascapes combined with rather good cloud effects. The lighting of some of the clouds, however, does not appear quite natural, though it is scarcely possible that it could be otherwise.

Mr. George Patterson's frame (No. 362) contains a number of Manx views of good quality; but we must emphatically impeach the taste which induced him to include the central picture, *Andromeda*. We are not squeamish by any means, nor do we, on the other hand, believe in the cry of *honi soit qui mal y pense* as an excuse for the exhibition publicly of such pictures.

Mr. Adam Diston's *genre* subjects are too well known to most of our readers to require much notice from us here, and they have been awarded the gold medal. But one of this gentleman's exhibits which is new to us, *Photographing Baby* (No. 449), is about as good as anything in the Exhibition. The wretched little "victim," with nothing on but his shirt (or whatever the juvenile garment may be designated), is on the chair, surrounded by a dozen or so assistants, male and female, in every possible attitude of idiocy and excitement, and the result of whose exertions appears to be only to increase the "subject's" perturbation. The picture is well conceived and admirably executed.

Messrs. Freese and Green have some rather pleasing studies, which are, however, somewhat marred by the "original poetry" appended to them.

Amongst the examples of foreign work we may specially notice the medal pictures of G. Taeschler. These are much in the style of the famous Kareline pictures, which caused a sensation six or seven years ago, though they are smaller in size. No. 636, a portrait of a lady in fancy costume, is excellent. Ermakoff's landscapes, especially the larger ones, are also very noticeable, as are A. Greiner's Dutch views, principally of Amsterdam.

A remarkable picture, which has escaped entry in the catalogue, is amongst the Russian exhibits. This consists of a portrait taken at night by the light of a kerosine lamp, and certainly shows no sign either of under-exposure or of any abnormal form of lighting. Particulars are, however, wanting.

The usual show of apparatus is to be found, together with the miscellaneous adjuncts which find their way into most photographic exhibitions. The "loan collection" also occupies some space, but does not include anything of great importance. Some of the exhibits there, however, lend force to our belief in the wisdom of the Parent Society in excluding *coloured* photographs from their exhibitions.

ROUND THE WORLD.

No. V.

As it is desirable that I should finish my series with the year, I now shall confine myself so far as possible to a record of my travels, so as to illustrate and explain my photographic work, which became pretty frequent at this stage. I had not yet seen any of the east coast of the north island of New Zealand, so on June the 13th I went to New Plymouth with the younger of my half-brothers, who was "out of sorts" and required relaxation from his violent manual labours. The 14th was occupied in taking instantaneous views of the pier in process of formation. Though the sea was lashed into fury by a strong gale, the results in my negatives present no such appearance; the waves look quite ordinary tidal swells. I don't know why.

On the 15th of June I started by coach at 6 30 a.m. The sunrise on Mount Egmont—snow-covered at this time more than usual—was

simply gorgeous, with an indescribable tint of violet purple. At 11 a.m. we arrived at Pungarehu where we got off the coach and walked a mile or two to Parihaka, the Maori capital and the head quarters of a considerable force of armed constables.

Parihaka is a collection of perhaps 200 *wharés*, surrounded, as usual, with a stockade of "pungas"—a sort of tree fern. There was a bit of an *émeute* here at this time, as the Maories were assembling in large numbers, contrary to regulations, and some disturbance was feared. Over 800 natives tried to collect at Parihaka this very day, but numbers were turned backed by the A. C. men. Mount Egmont was hidden by a thick cloud, but I got a couple of good views of the settlement from one of the forts. A friend of mine in the force showed me about the place. We returned by coach to New Plymouth. The 16th was a fine day. I did some work on the river Waiwakaiho, and got an instantaneous view of Mount Egmont in the extreme distance. This developed fairly, but the plate was very spotty—dust from the road probably.

On the 18th we took train to Hawera, a grand agricultural country. On the 19th we travelled by coach and train to Wanganui—a very nice town, with a public garden on a slight hill. On the 20th I took a view from the garden, and examined the bridge over the river. The bridge cost £32,000, and is 600 feet long, supported on seven cast-iron cylinders. At 10 p.m. we left Wanganui for Wellington by the steamer "Huia," and arrived at 11 a.m. on the 21st. On the 22nd (a dull, misty day) I got two negatives of the town, with Government House and Parliament House; but the negatives are not very good on account of the fog. On the 23rd (a regular wet day) we went by rail to Lower Hutt, to see a garden of which we had heard much. This belongs to a Mr. Macnab (a Scotchman, of course), and in spite of the rain I took six negatives. The plants, especially the *cycads* and *araucariæ*, interested me botanically, but I did not expect and did not get good pictures. Then we proceeded to Masterton, where I met another Scotchman, whose people and friends I knew intimately, and who gave me good news of a relation of my own who had disappeared from the family "ken." Next day I got two views of a lovely bush and river scene, but, alas! (see later). Coach at 1 15 p.m. to Eketahuna, a roadside inn.

On the 26th we breakfasted at *3 a.m.*, and started by coach at 3 45 a.m. for Woodville, driving through most lovely bush, and across the Manawater river several times. Once we crossed, each and all, on a sort of ferry, pulling ourselves across by a rope in a curious way. We arrived at Woodville at 8 a.m.; had breakfast, and then—the Palmerston coach having stuck on account of late floods and land-slips—we had some hours to wait. At last, we coached on to Makatoko—a station on the railway to Napier.

On the 27th we left Makatoko by rail at 6.15 am., and arrived at Napier at 10.30 a.m. Napier, the capital of Hawkes Bay Province, is a very handsome town indeed. I like it as well as any town in New Zealand. On the 28th we attended the race meeting at Hastings, and a more pleasant meeting I never witnessed. Of course I met a great many Scotch and English friends, and even a relative whom I had not seen for twenty years. I agreed to pay him a visit at an island near Auckland, where he has property lately acquired. On the 30th this friend, my brother, and I started by the grand S. S. "Waihora" for Auckland, where we arrived on July 2nd. I ought to have stated that at Napier, wishing to get a view of the city, I climbed a hill, rigged up my camera, and proceeded to get a plate out of the changing-box, when, alas! the bottom of the changing-box gave way, and out fell eighteen plates—my undeveloped Masterton negatives among the rest. *Moral:* Twelve plates are enough for a changing-box unless made specially strong. *Moral* No. 2: Have some double dark slides as well.

After an hour or two in Auckland, where I left my changing-box for repair, we again shipped for Waiheke, my friend's island. There we landed after some trouble, for there is no proper landing-place, and remained there some days. In this island vegetation is very luxuriant, lemons and oranges (and some very lovely roses) were growing all around the *wharé*. We got some goat shooting and fishing about Waiheke, but neither goats nor fish were good to eat.

After a day or two I went back to Auckland, got my changing-box, and returned to Waiheke, where I secured some views of the *wharé* and several groups on plates made by Messrs. Hemus and Hanna, of Auckland. I had left a lot of plates in Taranaki, which I did not get till later. One of these groups contained the "Boss" and two friends of his—a working man, a German nobleman (cook to my friend), and an ex-convict—a fair mixture, I think.

On July 5th we returned to Auckland, where, on a wet day, I tried a negative or two upon plants in the "demesne." These were the only negatives I completely lost during my tour from fault of exposure. The plates were very much slower in bad light than I anticipated, and I could get nothing at all out of them. After a short digression to Waiwera, another but inferior hot spring place, I took my berth on board the Pacific mail steamer "Australia," bound for San Francisco, *viâ* Honolulu. I was here joined by a lady who has long been a friend of mine; in fact, my mother, who had come out to New Zealand to see her sons settled. In future records it must be understood that "we" represents my mother and me, as we did not part for a day after this stage of my journeyings.

The "Australia" made a fine passage to Honolulu, and we were a very merry party on board. We had our share of gossip, sickness, and violent flirtations. We had also on board a notoriety or two, among others Sir Henry Parkes, Archibald Forbes, war correspondent, part of an Italian Opera Company, and a young amateur photographer, besides "this child." On the voyage I learnt the most fascinating of all games, "poker," and I was informed that I had learnt it more cheaply than most, my complete course costing just under £10. Soon after midnight on the 30th July we reached Honolulu—capital of the Sandwich or, rather, Hawaii Islands. I rose about 6·30 a.m., and with my young amateur friend went ashore with camera and great hopes. We breakfasted at the Hawaian Hotel on delicious melons and so on; took several views of the beautiful hotel, and some street views, meant to show the vegetation.

Then I went up to a tower on the hotel and got two fine views of Honolulu, some of its buildings, and the more distant valleys. We then took a cab, for which we had to pay "sweetly," and, taking a few views along the road, drove to what was called a waterfall. There was a strong breeze which forced me to expose very rapidly on trees, &c., so that my negatives during this drive are not up to the mark as photographs. *The* thing to visit at Honolulu is the Pali Valley; but as it was raining and very misty, as we could see, we did not take our driver's warm advice to visit it. Over the waterfall I have mentioned there is a rock, thirty feet high. I got a Knaka boy, for "a quarter" (1/-), to jump off the rock into the pool, and exposed on him in mid-air with my drop-shutter at its quickest. The negative is fair enough, but the boy is *non inventus*.

The heat in Honolulu was great, but I carried my camera and exposed a dozen plates during the few hours I was on shore. King Kalakaua came on board, but though I had letters of introduction to him I did not present them, as we were just leaving. His band, which is a first-rate one, played the Hawaii anthem—*not* a first-rate one. They played other music most creditably, led by a German, though the band consisted otherwise of Kanakas and half-castes. After leaving Honolulu I helped my friend to develope his negatives in the mail room. They were sufficiently good negatives, but he was foolish enough to carry them in a rack on a pretty rough day, and I need not enlarge. We had a grand fancy ball on board, and next day I took several groups under an awning on deck. These came out very good in spite of from seven to ten seconds' exposure each. About 200 prints were ordered and printed in San Francisco.

We reached 'Frisco on August 7th, and after a close but polite customs' examination we went to the Baldwyn Hotel, were we remained a week. I must not enlarge on San Francisco, or what we saw there. I was nobly treated by Madame Rulofson, of Bradley and Rulofson, photographers. I did the Chinese Joss House, theatre, opium and other dens, and altogether had enough of the "Heathen Chinee." We visited the Big Hotel, where a friend had room No. 1,040, and where 2,000 sat down to dinner one day. 'Frisco was very full at this time, on account of a great "conclave" of Knights Templars—not "good templars," but a sort of Freemason brotherhood. We had the company of some of these gentlemen more or less during the whole of our stay in America. As they assembled from every State in the great republic their information was most useful and instructive, and was always freely given.

On August 14th we left 'Frisco for Madera, where we arrived at 4 a.m. on the 15th. After breakfast we started by coach for "Clarke's" or Wawona—a hotel fifty-six miles from Madera, and about seven hours' drive from the Yosemite Valley. On the 17th, with a large party of Templars, we drove to the Big Tree Grove, and I was amazed at the number of immense trees that we saw. I expected to find perhaps half-a-dozen giants, but there are scores of them. The "grizzly giant" in the Mariposa Grove is about 300 feet high and thirty-three feet in diameter. I executed a group here at the root of the tree. The nine people forming the group looked almost like insects on the stem. I also got a view of "Wawona," with the coach and six driving through it. The diameter of this tree is twenty-seven feet, and that of "Andy Johnson," which is prone, almost the same. The trees are all more or less burned, either by accident or design. One, called "The Telescope," is so hollowed out by fire that you can look right up through it to the sky. These trees surpassed both in number and size my wildest expectations. The Americans do all things on a big scale, and I think their trees in this district are the biggest things they have produced.

I have now travelled a good deal in my time, and seen a good many of the "show places" of the world; but for grandeur, interest, and beauty combined nothing has so completely fascinated or astonished me as the Yosemite Valley. Leaving Clarke's early on the 18th we drove up hill for a good many miles till we got to about 7,000 feet above sea level. Then almost suddenly we saw below us a sight never to be forgotten. Right in front of us was a winding, steep road leading down into a valley with sides almost perpendicular and of enormous height, consisting of bright grey granite. From Inspiration Point we saw the valley in grand perspective. On our right was the Bridal Veil Waterfall, falling 940 feet over the face of the Graces, themselves 3,400 feet high. Further away was Sentinal Dome, 4,160 feet high, and in the far distance, Half Dome, 4,953 feet of cliff, and Clouds' Rest, 521 feet. On our left appeared El Capitan—an almost perpendicular granite cliff of 3,300 feet, and other granite faces stretching away back into the distance. Right below us, partly screened by pine trees of great size,

lay the valley, about six and a-half miles long at the bottom, with the Mercèd River meandering along its course. As we went down into the valley many other cliffs came into view—the North Dome, 3,633 feet; Glacier Point, 3,257 feet; Washington Column; the Cathedral spires, 2,660 feet; the Yosemite Fall, 2,550 feet, and many stupendous cliffs, of which I cannot remember the names.

I have a view taken by Mr. Fiske, of Yosemite Valley, from Inspiration Point—at once one of the most successful photographs I have seen, and a splendid birds'-eye view of this wonderful region. The bed of the Mercèd in the Valley is 3,850 feet above the sea, and all the heights I have mentioned are calculated from the valley level; so an idea may be formed of what the heights as usually calculated are. The valley is from half a mile to a mile and a-half broad, and runs about north by east and south by west. The remarkable points about it are the height and perpendicularity of its walls, averaging about 4,000 feet in height, and the paucity and smallness of *débris* lying at the foot of the walls. The latter feature precludes the idea of any sudden tearing or, indeed, sudden action of any kind. I think the valley must have subsided gradually in some way I cannot quite understand. Autumn is not at all a good time to visit the valley; for, not only are most of the cascades dried up, but the dust and dryness of all things are very uncomfortable. I found the valley so narrow and some of the cliffs so high that I could not photograph them, and never in my life did I see any object so change its appearance under different aspect of light and shade as the Cathedral Spires, which for the former reason I failed to photograph.

On the 19th August I drove a mile or two to the Mirror Lake—a small pool of water near the head of the valley, and entirely shut in by very lofty granite cliffs, Mount Watkins being one of the cliffs, named after Mr. Watkins, a photographer, who has done much to publish and portray these regions. When I arrived at the lake the sun had not reached the pool, but a heavy mist hung over it, and its surface was as glass. A small pebble thrown in would have spoiled the whole affair. There was not a breath of wind to ruffle the smooth surface, and I took no fewer than nine negatives from various points—some just before and others just after the sun had got high enough in the zenith to reach the lake. After breakfast I carried the camera about a mile from Cooke's Hotel, where we were staying, and got a view of the Half-Dome, Clouds' Rest, and some other peaks; but I was forced to take rather an ugly foreground, which has spoiled the effect of my picture. This day the thermometer marked 103° in the shade at noon, and about half-past ten in the forenoon a breeze (even amounting at times to a wind) always rises at this season in the valley.

On the 20th Mr. Cooke gave me a ticket for the stage to take me back towards Clarke's as far as Inspiration Point. I was either to walk back or wait for the return stage in the afternoon. I went as far as Artists' Point—not so far as Inspiration Point, but far enough from the hotel to make the walk back no joke on a broiling hot day with the camera on one's back. As it was about 8 a.m. the mist still hung over the valley. I determined to try a mist effect, and succeeded *à merveille*. This view was exhibited at Pall Mall in October. In returning a plate to the changing-box some hitch occurred, and I made sure all my plates were fogged; so, enraged and discouraged, I "made tracks" for the hotel, four miles off. To lighten my load I nearly threw away all my plates. Luckily I did not, as, being enabled by the great kindness of Mrs. Fiske (wife of the well-known Yosemite photographer) to develope a plate, I found to my intense delight that my fears were groundless. Mrs. Fiske also gave me a lot of very fine views 8 × 5, that being at the time Mr. Fiske's largest size. I am glad to say that so admirable a worker has since taken to 15 × 12 plates and gelatino-bromide.

On the 21st, my mother going to see the Mirror Lake, I took the chance of driving with her to a bridge over the Mercèd, a little below the lake, where, after a great deal of bother selecting my view-point, I got the negative, a print of which, in Messrs. Sprague's inimitable style, adorned last week's number. Of all the ink processes of reproducing photographs I have seen I consider this *facile princeps*. Driving back towards the hotel I got a river view, with the sun almost directly in my face. I did not expect a great success; but the negative turned out all right, and the view is one of my favourites.

Driving along the opposite side of the river we came suddenly upon what I consider the finest view in the valley for photographic treatment. This view also appeared in the Pall Mall Exhibition, under the title of *Photographer's Point*. The view was but a short time opened up by the felling of some trees, and I fancy it had not been photographed before, though I may be wrong. The immediate foreground was a lot of boulders of rock—rather too many and too white, perhaps; then the river bed, with willows and low scrub, and the distance filled with lofty peaks of granite. I think I never met with a view more adapted for photography, but, being pressed for time, I only took two negatives—one with a longish exposure, and the other with about one second, the lens working at $\frac{f}{7}$. Both negatives are good, and I felt that after this grand effort I had better conclude my work in the Yosemite. All that now remains is to describe very briefly our homeward journey.

On August 22nd we drove back to Clarke's, and on the 23rd we had another long, dusty drive to Madera. Taking train there we did not halt till we got to Sacramento—a lovely place with splendid vegetation. Then on to Ogden, after which we began a very steep ascent; through the Black Cañon, and down a gradient that must be highly dangerous, as in the tail carriage we looked down upon the engine funnel; then through the Grand Cañon, with perpendicular rocks thousands of feet high on our left, the river being on the right and below us. This part of the journey seemed to me at once the most dangerous line and the greatest engineering triumph in the world, and it was all extremely grand and picturesque.

On the 26th we got to bed at Denver, and left the same evening at 9.25. We did not again leave the "cars" for any time to speak of till we reached Niagara Falls. I consider the Falls the greatest "fraud" in the world compared with the talk about them and my expectations of them. The "Rapids" below are really fine, yet much less is said of them than the Falls. The Horseshoe Fall is an enormous body of water, no doubt; but its height is only 164 feet, which is a "detail" after the Yosemite Falls.

My camera "legs" having been "annexed" during my late travels, I could not do any work at Niagara, and we left after a few hours for New York, the journey down the Hudson River being lovely. After four days in New York, we sailed for Liverpool by the Guion S. S. "Wisconsin," on September 4th. Except the Central Park, I care very little for New York. Broadway is a complete misnomer. "Longway" might be appropriate; but if some of our London streets were no broader than Broadway there would be blocks of weeks' duration. The Brooklyn Bridge is wonderful—more so than beautiful—and the smells at certain parts of New York compare favourably with those of Naples.

Our passage across the "pond" was as peaceful as if the Atlantic were really a pond. On the 14th September—nine months from the day I left the Thames—we landed at Liverpool. Of course I did not hurry home. Oh! no!! After all I had seen, I felt a warm affection for the peaceful and prosperous hillsides of my own country, and I felt that bonny Eskdale was wearing her sweetest garb to welcome the returning wanderer.

Of my 130 undeveloped negatives I lost five from wrong exposure, and seven or eight from technical imperfections of the plates; but I have a good number more or less spoiled by drying marks, while a great many are as good as could be expected under the uncertain circumstances of hurried and varying exposure—not a plate broken, and very few affected by damp. In a few cases the paper used in protecting the faces of the negatives had stuck in small spots to the gelatine. I regret having had to hurry so rapidly over the last stages of my journey, but possibly my readers may find it a cause for gratulation. Of one thing I am certain, and that is—however much benefit may accrue to mind and body (and I have cause to be thankful) from travelling, the best plan is to spend, what I wish to all readers of this Journal—Christmas at Home! ANDREW PRINGLE.

ON THINGS IN GENERAL.

If the London and Provincial Photographic Society get many more such capital lectures as Mr. J. T. Taylor's on lens manufacture and Mr. A. L. Henderson's on enamelling processes, they will soon become celebrated. I venture to say that the amount of technical information conveyed on each of those occasions has rarely, if ever, been equalled in the contents of some of the more pretentious papers read elsewhere. Not that I for one moment would decry the reading of such papers—far from it. They form a most useful medium for the dissemination of knowledge, and have in the aggregate conveyed a vast fund of information. I speak more particularly of isolated communications.

Mr. C. E. Abney's paper, read at this same meeting, gave prominence to a capital plan of copying and enlarging albumenised prints which is not so well known as it deserves. The method, however, is by no means novel, as, indeed, was stated by several speakers at the meeting. I have practised it myself years ago. The disadvantage it possesses is that it cannot be adopted with safety with any *carte* or old photograph entrusted to one for copying.

On reading, in last week's issue of this Journal, the article upon *A Few Photographic Conveniences*, I accidentally read the last word of the title as "Coincidences," which is strange, seeing that a precisely similar arrangement of light shading as that described in the text appeared in these pages a year ago; while an almost identical plan is pictured in the new ALMANAC, and stated to have been in use for two years by Mr. Marshall Wane, of well-known fame. Even the very bicycle saddle, recommended by Mr. Wane to sit upon during development, is described in Mr. W. Crooke's article. He does not exactly say he invented or devised them, but that is the inference. How true it is that "great minds think alike!"

Mr. F. York's remarks, embodying his heterodox views upon swing-backs, created quite a lively time. It is truly marvellous how little the real functions and the actual usefulness of a swing-back is understood by the average photographer. In many cases the question is simply whether a small stop used with part of a picture out of focus will give or will not give more sharpness than when the same object lies close to the margin of the field of the lens. I took an $8\frac{1}{2} \times 8\frac{1}{2}$ negative some little while ago with an (nominal) equivalent four-inch focus lens, and the

view covered the greater part of the plate. If I had raised my camera front the top of the building would have been lost to view entirely. Mr. York's skill is well known; hence his *dicta* must be received with respect. I apprehend he has been able to work well within the field of view his lenses would give, in which case his method of working could not be improved upon. As a matter of fact, I rarely use a swing-back for the purpose of correcting perspective. Its chief use to me has been to assist in getting sharp pictures by adjusting the focus and then I have left perspective to take care of itself. We are not to forget that there is a side swing as well as a vertical one.

Mr. J. McGhie told the members of the Photographic Society of Ireland he believed Mr. Goodall was the first to introduce matt-surface opal as an article of commerce to the photographers of Great Britain three years ago! Gracious goodness! Three years ago! Opals with a matt surface—"the chaste, pure, and beautiful opal," Mr. McGhie terms them—were the staple business of one well-known London firm I am afraid to say how many more than three times three years ago! This is almost equal to *Anthony's Bulletin* crediting Mr. Kurtz with the invention of retouching.

According to another New York photographic journal arrangements have been made to photograph (among others) Patti's vocal chords. If that gifted lady charges fifty or a hundred guineas for sitting to be photographed, I wonder what terms she has insisted upon before consenting to allow a camera to look down her throat!

Canary medium is cropping up again, and once more, no doubt, we shall have all the old things said once again—how one man photographs with a naked lamp, another with subdued daylight, and so on; but, all the same, thanks are due to Mr. W. E. Debenham for his efforts to mitigate an undoubted nuisance, if not a positive danger—the dull illumination of the "dark room of the period," to which dulness, however, there are, or have been, striking exceptions.

Apropos of Mr. Debenham's remarks upon Sir J. W. Herschel's views upon bromide: Mr. Debenham seems to have forgotten they were qualified by after-utterances. It is singular to note that all the early experimenters gave a zero of chemical action upon silver salts to the yellow rays. The frontispiece to Hunt's *Treatise on Light* shows the yellow of the spectrum as being without action on any of the eleven silver salts represented.

The older lights of photography seem to be having their turn, and I must confess to a considerable feeling of mental gratification at Mr. T. Sebastian Davis's tribute to Major Russell's discovery of the alkaline developer. It is the corner-stone of modern photography; yet, for some reason or other, the name of Russell in connection with photographic progress seems to be studiously ignored almost universally.

I do not know if I shall have much spare time for reading anything but my BRITISH JOURNAL ALMANAC for some time to come. It is such a fine, portly volume, and contains so much matter of high interest that it will take time to absorb so great an amount of mental pabulum. It is a great success, and should be in the hands of every photographer—to all of whom I offer my wishes for "A Bright Christmas and a Happy New Year." FREE LANCE.

THE PAST, PRESENT, AND FUTURE OF PHOTOGRAPHY IN NATURAL COLOURS.*

IN Hunt's *Researches on Light* we read that iodised paper brushed over with solutions of potassium, ferrocyanide, and nitrate of silver will reproduce the colours of the spectrum with a certain amount of truth.

For the first substantial advance on the discovery of Professor Seebeck, we must turn to the protracted and arduous investigations of M. Edmond Becquerel, the whole of whose remarkable discoveries are detailed in their author's great work on light.

Becquerel worked with pure silver plates, which he chlorinated by immersion in various liquids. His first experiments were with chlorine water, in which he dipped his silver plate until its surface became covered with a grey film of silver chloride. On exposing the plate so prepared to the solar spectrum, he obtained an image of the latter which, for brilliancy of colour and fidelity to the original, far surpassed the results obtained by any previous investigator. Pursuing his experiments, he discovered that the thickness of the layer of silver chloride had a very considerable influence on the rapidity and vigour with which the colours came out, and he consequently gave up the method of chlorinating with chlorine water, and substituted the following electrolytic plan.

A plate of pure silver carefully polished with rouge and alcohol was attached to the positive electrode of a galvanic battery, and suspended in a solution composed of one volume of pure hydrocholoric acid to eight volumes of water. On plunging into the liquid a rod of platinum or copper connected with the negative electrode of the battery, the electric current decomposed the acidulated water, and minute bubbles of chlorine detached themselves from the rod, and, passing to the silver plate, attacked its polished surface, producing a layer of silver sub-chloride. As the action continued, and this layer increased in thickness, the plate showed in succession the series of colours due to the action of light on thin transparent plates. After the surface had become grey, yellow, violet, and green in succession, the plate was removed from the solution, washed with distilled water, dried over a spirit lamp, and carefully polished with a velvet pad, after which process it was ready for exposure.

* Concluded from page 776.

Although a plate treated as above reproduced the colours in their true tints, and with very considerable brilliancy, its sensitiveness was but small. When submitted to a powerful solar spectrum, an exposure of nearly an hour was required to reproduce the colours; and to get a picture in a camera an exposure of many hours was requisite. When exposed to the light under pieces of coloured glass, the colours of the latter were rapidly reproduced.

Becquerel also discovered that heating the plates after chlorinating greatly increased their sensitiveness. A strong heat for a short time had, however, the objectionable effect of considerably altering the tint of green and yellow colours; but with prolonged heating at a moderate temperature, sensitiveness could be increased without any bad influence on the results. With these baked plates a very curious phenomenon was witnessed, for white light was found to have a bleaching effect on the silver sub-chloride, producing white, and not black, as is usually the case. Prolonged exposure to the light under ruby and cobalt glasses, was found to have very much the same effect as the baking process.

Although Becquerel made many attempts to fix the coloured photographs that he obtained, he never succeeded. Hyposulphite of soda ammonia, and other substances capable of dissolving silver chloride, were of no use, as they were found to destroy immediately all traces of the image, leaving, however, in some cases, an extremely faint picture in colours complementary to those which had previously existed. This, however, also vanished as soon as the plate was dry.

After Becquerel, the next observer of note who attacked the problem was Nièpce de St. Victor. He employed silver plates which he chlorinated by immersion in a solution of iron and copper chloride, and then heated them strongly. By this means he obtained plates of great sensitiveness, with which he succeeded in taking camera pictures in sunlight with an exposure of only fifteen seconds. He took successful coloured photographs of flowers, painted windows, dolls dressed in coloured clothes, and peacocks' feathers, in which not only did the colours appear correctly, but the gold and silver also retained their metallic lustre. Examples of his work were exhibited in a subdued light at the Paris International Exhibition of 1867, and in London at the Loan Exhibition of Scientific Apparatus. He contributed full accounts of his discoveries to the Paris Academy between the years 1857 and 1867.

Other workers have been Poitevin, Wharton Simpson, and St. Florent. Poitevin employed violet silver sub-chloride on paper; Simpson, silver chloride suspended in a film of collodion or gelatine; and St. Florent succeeded in partially fixing the colours produced on silver sub-chloride by a bath of ammonia and alcohol. The details of the investigations of these experimentalists are too lengthy to describe on the present occasion, but may be found in full in a book entitled *Die Heliocromie*, recently published in German by Dr. Liesegang, of Düsseldorf, in which book are also accounts of the experiments of Becquerel and Nièpce. This book is I believe, the only one that exists upon the subject, and the fact of its being written in German prevents it being of much use to those who are not conversant with the language.

The visible colouration produced in the manner above described has been generally attributed to the same cause as in the case of thin plates; but, according to Captain Abney and other authorities, this is not the case, and the colours are probably due to different stages of oxidation of the silver salt. When this is taken into consideration, the difficulty of fixing the colours and preventing the further action of light on the silver becomes more apparent.

In an ordinary photograph the silver salt is reduced by light to the metallic state; fixation is accomplished by immersion in solutions of sodium hyposulphite or potassium cyanide, which dissolve away the unaltered part of the silver without affecting the image. With coloured photographs, on the other hand, the case is entirely different. The whole of the silver salt appears to be acted upon more or less, and upon the extent of the action depends the colour produced. The silver is in no case reduced to a metallic state, and any chemical capable of dissolving the salt is consequently found to remove all traces of colour.

It is thus clear that fixing in the sense of dissolving out all the unaltered silver cannot be accomplished, for though all the salt is more or less acted upon, none is metallic, and all is soluble.

If, however, the theory be true that the colours are due simply to different degrees of oxidation, it may, perhaps, be found possible to fix the image by protecting the surface of the plate from the access of oxygen, which would render further oxidation impossible. At the same time, however, it will be necessary to guard against the evolution of chloride, which would reduce the silver sub-chloride on a metallic state.

Although this may sound easy in theory, in practice it is a difficult problem, and, moreover, the results are not what we would expect. A layer of paraffine is believed to be quite impermeable to both oxygen and chlorine; but a layer of paraffine on the surface of a chlorinated plate does not appear to have the slightest effect in arresting or modifying the formation of colours, or in procuring their subsequent permanency. With a silver plate prepared according to Becquerel's electrolytic method, the presence or absence of a layer of paraffine produces very little appreciable difference, and hence the conclusion is forced upon us that either the colours are not due to oxidation, or that there is sufficient oxygen present in the film without any recourse to the outer air. The latter is very probably the correct explanation, for without doubt the electric current, acting upon the acidulated water, liberates oxygen as well as chlorine, and, consequently, the film does not consist exclusively of silver and chlorine; but there is also, probably, oxygen present as well. Moreover, though paraffine may be practically impermeable to oxygen, still it may actually be slightly permeable, and with so very delicate a substance as silver sub-chloride a very minute amount of oxygen may be able to have great effect.

It is greatly to be hoped that some process by which the beautiful colours produced on silver sub-chloride may be rendered permanent will be discovered, but it cannot be denied that the problem is of considerably greater difficulty than was the case in the instance of ordinary monochrome photographs. While in the latter the unaltered silver has only to be

dissolved away, in the former the image consists of silver in a very unstable state of transition from one form to another, and a means of causing it to remain permanently in this transitional state is, consequently, very difficult to discover.

However, who can doubt that a fixing medium will some day be discovered, when it is remembered that in the case of uncoloured photography no less than seventeen years elapsed before permanency was obtained by the discovery of the properties of hyposulphite of soda?

It must not, however, be imagined that a fixing medium is the only thing that is required to render coloured photography feasible, although when the one is found the rest will be sure soon to follow.

Great as has been the progress made, much yet is left to be accomplished before practical success can be assured. Even in bright sunshine, and the most sensitive plates at his command, Nièpce found fifteen seconds' exposure necessary, while with a diffused light the exposure was measured by minutes.

This, in our modern days of instantaneous photography, would never do, and before photography in colours can become of any practical use plates of much greater sensitiveness than those employed by Nièpce must undoubtedly be produced. To those, however, who have watched the progress of photography from the days of the Talbotype and the Daguerreotype until now, this will in nowise appear an insuperable obstacle, for in those early days exposures of one to two hours were not uncommon.

At all events, photographs in natural colours have been produced, and partial fixation has also been attained. The rest is sure to follow; it can only be a question of time.

I fear that this paper is by no means worthy of its theme, but it is not possible to fully treat of so extensive a subject as that of coloured photography in a short space of time. Information as to what has been discovered is, moreover, in this country extremely scant, and nearly all the literature pertaining to the subject that can be obtained is of foreign origin.

If I have been successful in arousing only a little interest in the great problem I am fully satisfied; for interest will, perhaps, lead to investigation, and the latter to fresh discoveries.

The progress towards the attainment of photography in natural colours has been undoubtedly slow—it has been none the less sure; and, though much still remains to be worked out, a basis on which to work has, at all events, been discovered.

Seebeck, Herschell, Hunt, Becquerel, Nièpce, Poitevin, Simpson, St. Florent, have done their share towards the solution of the problem, and the names of those who succeeded in supplementing their labours will go down to posterity with like glorious associations.

A. A. Campbell Swinton.

THE SOIRÉE OF THE ASSOCIATED SCIENTIFIC SOCIETIES OF LIVERPOOL.

This year's festivity of the combined Learned Societies of this City passed off on Wednesday evening, the 19th inst., with even more than its usual *éclat*. There was, probably, the most numerous assemblage of guests in St. George's Hall that have ever met together for the enjoyment of these reunions, and the entertainment provided for them was in no way inferior to that of former years.

The great hall, was, as usual on these occasions, well filled with interesting exhibits of various kinds, and the lectures and musical entertainments were numerous and varied in their character.

The lecturers who called in the aid of photographic transparencies and the lantern to illustrate their subjects were Father Perry, of Stoneyhurst College, who discoursed on Madagascar; the Rev. H. J. Palmer, who lectured on Switzerland; Mr. Birchall, on old French towns; Dr. Hicks, on insects and their habitations; and Professor Donkin, on photography in the high Alps. Of these, undoubtedly Mr. Donkin's transparencies, on Mr. Chapman's and Mr. Cowan's plates, bore off the palm, though some of Mr. Palmer's, on his own tea-plates, were exceedingly fine.

The Liverpool Amateur Photographic Association displayed a really splendid collection of pictures, and their portion of the building was thronged with visitors during the whole evening. The "hanging committee" had been hard at work all day, and, thanks to Messrs. Crowe, Forrest, Guyton, and the Hon. Secretary, the exhibits of the Society were displayed to the very best advantage. The fine collection of Welsh views, and some interiors of the Children's Hospital, by Mr. J. H. T. Ellerbeck; the splendid pictures of the high Alps, by Mr. Donkin; Mr. R. Crowe's collection of instantaneous views; the prize pictures of the Amateur Photographic Society (London), exhibited by the Rev. H. J. Palmer; and especially the Liverpool Amateur Photographic Association's competition prints for this year, were among the most interesting portions of the exhibition. Mr. J. J. Atkinson and Messrs. Cussons and Co., contributed some excellent specimens of apparatus of various kinds; and Mr. Atkinson's Zoëtropes, with Mr. Maybridge's moving animals and figures, were a source of unceasing interest and amusement.

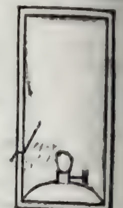
On the whole, the photographic department of this year's Associated Soirée well sustained the reputation for excellence and novelty which it has obtained for some years past.

Meetings of Societies.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

At the meeting of this Society, held on the 20th instant, the chair was occupied by Mr. W. Coles.

Mr. H. S. Starnes said that, like many others, he had been making experiments to find a suitable light for the dark room. Red light was very painful, and in looking for a substitute he had determined to construct a lantern which should illuminate by reflection alone. He showed the lantern, which consisted of a wooden box about sixteen inches in height and six inches square. Three sides, the top, and about one-third of the front measured from the bottom were closed; the remainder of the front was open, except that a piece of tin blackened on the front was fitted to rise from the wood about another third of the height of the box. This tin slanted inwards to just such an extent that the flame of an oil lamp standing on the bottom of the box, did not project any light directly through the opening. The inside of the box was painted—first with white, and then with raw sienna, mixed with gold size. He had at first tried orange, but found on photographing the two colours that orange gave more impression on the film than yellow. The colours he had found to answer were raw sienna, *terra verte*, and Vandyke brown. Of these he preferred the first named. He exhibited a plate which had been kept in the developing solution for ten minutes after having been exposed in four divisions at the place where the developing dish would be placed for periods of fifteen minutes, forty-five minutes, one hour, and an hour and a-half. On the most-exposed portion only a very faint deposit was visible, and none at all on the others. The developing solution at first contained five minims of ammonia; but this was afterwards made up to twenty minims, or three times the normal quantity.



The Chairman thought that the arrangement was simply a reduction of the amount of light. He had worked in a room with the gas turned down low, and the plate kept out of its direct rays.

Mr. Starnes considered that the efficacy of the lamp depended upon the colour of which it was painted. If it were blue, or even orange, there would be action.

The Chairman remarked that the flame itself gave out a yellow light, and of that light much was absorbed instead of being reflected.

Mr. W. M. Ashman suggested that the lamp enclosed in the box should be fed with spirits of wine and salt instead of oil.

Mr. W. E. Debenham thought it would be better to paint the inside of the box of a brighter colour—say deep chrome yellow—and to have a light yellowish-green glass in front. Mr. L. Warnerke had described a lamp in which all direct rays were screened off and the light supplied by reflection from a vermilion-coloured dome transmitted through ruby glass. As to the developer employed by Mr. Starnes, he should like to have the formula, as he was not acquainted with one which would bear to have three times its normal quantity of ammonia kept upon the plate for a quarter of an hour or twenty minutes without inducing fog.

Mr. Starnes could not at the moment give the formula, but would do so at a future meeting. He also said that he found that setting and remelting an emulsion removed the effect of its having been subjected to a light which would otherwise have fogged it. This he attributed to the cause Major Sedgwick had pointed out—the expansion and contraction of the gelatine.

Mr. F. W. Hart suggested that instead of painting the woodwork of the box it should be lined with sand paper painted of the desired colour.

Mr. A. Haddon said that he observed considerable reflection from the front surface of the gold size. This would be reflected white light, and he recommended the use of starch to be mixed with the pigment instead of gold size.

Mr. C. H. Cooke thought that it would suffice to use turpentine and a very little gold size.

Mr. A. L. Henderson proposed that the discussion on Mr. Starnes' lamp be adjourned for a month. During the interval he and, doubtless, others would experiment in the same direction.

Mr. W. T. Wilkinson seconded the proposition, which was carried.

Mr. J. G. Tunny said, with reference to the quantity of ammonia that might be introduced into a developer without inducing fogging, he had seen Mr. Gray, of Gateshead, use twenty or thirty times the normal amount. In answer to a question he said that the developer was made up of—

Pyro	160	grains.
Water	80	ounces.
Nitric acid	8	minims.
Bromide of potassium	½	ounce.

With this mix an equal part of a solution of one part of liquor ammonia in eighty of water.

Mr. Haddon showed a photograph of sparks given off from a Holtz's induction electrical machine. The duration of the spark was from the twenty-thousandth to the thirty-thousandth part of a second.

Mr. J. B. B. Wellington showed prints from negatives recently taken, which were exposed after sunset, and in one of them the street lamps were to be seen alight. He had given a long exposure, and the result was satisfactory.

Messrs. C. and F. Darker then exhibited a lantern polariscope and many beautiful and interesting slides prepared for the same. Together with slides of their own preparation were some very fine selenite delineations, the work of Mr. W. M. Ayres. The display elicited warm tokens of approbation, and at the request of several members it was promised that another exhibition would be given, and would be arranged for a time to be announced at some future meeting.

The following gentlemen were elected members of the Society:—Messrs. L. Atkinson, H. C. Green, and H. R. Milner.

Correspondence.

LIGHT IN THE OPERATING ROOM.

To the Editors.

Gentlemen,—I am pleased to see, from your Journal, that the subject of lighting the dark room has been occupying the attention of

photographers. From the remarks of the various writers on the subject it appears that the ruby light is that generally used where gelatine plates are developed.

When I first adopted dry plates in the ordinary work of my studio I, too, had my dark-room windows fitted with ruby glass; but I found it very unsatisfactory and, in my case, most hurtful to the eyes. After continuing its use for a considerable time, I found it really so distressing that I began to look about for a substitute.

After experimenting with various colours I found that three thicknesses of yellow glass was perfectly safe for all practical purposes, and for three years I have used no other light, while I have worked plates from ten to fifty times more sensitive than the wet collodion.

I may here remark that my dark room is a small one, being about six feet square, and has a north aspect. The window is about two feet six inches by two feet, from which dimensions you can easily imagine the illumination to be ample. The sink at which I develope my plates is immediately under the window; yet, under these apparently somewhat trying conditions, I have never observed the slightest trace of fog. The glass I use is, I believe, known in the trade as "amber," and I should think may be procured from any dealer in window glass. I find it varies very much in colour, some sheets being much darker than others. The deepest coloured is the best. I do not see why photographers should grope about in the dark when by such a simple means the dark room may be lighted so safely and so well. I developed a trial plate the other day in my printing-room, the door and window of which are both fitted with the yellow light, and where I could easily read the small type of a newspaper. The negative turned out a perfectly good one, thus demonstrating what I have been trying to show, namely, that the light may be safely admitted if only conveyed through a proper medium.

If not trespassing too much on your space, I should like to make a few remarks about a dark room I am at present fitting up. I am arranging it so that the changing of the plates from their box to the dark slide is done in one room and the development in another. The changing-room is thus always dry. I think this arrangement will be very convenient. Each of these rooms will have about twenty superficial feet of glass—one half yellow and the other white, the white portion being covered with an opaque blind removable at will in order to enable me to weigh chemicals, or do any other work in the dark room requiring a white light. I am afraid my letter will take up more space than I at first intended, but if it be of any use to any of the readers of the Journal I shall be rewarded.—I am, yours, &c., W. McLiesh.

Darlington, December 19, 1883.

LIGHT IN THE DARK ROOM.

To the Editors.

Gentlemen,—We have for over a year used a combination of dark green and orange glass to admit light to our coating and developing rooms for dry plates, finding it a very safe and pleasant light to work by. We use a yellow shade to cut off *very bright* light.—We are, yours. &c., Allen and Rowell.

Boston, U.S., December 11, 1883.

DIRECT POSITIVES.

To the Editors.

Gentlemen,—I have been very much interested in Mr. J. M. Carroll's article on the above subject, which I have been longing for; but I should like, if it be not trespassing on Mr. Carroll's good nature too much, to ask him for a little more information as to manipulation.

He advises the use of cardboard. Would not glass plates do as well? And would the ordinary gelatino-bromide do, or should it be the chloride?

After development, washing, and flooding with iodine he says "expose freely to light;" but for what period of time—one or more seconds or minutes? And would exposure to the lime light be sufficient, or must it be pure daylight?

If Mr. Carroll would give the required information, together with any other hints necessary, he, I think, would oblige others besides—Yours, &c., Amateur.

December 11, 1883.

CANARY MEDIUM *VERSUS* RUBY.

To the Editors.

Gentlemen,—So many wrote from this neighbourhood, about a year ago, respecting canary medium, all of whom have continued to use it, it seems strange that in the south yellow mediums are only now coming to the front again.

Granted that a yellow light is less injurious to the sight than a ruby, and that development is much more comfortably carried on, it is curious that so plentiful a material should require to be re-introduced. In my visits amongst practical photographers I see canary used in divers ways.

In Messrs. Gregson and Son's studios, in Blackpool, I have seen windows as large as one square yard covered with nothing else. I see it used in gas and petroleum lanterns of all sizes; and, finally, a Bradford plate-maker, of more than local repute, who was the first to use it, not only makes his emulsion but coats his plates by its light, his plates being quite as quick as the so-called "twenty times." I have also developed Wratten's and Nelson's quickest plates with it without fog.

There is only one kind of "canary medium," and if those who have not had the right kind will write to me I will send a sample free of charge. The paper is not made specially for photographers; it is used in large quantities every day in the Bradford shipping houses for making up pieces.

Besides being thick, it is a very permanent colour. On testing with a drop of ammonium sulphide a dark stain is produced, the colouring matter being lead chromate, which is added to the pulp. It can be had in sheets of large size, one 36 × 24 inches costing 3d., so that aurine papers are neither so cheap nor so permanent.—I am, yours, &c.,

Leeds-road, Bradford, December 24, 1883. G. D. Scorah.

THE PHOTOGRAPHIC SOCIETY OF IRELAND.

To the Editors.

Gentlemen,—I find in your last issue the address which I gave before the Photographic Society of Ireland is attributed to Mr. J. McGhie. Mr. McGhie never wrote one word of that paper, neither did he read it before the Society, as the condensed report states.

The truth of my assertion can be verified by any one of the fifty gentlemen present. Copies of my address I left with Mr. H. V. Robinson to forward in the usual way to both journals, together with notices of the Society's meeting.

Hoping you will insert this rectification,—I am, yours, &c ,

J. H. Halvey.

49, *Jamaica-street, Glasgow, December* 25, 1883.

WHY IS THIS THUS?

To the Editors.

Gentlemen,—The quotation, "There is something rotten in the state of Denmark," may be aptly applied to all societies who, by some muddle or faulty organisation, succeed generally in giving dissatisfaction.

For instance, here is a case in point:—Two pictures were sent to the late exhibition in Pall Mall by an exhibitor *whose name was unknown to the hangers*. What was the result? One picture was rejected, and the other ignominiously floored, a free passage for air being opened through the glass; and yet these identical pictures have been awarded a medal at the Bristol Exhibition, where, in addition to the bulk of the pictures exhibited in Pall Mall, have been added the pick of the best photographs produced for the last three years. Is it too exacting to ask why this is so?

As to the rejected ones at Pall Mall: I am informed, on the best authority, that they were not even seen by some of the judges. When so much depends on those appointed to hang the exhibits it seems to me *that they and the judges should work together*, and *place the best pictures in the best places*. I am quite aware of the difficulties and troubles of hanging a room full of pictures to the best advantage; but the plan now pursued is of all others the most unsatisfactory and absurd. When we see pictures bearing the green label floored or placed in out-of-the-way corners, and average work monopolising the best positions, the only explanation seems to be that the frames and size were the only considerations in the minds of those appointed to arrange them on the walls, supported, in a manner, by knowledge of the sender; but as to the merits of the pictures themselves they were entirely oblivious.—I am, yours, &c., Edwd. Dunmore.

December 24, 1883.

The Patents Act, 1883.—The daily papers have been requested to state that no applications under the new Patents, &c., Act will be accepted if they bear a date prior to the 1st of January, 1884, the day upon which the Act comes into operation. Copies of the rules under the Act can be purchased at the Patent Office, Sale Department, Cursitor-street, Chancery-lane. It will not be possible to place the forms for applications under the Act for sale at various post-offices before the 29th of December; but any persons, if they think fit, may prepare forms in manuscript in conformity with the rules.——In *The Times* of Wednesday last a barrister of fourteen years' standing writes:—"December 24th,—In *The Times* of today appears a notice purporting to be 'by authority.' It relates to the new Patents Act coming into force on the first of January next. According to this notice, no application will be accepted if dated prior to the first of January. The effect of this is simply that all inventors living abroad or in the country who from poverty or other cause cannot come to London will lose their priority of application, and may thus be deprived of their legal rights under the Act. This is done by a high-handed process, which has no justification whatever, either under the Act itself or the rules issued by the Board of Trade, and is altogether *ultrá vires* and illegal. What makes the matter of pressing importance

is that the issue of this unsigned notice has been delayed until the Law Courts have risen for vacation, which leaves no appeal except to the press. If this be the way in which the new Act will be worked, the poor inventor, at anyrate, will have but little cause of congratulation on the recent change in the law."

EXCHANGE COLUMN.

Wanted, a light portable half-plate camera, with double slides, in exchange for a 10 × 8 mahogany brass-bound Kinnear camera, cost £7.—Address, C. Arthur, Maryport.

ANSWERS TO CORRESPONDENTS.

☞ *Correspondents should never write on both sides of the paper.*

Wm. Berry (Chorley),—The Publisher will write privately to the photographer named.

J.B.—Evidently your previous letter miscarried; hence its remaining unanswered. Kindly repeat your query, and it shall receive immediate attention.

G. Barington.—With any good sample of transparent gelatine it is not at all necessary to clarify it with albumen. You can, however, if you like, take the trouble; it will certainly do no harm.

W. Taylor.—The lens, if it be of fairly good quality, should cover the whole-plate size with an aperture equal to $\frac{f}{15}$. But with a smaller stop it will, no doubt, cover a plate eleven by nine inches—possibly twelve by ten.

E. J. W.—If you employ gelatine plates of so large a size as thirty-two inches we strongly advise you to have plate glass, as we fear you may experience some difficulty in procuring sheet glass sufficiently flat to get an even coating with the emulsion.

W. G. George.—Yes; the wet collodion process is quite sensitive enough to enable you to produce life-sized enlargements by the aid of the lime light. The diameter of the condensers must depend upon the size of negatives you wish to enlarge from.

Wilts.—It certainly looks very much as if the mounts do contain something (probably hyposulphite of soda) that has caused the prints to fade so rapidly, seeing that the unmounted prints show no signs of fading, although produced under similar conditions.

A. S. W.—Such a long soaking will certainly not conduce to the permanence of the prints; on the contrary, it will tend to cause them to fade. The more rapidly the prints are washed—provided all the hyposulphite is removed—the better it will be for their permanency.

A. B. C.—Certainly, if the magic lantern be of good quality, as regards its condensers, and it is fitted with a photographic lens. With these, at the price you name, we imagine your lantern is not supplied. The light from a good paraffine lamp will be sufficient with plates of ordinary sensibility.

H. W. Bennett.—You must not expect to get a clear solution when you dissolve shellac in methylated spirit. There is always some sediment. Allow the solution to stand until the sediment subsides, and then pour off the bright portion. Stand the bottle in a warm situation; this will facilitate the subsidence.

A Poor Amateur.—Without seeing the lens we can, of course, pass no opinion on its merits. But it is clear, from the picture enclosed, either that you have not focussed it accurately, or, if you did, that the focussing-screen and dark slide are not in register. Perhaps, however, the optical and chemical foci of the lens are not coincident.

A. G. B.—1. Any working optician would supply you with the condensers, and a tinman in your neighbourhood will do the necessary fittings. You can scarcely expect such fine detail on paper as you can get on glass.—2. Yes; with its full aperture your lens will answer for negatives up to five inches by four, but for larger-sized negatives you had better employ one of longer focus.

X. asks:—"Is the length of focus of a single landscape lens the governing power of its width of angle? For instance: if at twelve inches' distance I get a certain width of angle on a half-plate, can I, by paying an optician, get a narrower-angle single lens with the same focal length? If not, what can be done in the way of narrowing the angle, by buying a doublet made for the special purpose, with the focal length of the combination twelve inches as before?"——In reply: It is the form of the lens and position of the stop, not the focal length, that determines the width of angle included as regards covering power; but a lens of twelve inches focus, that includes a definite angle on a half-plate, cannot be altered in any way whatever so as to include a greater angle without shortening its focus.

A Correspondent says:—"I have read with great interest your valuable articles on lenses, and hope they will be republished in book forms. But would you kindly give a little information on the following points:—1. The effect of varying the aperture of the stops of landscape single lenses, and of varying their distance from each lens without varying its size or focal length.—2. The merits of a landscape lens adapted to the size of the plate, irrespective of the curvature of lines, as compared with one of which only the central field of the lens is used.—3. Information about extremely narrow angle doublet lenses—their merits aud their focal lengths."——To this we reply:—1. The effect of employing a large stop in preference to a small one is to give greater vigour to the part focussed upon by its greater sharpness, a small stop giving greater definition, which is not necessarily an improvement in every instance.—2. If the centre of the lens alone be employed the lens is not then at its greatest advantage.—3. Speaking in general terms, the narrower the angle of the doublet the greater may be the aperture with which it can be worked.

Colonel.—1. In some of the early volumes of this Journal you will find articles on uranium printing by M. Niepce de St. Victor and Mr. C. J. Burnett, of Edinburgh.—2. Any of the retouching mediums sold for the purpose will answer.—3. It will be necessary to wax the plates before they are coated with the emulsion, when the films may be removed; but they will require to be made somewhat thicker by coating them with alternate layers of collodion and india-rubber—of course before they are removed from the glass.

*** With the present number we present the Title-page and Index to this year's volume.

Photographic Club.—At the next meeting of this Club, to be held January 2nd, 1884, at Anderton's Hotel, the adjourned discussion *On Double Printing and Masking* will take place. The address of the Hon. Secretary and Treasurer is now—Sunnycote, South Hill Park, Hampstead, N.W.

South London Photographic Society.—The annual lantern meeting of this Society will be held on Thursday next, January 3rd, 1884, at seven o'clock. In order to avoid the inconvenience that has arisen on previous occasions from the late delivery of slides, and also to allow time for the satisfactory arrangement of the exhibits, all pictures intended for exhibition must be delivered at the House of the Society of Arts, John Street, Adelphi, W.C., not later than four o'clock on the day of the meeting, after which hour they cannot be received.

Obituary.—With feelings of regret we record the death, on Wednesday, the 12th inst., of Mr. Alfred G. Pettitt, the well-known Lakes District photographer, and eldest son of the late Mr. Alfred Pettitt, artist, of Keswick. Mr. Pettitt was a member of the Photographic Society of Great Britain, and for the last few years his name has been brought repeatedly before the public at different photographic competitions, where his exhibits have been distinguished either with prize medals, honourable mention, or high commendation in every instance. Mr. Pettitt was one of our youngest photographic artists, being only 27, and was well and deservedly respected and esteemed, his particularly genial disposition and high principle having endeared him to an unusually large circle of friends, amongst whom his early death will long be deplored. He died from tubercular phthisis brought on by cold less than two years ago. During last summer he was much better and felt quite able to go through the district with his cameras, doing a good deal of work, the last being for Professor Ruskin, at Coniston, early in October. He became confined to his bed eight weeks ago, and from that day he knew that life could only be a matter of a few weeks or days. He was proprietor of the Art Gallery and Portrait Studio, at Keswick, so that his name was well known to all visitors at Lakeland in connection with these establishments, as well as for his photographs of the district. Many of the mountain climbers will miss the enterprising photographer who, until his illness two years ago, thought nothing of camping out for a few nights and days on England's highest mountains, so as to get them, and the views from them. His patience and endurance was rewarded by singular pictorial success. The remains of the deceased were interred at St. John's Church, Keswick.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 1......	Sheffield	Freemasons' Hall, Surrey-street.
,, 1......	Halifax	*Courier* Office, Regent-street.
,, 1......	Bolton Club	The Studio, Chancery-lane.
,, 1......	Glossop Dale	Glossop Coffee Palace, High-street.
,, 2......	Benevolent	181, Aldersgate-street.
,, 2......	Edinburgh	Hall, 5, St. Andrew-square.
,, 2......	North Staffordshire	Town Hall, Hanley.
,, 2......	Photographic Club	Anderton's Hotel, Fleet-street.
,, 3......	London and Provincial	Masons' Hall, Basinghall-street.
,, 3......	South London	Society of Arts, John-st., Adelphi.
,, 3......	Bolton	The Baths.
,, 3......	Leeds	Philosophical Hall.
,, 3......	Glasgow	177, Buchanan-street.
,, 3......	Dundee	Lamb's Hotel, Reform-street.
,, 3......	Coventry	Coventry Dispensary.
,, 3......	Yorkshire College	College, Cookridge-street.

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ESTABLISHED 1854.] THE [PUBLISHED WEEKLY.

British Journal of Photography.

THE ORGAN OF THE FOLLOWING SIX SOCIETIES:—
LIVERPOOL, MANCHESTER, EDINBURGH, GLASGOW, LEEDS, AND SHEFFIELD.

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24 ,, 19	5/-	48/-	12/-	100/-
22 ,, 15	4/-	30/-	8/-	60/-
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Cream Bristol Fronts, White Enamel Backs, Printed with Ornamental Design, in Grey, Pink, or Blue.

C.-D.-V.'s, 5-sheet, 12/- per 1,000 | Cabinets, 6-sheet .. 40/- per 1,000

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4¼ × 3¼	6½ × 4¼	8½ × 6½	POLISHED.
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READY SENSITIZED.

NO CRACKING. NO BLISTERING.

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ENLARGED NEGATIVES to any size. Opals, 12 by 10, 5/- Collodion Transfers, 12½ by 10½, 1/3 each. Painting do., from 5/-

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The "Soho" Albumenized Paper, a new brand, per Ream, £6 5/-. **Ditto,** best quality, 13/6 per Quire; Half-Quire, 7/-
Marion's Ready Sensitized Albumenized Paper (Thick), 11/6 per Quire; 6/- per Half-Quire, free per post.
Cheap Cameras, for Dry Plate work; for the Studio or the Field. Square, with two double backs, Bellows Body, Screw Adjustment, Sliding Front, $4\frac{1}{4}$ by $3\frac{1}{4}$, 35/-; $6\frac{1}{2}$ by $4\frac{3}{4}$, 47/-; $8\frac{1}{2}$ by $6\frac{1}{2}$, 63/-. **Marion & Co.'s Cabinet Lens** (guaranteed), £12 10/-.
Cheap Cameras, for Dry Plate Work, Double Swing, Bellows Body, Screw Adjustment—not square. 10 by 8, 105/-; 12 by 10, 125/-.
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Marion & Co's Promenade Lens (guaranteed), £12 10/- **Chloride of Gold,** in 15-grain Tubes, 19/- per dozen.
Marion & Co.'s Cheap C.-D.-V. and Cabinet Lens, 65/-. **Nitrate of Silver,** 3/1 per ounce.
Hyposulphite of Soda, in 1 cwt. Kegs, 10/-; 28 lbs., 3/6; 14 lbs., 2/-.
Collodions.—Pints—Mawson's, 6/1; Thomas's, 6/4; Huggon's, 5/10; the Soho Portrait, 7/-; The Soho Copying 7/-. Winchesters—Mawson's, 5 pints, 22/11; Thomas's, 4 pints, 23/-; Huggon's, 22/6. **Acetate Soda,** 9d. per lb., bottle included.
Acid, Glacial Acetic, solid at 50°, sold in 1 lb. bottles. Price, including bottle, 1/6; Winchester, 6 lbs., bottle included, 7/4.
Bromide Potassium, 2/2 per lb., bottle included. **Acid, Pyrogallic,** Schering's best, in 1 oz. bottles, 1/5.
Acid, Pyrogallic, Schering's best, in tins of 16 oz., 1/3 per oz. (not sold in smaller quantities than 16 ounces).
Acid, Citric, 2/10 per lb., bottle included. **Acid, Nitric,** (1·420), 11d. per lb.; Winchester, 5/-: bottles included.
Spirit, Methylated, in Gallon Jars; price, including Jar, 4/5. **Oxalate Ferrous,** 2/- per lb., bottle included.
Ammonia Liquid (·880), Pints, bottle included, 11d.; Winchesters, $4\frac{1}{4}$ lbs., bottle included, 3/4. **Potash Oxalate,** 1/4 per lb.
Ammonium Bromide, 2/6 per lb., bottle included; per oz., 3d. **Cyanide Potassium,** Cake, 1/6; Stick, $1/8\frac{1}{2}$; bottles included.
The Soho Matt Varnish, for Retouching, 1/4 per bottle. **Protosulphate Iron,** $1\frac{1}{2}$d. per lb.
Britannia Dry Plates, Extra Rapid, not less than a £1 parcel. *Nett Prices*—$4\frac{1}{4}$ by $3\frac{1}{4}$, $1/4\frac{1}{2}$; 5 by 4, 2/1; $6\frac{3}{4}$ by $3\frac{1}{4}$, 3/-; $6\frac{1}{2}$ by $4\frac{1}{4}$, 3/2 $6\frac{1}{2}$ by $4\frac{3}{4}$, 3/3; $7\frac{1}{4}$ by $4\frac{1}{2}$, 4/-; 7 by 5, 4/9; $7\frac{1}{2}$ by 5, 4/9; 8 by 5, 5/4; $8\frac{1}{2}$ by $6\frac{1}{2}$, 5/9; 9 by 7, 7/3; 10 by 8, 10/-; 12 by 10, 14/6; 13 by 8, Panel, 14/6; 15 by 12, 25/6. **Cadett's Mattline**—a powerful medium for Retouching—1/6 per bottle.
Britannia Solution, for Developing Britannia Dry Plates, 5/-. **Ruby Candle Lamps,** 1/10 each.
Papier Mache Trays, for developing Dry Plates—for $\frac{1}{4}$, $9\frac{1}{2}$d.; 5 by 4, 1/-; $\frac{1}{2}$, 1/5; $7\frac{1}{2}$ by 5, 1/9; 8 by 5, 1/11; 1-1, 1/11; 9 by 7, 2/-; 10 by 8, 2/1; 12 by 10, 2/10. **Mahogany Plate Racks,** Quarter and Half-plate, 24 grooves, 1/6; 1-1 plate, 24 grooves, 2/6.
Zinc Tanks for washing Dry Plates, with Syphon, $\frac{1}{4}$, with 24 grooves, 5/3; $\frac{1}{4}$, with 50 grooves, 7/2; 5 by 4, with 24 grooves, 5/7; 5 by 4, with 50 grooves, 6/10; $\frac{1}{2}$, with 24 grooves, 5/10; $\frac{1}{2}$, with 50 grooves, 7/10; $7\frac{1}{4}$ by $4\frac{1}{2}$, with 24 grooves, 6/2; 1-1, with 24 grooves, 6/6; 1-1, with 50 grooves, 8/6; 9 by 7, with 24 grooves, 7/2; 9 by 7, with 50 grooves, 9/1; 10 by 8, with 12 grooves, 5/10; 10 by 8, with 24 gooves, 7/6; 12 ly 10, with 12 grooves, 6/6; 12 by 10, with 24 grooves, 9/1; 15 by 12, with 12 grooves, 8/9. Without Syphon, 8d. each less. **Pot Opal, hand smoothed,** Half-plate, 3/3; 1-1, 6/-; 10 by 8, 8/6; 12 by 10, 12/6; 15 by 12, 18/- per dozen.
Superior Oak Printing Frames, Quarter-plate, 4/-; 5 by 4, 5/-; Half-plate, 7/6; Half-plate oblong, 8/6; $7\frac{1}{4}$ by $4\frac{1}{2}$, 9/-; 1-1 plate, 12/6; 1-1 plate, oblong, 14/-; 10 by 8, 16/; 12 by 10, 20/- per dozen.
The Paris Mount, Mat Enamel, Straw colour, printed both sides, no charge for composition. Prices for 2,500, 29/6; for 5,000, 50/-; for 10,000, 97/-; for 25,000, 230/-; Round Corners, 6d. 1,000 extra.
The Paris Mount, for Cabinets, printed on one side only, for 500, 17/6; 1,000, 29/-; 2,000, 56/-; 3,000, 82/-; 5,000, 125/-; 10,000, 240/-.
The Paris Mount, for Cabinets, printed on both sides, for 500, 22/-; 1,000, 34/-; 2,000, 65/; 3,000, 94/-; 5,000, 143/-; 10,000, 275/-.
Olive Green Real Gold Bevil Mounts, 8-sheet, for Carte-de-Visite, unprinted, 40/- per 1,000.
Do do. do. do. for Cabinets, unprinted, 80/- per 1,000; 8/9 per 100.
CHEAP MOUNTING BOARDS, Pale Green, 10 by 8, with Red Line for half-plates, and name and address, 8/6 per gross; 15 by $10\frac{1}{2}$, with Red Line for whole-plates, and name and address, 15/- per gross; 20 by $14\frac{3}{4}$, with Red Line for 12 by 10 and 10 by 8, with name and address, 23/- per gross.
Ditto, price without line and name and address, 10 by 8, 6/-; 15 by $10\frac{1}{2}$, 12/-; 20 by $14\frac{3}{4}$, 20/- per gross.
CHEAP Cream and White MOUNTING BOARDS, FOR VIEWS, &c.—$12\frac{3}{4}$ by $9\frac{1}{4}$, 6/6; $14\frac{3}{4}$ by $10\frac{1}{2}$, 10/3; $16\frac{1}{2}$ by 13, 19/-; 20 by $14\frac{3}{4}$, 26/6 per gross. **Ditto,** with India Tint, $12\frac{3}{4}$ by $9\frac{1}{4}$, 11/3; $14\frac{3}{4}$ by $10\frac{1}{2}$, 15/-; $16\frac{1}{2}$ by 13, 26/-; 20 by $14\frac{3}{4}$, 34/6.
Large Boards, for Rough Mounting, &c.—$24\frac{1}{2}$ by $19\frac{1}{2}$, 8-sheet, 3/1; 10-sheet, 3/7; 12-sheet, 4/6; $29\frac{1}{2}$ by $21\frac{1}{4}$, 8-sheet, 4/7; 10-sheet, 6/- 12-sheet, 8/- per dozen. **Birthday Cards,** for Gems or Victorias, 8/- per gross.
Albums. The K.C., sold retail at 21/-. The Alexandra, sold retail at 21/-. Pages decorated with original coloured designs. The two best Guinea Albums in the market. **Ferro. Cards,** for Gems or Victorias, Enamelled in white, rose, or blue, 8/- per 1,000.
Book Post Wrappers, solid and well made, name and address printed in black or red, C.-D.-V., 16/6 per 1,000; Cabinet, 24/6; reduction by five thousand and upwards. **Ditto,** three-fold, with tape, superior make, C.-D.-V., 25/-; Cabinet, 40/8; Promenade, 42/- per 1,000.
Victoria Enamel Glass Passe-Partout, for Ferrotypes—Victoria size, 20/- per gross.
Cowan's Plate Holders, for Dry Plate work, save the fingers from all stain—3/- for six assorted sizes.
New Vignetting Frame, in Oak, with three sizes of wood Vignettes to each frame. Specialite: *softness of Vignette.* Quarter, 30/-; for two C.-D.-V.'s on a plate, 55/-; Half, 46/-; and whole Plate, 60/- per dozen.
Christmas Film Negatives, to print a handsome Border; designed specially for Christmas time, C.-D.-V., 1/6; Cabinet, 3/- each.
Christmas Cards, with openings for Gem or Victoria Photos., 8/- per gross.
Star Burner, for Heating or Lighting, with six feet gas tubing, 5/-.
Job Mounts, cream and white, plain both sides, for C.-D.-V., 4/- per 1,000.
Job Mounts, Enamelled straw, C.-D.-V., 6/-, and Cabinet, 20/- per 1,000.
Job Velvet Frames, for Ferrotypes, Heartsease pattern, 8/- per gross.
Job—Warwick Brook's Apparatus, for waxing photos, original price, 84/-; reduced to 30/-. Fine White Wax, 4d. per Cake.
Wax Negatives, "In Memoriam," Cabinets, 3/-; Imperials, 5/- each.

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